### Syllabus

#### Theory

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<td>Mrs.R.Sujatha</td>
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<td>Mr.S.Balamurugan</td>
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#### Practical

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| Total  | 26          |

**IT2301 JAVA PROGRAMMING**

#### UNIT I


#### UNIT II


#### UNIT III


#### UNIT IV


#### UNIT V


**TOTAL:45 PERIODS**

### TEXT BOOK

REFERENCES

MG2452 ENGINEERING ECONOMICS AND FINANCIAL ACCOUNTING

UNIT I  INTRODUCTION  5
Managerial Economics - Relationship with other disciplines - Firms: Types, objectives and goals - Managerial decisions - Decision analysis.

UNIT II  DEMAND & SUPPLY ANALYSIS  10
Demand - Types of demand - Determinants of demand - Demand function – Demand elasticity - Demand forecasting - Supply - Determinants of supply - Supply function - Supply elasticity.

UNIT III  PRODUCTION AND COST ANALYSIS  10

UNIT IV  PRICING  5
Determinants of Price - Pricing under different objectives and different market structures - Price discrimination - Pricing methods in practice.

UNIT V  FINANCIAL ACCOUNTING (ELEMENTARY TREATMENT)  10
Balance sheet and related concepts - Profit & Loss Statement and related concepts - Financial Ratio Analysis - Cash flow analysis - Funds flow analysis – Comparative financial statements - Analysis & Interpretation of financial statements.

UNIT VI  CAPITAL BUDGETING. (ELEMENTARY TREATMENT)  5
Investments - Risks and return evaluation of investment decision - Average rate of return - Payback Period - Net Present Value - Internal rate of return.

TOTAL: 45 PERIODS

TEXT BOOKS:
CS2304  SYSTEM SOFTWARE

UNIT I   INTRODUCTION  8
System software and machine architecture – The Simplified Instructional Computer (SIC) - Machine
architecture - Data and instruction formats - addressing modes - instruction sets - I/O and programming.

UNIT II  ASSEMBLERS  10
Basic assembler functions - A simple SIC assembler – Assembler algorithm and data structures - Machine
dependent assembler features - Instruction formats and addressing modes – Program relocation - Machine
independent assembler features - Literals – Symbol-defining statements – Expressions - One pass assemblers
and Multi pass assemblers - Implementation example - MASM assembler.

UNIT III  LOADERS AND LINKERS  9
Basic loader functions - Design of an Absolute Loader – A Simple Bootstrap Loader - Machine dependent
loader features - Relocation – Program Linking – Algorithm and Data Structures for Linking Loader - Machine-
independent loader features – Automatic Library Search – Loader Options - Loader design options - Linkage

UNIT IV  MACRO PROCESSORS  9
Basic macro processor functions - Macro Definition and Expansion – Macro Processor Algorithm and data
structures - Machine-independent macro processor features - Concatenation of Macro Parameters – Generation
of Unique Labels – Conditional Macro Expansion – Keyword Macro Parameters-Macro within Macro-
Implementation example - MASM Macro Processor – ANSI C Macro language.

UNIT V  SYSTEM SOFTWARE TOOLS  9
Text editors - Overview of the Editing Process - User Interface – Editor Structure. - Interactive debugging
systems - Debugging functions and capabilities – Relationship with other parts of the system – User-Interface
Criteria.

TEXT BOOK
Education Asia, 2000.

REFERENCES
Hill, 1999.

CS2302  COMPUTER NETWORKS
UNIT I  9
Network architecture – layers – Physical links – Channel access on links – Hybrid multiple access techniques -
Issues in the data link layer - Framing – Error correction and detection – Link-level Flow Control

UNIT II  9
Medium access – CSMA – Ethernet – Token ring – FDDI - Wireless LAN – Bridges and Switches

UNIT III  9
Lpv6 – Multicasting – Congestion avoidance in network layer
UNIT IV

UNIT V

TEXT BOOK:

REFERENCES:

CS2403 DIGITAL SIGNAL PROCESSING

UNIT I SIGNALS AND SYSTEMS

UNIT II FREQUENCY TRANSFORMATIONS

UNIT III IIR FILTER DESIGN
Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (HPF, BPF, BRF) filter design using frequency translation

UNIT IV FIR FILTER DESIGN
Structures of FIR – Linear phase FIR filter – Filter design using windowing techniques, Frequency sampling techniques – Finite word length effects in digital Filters

UNIT V APPLICATIONS

TEXT BOOKS:
REFERENCES:

IT2302 INFORMATION THEORY AND CODING

UNIT I INFORMATION THEORY

UNIT II SOURCE CODING: TEXT, AUDIO AND SPEECH
Text: Adaptive Huffman Coding, Arithmetic Coding, LZW algorithm – Audio: Perceptual coding, Masking techniques, Psychoacoustic model, MEG Audio layers I,II,III, Dolby AC3 - Speech: Channel Vocoder, Linear Predictive Coding

UNIT III SOURCE CODING: IMAGE AND VIDEO

UNIT IV ERROR CONTROL CODING: BLOCK CODES
Definitions and Principles: Hamming weight, Hamming distance, Minimum distance decoding - Single parity codes, Hamming codes, Repetition codes - Linear block codes, Cyclic codes - Syndrome calculation, Encoder and decoder – CRC

UNIT V ERROR CONTROL CODING: CONVOLUTIONAL CODES
Convolutional codes – code tree, trellis, state diagram - Encoding – Decoding: Sequential search and Viterbi algorithm – Principle of Turbo coding

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

CS2308 SYSTEM SOFTWARE LABORATORY
(Using C)
1. Implement a symbol table with functions to create, insert, modify, search, and display.
2. Implement pass one of a two pass assembler.
3. Implement pass two of a two pass assembler.
4. Implement a single pass assembler.
5. Implement a two pass macro processor
6. Implement a single pass macro processor.
7. Implement an absolute loader.
8. Implement a relocating loader.
9. Implement pass one of a direct-linking loader.
10. Implement pass two of a direct-linking loader.
11. Implement a simple text editor with features like insertion / deletion of a character, word, and sentence.
12. Implement a symbol table with suitable hashing
(For loader exercises, output the snap shot of the main memory as it would be, after the loading has taken place)

TOTAL: 45 PERIODS

IT2305 JAVA PROGRAMMING LABORATORY

1. Develop a Java package with simple Stack and Queue classes. Use JavaDoc comments for documentation.
2. Design a class for Complex numbers in Java. In addition to methods for basic operations on complex numbers, provide a method to return the number of active objects created.
3. Design a Date class similar to the one provided in the java.util package.
4. Develop with suitable hierarchy, classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism.
5. Design a Java interface for ADT Stack. Develop two different classes that implement this interface, one using array and the other using linked-list. Provide necessary exception handling in both the implementations.
6. Write a Java program to read a file that contains DNA sequences of arbitrary length one per line (note that each DNA sequence is just a String). Your program should sort the sequences in descending order with respect to the number of 'TATA' subsequences present. Finally write the sequences in sorted order into another file.
7. Develop a simple paint-like program that can draw basic graphical primitives in different dimensions and colors. Use appropriate menu and buttons.
8. Develop a scientific calculator using even-driven programming paradigm of Java.
9. Develop a template for linked-list class along with its methods in Java.
10. Design a thread-safe implementation of Queue class. Write a multi-threaded producer-consumer application that uses this Queue class.
11. Write a multi-threaded Java program to print all numbers below 100,000 that are both prime and fibonacci number (some examples are 2, 3, 5, 13, etc.). Design a thread that generates prime numbers below 100,000 and writes them into a pipe. Design another thread that generates fibonacci numbers and writes them to another pipe. The main thread should read both the pipes to identify numbers common to both.
12. Develop a multi-threaded GUI application of your choice.

TOTAL: 45 PERIODS

GE2321 COMMUNICATION SKILLS LABORATORY

A. ENGLISH LANGUAGE LAB (18 Periods)
UNIT I LISTENING COMPREHENSION: (6)
Listening and typing – Listening and sequencing of sentences – Filling in the blanks - Listening and answering questions.

UNIT II READING COMPREHENSION: (6)
Filling in the blanks - Close exercises – Vocabulary building - Reading and answering questions.

UNIT III SPEAKING: (6)
Conversations: Face to Face Conversation – Telephone conversation – Role play activities (Students take on roles and engage in conversation)
B. DISCUSSION OF AUDIO-VISUAL MATERIALS (6 PERIODS)
(Samples are available to learn and practice)

UNIT I RESUME / REPORT PREPARATION / LETTER WRITING (1)
Structuring the resume / report - Letter writing / Email Communication - Samples.

UNIT II PRESENTATION SKILLS: (1)
Elements of effective presentation – Structure of presentation - Presentation tools – Voice Modulation – Audience analysis - Body language – Video samples

UNIT III SOFT SKILLS: (2)
Time management – Articulateness – Assertiveness – Psychometrics – Innovation and Creativity - Stress Management & Poise - Video Samples

UNIT IV GROUP DISCUSSION: (1)
Why is GD part of selection process? - Structure of GD – Moderator – led and other GDs - Strategies in GD – Team work - Body Language - Mock GD -Video samples

UNIT V INTERVIEW SKILLS: (1)
Kinds of interviews – Required Key Skills – Corporate culture – Mock interviews-Video samples.

I. PC based session (Weightage 40%) 24 periods
1. Resume / Report Preparation / Letter writing: Students prepare their (2) own resume and report.
2. Presentation Skills: Students make presentations on given topics. (8)
3. Group Discussion: Students participate in group discussions. (6)
4. Interview Skills: Students participate in Mock Interviews (8)

REFERENCES:

LAB REQUIREMENTS:
1. Teacher console and systems for students.
2. English Language Lab Software
3. Career Lab Software

L: 45, T: 15, TOTAL= 60 PERIODS
SUBJECT NAME: JAVA PROGRAMMING  
SUBJECT CODE: IT2301  
UNIT-I  
PART-A (1 MARK)  

1. The address of a variable temp of type float is  
   (A) *temp (B) &temp (C) float& temp (D) float temp&  
   
2. The process of building new classes from existing one is called  
   (A) Polymorphism (B) Structure (C) Inheritance (D) Cascading  
   
3. Usually a pure virtual function  
   (A) has complete function body. (B) will never be called.  
   (C) will be called only to delete an object. (D) is defined only in derived class.  
   
4. RunTime Polymorphism is achieved by  
   (A) friend function (B) virtual function (C) operator overloading (D) function overloading  
   
5. A function call mechanism that passes arguments to a function by passing a copy of the values of the arguments is  
   (A) call by name (B) call by value (C) call by reference (D) call by value result  
   
6. Use of virtual functions implies  
   (A) overloading. (B) overriding. (C) static binding. (D) dynamic binding.  
   
7. It is possible to declare as a friend  
   (A) a member function (B) a global function (C) a class (D) all of the above  
   
8. Exception handling is targeted at  
   (A) Run-time error (B) Compile time error (C) Logical error (D) All of the above.  
   
9. How many constructors can a class have? (A) 0 (B) 1 (C) 2 (D) any number  
   
10. An exception is caused by  
    (A) a hardware problem (B) a problem in the operating system  
    (C) a syntax error (D) a run-time error  
   
11. RunTime polymorphism is achieved by  
    (A) friend function (B) virtual function (C) operator overloading (D) function overloading  
   
12. Which of the following is not the characteristic of constructor.  
    (A) They should be declared in the public section.  
    (B) They do not have return type. (C) They can not be inherited. (D) They can be virtual.  
   
13. A class defined within another class is:  
    (A) Nested class (B) Inheritance (C) Containership (D) Encapsulation  
   
14. An exception is caused by  
    (A) a runtime error. (B) a syntax error.  
    (C) a problem in the operating system. (D) a hardware problem.  
   
15. A white space is:  
    (A) blank space (B) new line (C) tab (D) all of the above  
   
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PART- B (2 MARKS)

16. How could Java classes direct program messages to the system console, but error messages, say to a file?
   The class System has a variable out that represents the standard output, and the variable err that represents the standard error device. By default, they both point at the system console. This how the standard output could be re-directed: `Stream st = new Stream(new FileOutputStream("output.txt")); System.setErr(st); System.setOut(st);`

17. What is meant by Object Oriented Programming?
   OOP is a method of programming in which programs are organised as cooperative collections of objects. Each object is an instance of a class and each class belong to a hierarchy.

18. What is a Class?
   Class is a template for a set of objects that share a common structure and a common behaviour.

19. What is an Object?
   Object is an instance of a class. It has state, behaviour and identity. It is also called as an instance of a class.

20. What is an Instance?
   An instance has state, behaviour and identity. The structure and behaviour of similar classes are defined in their common class. An instance is also called as an object.

21. What are the core OOP’s concepts?
   Abstraction, Encapsulation, Inheritance and Polymorphism are the core OOP’s concepts.

22. What is meant by abstraction?
   Abstraction defines the essential characteristics of an object that distinguish it from all other kinds of objects. Abstraction provides crisply-defined conceptual boundaries relative to the perspective of the viewer. Its the process of focussing on the essential characteristics of an object. Abstraction is one of the fundamental elements of the object model.

23. What is meant by Encapsulation?
   Encapsulation is the process of compartmentalising the elements of an abtraction that defines the structure and behaviour. Encapsulation helps to separate the contractual interface of an abstraction and implementation.

24. What are Encapsulation, Inheritance and Polymorphism?
   Encapsulation is the mechanism that binds together code and data it manipulates and keeps both safe from outside interference and misuse. Inheritance is the process by which one object acquires the properties of another object. Polymorphism is the feature that allows one interface to be used for general class actions.

25. What are methods and how are they defined?
   Methods are functions that operate on instances of classes in which they are defined. Objects can communicate with each other using methods and can call methods in other classes. Method definition has four parts. They are name of the method, type of object or primitive type the method returns, a list of parameters and the body of the method. A method’s signature is a combination of the first three parts mentioned above.

26. What are different types of access modifiers (Access specifiers)?
   Access specifiers are keywords that determine the type of access to the member of a class. These keywords are for allowing privileges to parts of a program such as functions and variables. These are:
   - `public`: Any thing declared as public can be accessed from anywhere.
**private:** Any thing declared as private can’t be seen outside of its class.

**protected:** Any thing declared as protected can be accessed by classes in the same package and subclasses in the other packages.

**default modifier:** Can be accessed only to classes in the same package.

27. **What is an Object and how do you allocate memory to it?**
    Object is an instance of a class and it is a software unit that combines a structured set of data with a set of operations for inspecting and manipulating that data. When an object is created using new operator, memory is allocated to it.

28. **Explain the usage of Java packages.**
    This is a way to organize files when a project consists of multiple modules. It also helps resolve naming conflicts when different packages have classes with the same names. Packages access level also allows you to protect data from being used by the non-authorized classes.

29. **What is method overloading and method overriding?**
    Method overloading: When a method in a class having the same method name with different arguments is said to be method overloading. Method overriding: When a method in a class having the same method name with same arguments is said to be method overriding.

30. **What gives java it’s “write once and run anywhere” nature?**
    All Java programs are compiled into class files that contain bytecodes. These byte codes can be run in any platform and hence java is said to be platform independent.

31. **What is a constructor? What is a destructor?**
    Constructor is an operation that creates an object and/or initialises its state. Destructor is an operation that frees the state of an object and/or destroys the object itself. In Java, there is no concept of destructors. Its taken care by the JVM.

32. **What is the difference between constructor and method?**
    Constructor will be automatically invoked when an object is created whereas method has to be called explicitly.

33. **What is Static member classes?**
    A static member class is a static member of a class. Like any other static method, a static member class has access to all static methods of the parent, or top-level, class.

34. **What is Garbage Collection and how to call it explicitly?**
    When an object is no longer referred to by any variable, java automatically reclaims memory used by that object. This is known as garbage collection. System. gc() method may be used to call it explicitly.

35. **In Java, How to make an object completely encapsulated?**
    All the instance variables should be declared as private and public getter and setter methods should be provided for accessing the instance variables.

36. **What is static variable and static method?**
    static variable is a class variable which value remains constant for the entire class static method is the one which can be called with the class itself and can hold only the static variables.

37. **What is finalize() method?**
    finalize () method is used just before an object is destroyed and can be called just prior to garbage collection.

38. **What is the difference between String and String Buffer?**
    a) String objects are constants and immutable whereas StringBuffer objects are not.
    b) String class supports constant strings whereas StringBuffer class supports growable and modifiable strings.
39. **What is the difference between Array and vector?**
   Array is a set of related data type and static whereas vector is a growable array of objects and dynamic.

40. **What is a package?**
   A package is a collection of classes and interfaces that provides a high-level layer of access protection and name space management.

41. **What is the difference between this() and super()?**
   this() can be used to invoke a constructor of the same class whereas super() can be used to invoke a super class constructor.

42. **Explain working of Java Virtual Machine (JVM)?**
   JVM is an abstract computing machine like any other real computing machine which first converts .java file into .class file by using Compiler (.class is nothing but byte code file.) and Interpreter reads byte codes.

43. **What's the difference between an interface and an abstract class?**
   An abstract class may contain code in method bodies, which is not allowed in an interface. With abstract classes, you have to inherit your class from it and Java does not allow multiple inheritance. On the other hand, you can implement multiple interfaces in your class.

44. **Why would you use a synchronized block vs. synchronized method?**
   Synchronized blocks place locks for shorter periods than synchronized methods.

45. **Explain the usage of the keyword transient?**
   This keyword indicates that the value of this member variable does not have to be serialized with the object. When the class will be de-serialized, this variable will be initialized with a default value of its data type (i.e. zero for integers).

46. **How can you force garbage collection?**
   We can't force Garbage Collection, but could request it by calling System.gc(). JVM does not guarantee that Garbage Collection will be started immediately.

47. **How do you know if an explicit object casting is needed?**
   If we assign a superclass object to a variable of a subclass's data type, you need to do explicit casting. For example: Object a; Customer b; b = (Customer) a; When you assign a subclass to a variable having a superclass type, the casting is performed automatically.

48. **What's the difference between the methods sleep() and wait()?**
   The code sleep(1000); puts thread aside for exactly one second. The code wait(1000), causes a wait of up to one second. A thread could stop waiting earlier if it receives the notify() or notifyAll() call. The method wait() is defined in the class Object and the method sleep() is defined in the class Thread.

49. **Can you write a Java class that could be used both as an applet as well as an application?**
   Yes. Add a main() method to the applet.

50. **What's the difference between constructors and other methods?**
   Constructors must have the same name as the class and can not return a value. They are only called once while regular methods could be called many times.

51. **you call one constructor from another if a class has multiple constructors**
   Yes. Use this() syntax.

52. **Explain the usage of Java packages.**
   This is a way to organize files when a project consists of multiple modules. It also helps resolve naming conflicts when different packages have classes with the same names.
Packages access level also allows you to protect data from being used by the non-authorized
classes.

53. **If a class is located in a package, what do you need to change in the OS environment to be able to use it?**

   We need to add a directory or a jar file that contains the package directories to the CLASSPATH environment variable. Let's say a class Employee belongs to a package com.xyz.hr; and is located in the file c:\dev\com\xyz\hr\Employee.java. In this case, you'd need to add c:\dev to the variable CLASSPATH. If this class contains the method main(), you could test it from a command prompt window as follows: c:\java com.xyz.hr.Employee

54. **What's the difference between J2SDK 1.5 and J2SDK 5.0?**

   There's no difference, Sun Microsystems just re-branded this version.

55. **What would you use to compare two String variables - the operator == or the method equals()?**

   We use the method equals() to compare the values of the Strings and the == to check if two variables point at the same instance of a String object.

56. **Does it matter in what order catch statements for FileNotFoundException and IOException are written?**

   Yes, it does. The FileNotFoundException is inherited from the IOException. Exception's subclasses have to be caught first.

57. **Can an inner class declared inside of a method access local variables of this method?**

   It's possible if these variables are final.

58. **What can go wrong if you replace && with & in the following code: String a=null; if (a!=null && a.length()>10) {...}**

   A single ampersand here would lead to a NullPointerException.

59. **What's the main difference between a Vector and an ArrayList**

   Java Vector class is internally synchronized and ArrayList is not.

60. **When should the method invokeLater() be used?**

   This method is used to ensure that Swing components are updated through the event-dispatching thread.

61. **How can a subclass call a method or a constructor defined in a superclass?**

   Use the following syntax: super.myMethod(); To call a constructor of the superclass, just write super(); in the first line of the subclass's constructor For senior-level developers:

62. **Give the properties of abstract classes and methods and write a suitable example. (APR/MAY 2011)**

   To declare a class abstract, you simply use the abstract keyword in front of the class keyword at the beginning of the class declaration. There can be no objects of an abstract class. That is, an abstract class cannot be directly instantiated with the new operator.

   ```java
   abstract class A {
       abstract void callme();
       void callmetoo() {
           System.out.println("This is a concrete method."); }
   }
   class B extends A {
       void callme() {
           System.out.println("B's implementation of callme."); }
   }
   class AbstractDemo {
       public static void main(String args[]) {
       }
   ```
63. Why does Java not support destructors and how does the finalize method help in garbage collection? (APR/MAY 2011)

The garbage collector runs periodically, checking for objects that are no longer referenced by any running state or indirectly through other referenced objects. Right before an asset is freed, the java run time calls the finalize() method on the object.

The finalize() method has this general form:
```java
protected void finalize()
{
    // finalization code here
}
```

Here, the keyword protected is a specifier that prevents access to finalize() by code defined outside its class.

64. What is the difference between static and non-static variables?(NOV/DEC 2010)

<table>
<thead>
<tr>
<th>S.NO</th>
<th>Static variable</th>
<th>Non Static variable:</th>
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<tbody>
<tr>
<td>1.</td>
<td>Memory allocated before creation of object.</td>
<td>Every time the class is instantiated, the object has their own copy of these variables.</td>
</tr>
<tr>
<td>2.</td>
<td>static variables are class variables and the values remains same for the whole class and its value is same for all classes in a program.</td>
<td>Non static value is called by creating an object.</td>
</tr>
<tr>
<td>3.</td>
<td>Static variables value is automatically show(there is no need to create an object.)</td>
<td>Non-Static Variables are loading only when an object is creating for the particular class</td>
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</tbody>
</table>

65. What is the purpose of finalization? (NOV/DEC 2010)

The purpose of finalization is to give an unreachable object the opportunity to perform any cleanup processing before the object is garbage collected.

66. Define Encapsulation. (NOV/DEC 2011)

Java encapsulation is a programming concept that a language should support in order to object's state from its behavior. This is typically facilitated by means of hiding an object's data representing its state from modification by external components.

67. What is an abstract class? (NOV/DEC 2011)

An abstract class is a class that is declared by using the abstract keyword. It may or may not have abstract methods. Abstract classes cannot be instantiated, but they can be extended into sub-classes.

68. What is meant by abstract base class? (NOV/DEC 2012)

A class that does not include an implementation and therefore cannot be directly used. It is used to derive other classes; the derived classes implement the methods.

69. Mention some of the separator in java programming? (NOV/DEC 2012)

( ) Contain a list of parameters in method definition & invocation.
{ } Contain the value of automatically initialized arrays.
[ ] Declare array types.
; Terminate statements.
. Separate package name from sub packages.

70. What are the OOP Principles?

The four major principles of OOPs are:
• Encapsulation
• Data Abstraction
• Polymorphism
• Inheritance.

71. What is Polymorphism?
Polymorphism – means the ability of a single variable of a given type to be used to reference objects of different types, and automatically call the method that is specific to the type of object the variable references.

72. What is Inheritance?
Inheritance – is the inclusion of behavior (i.e. methods) and state (i.e. variables) of a base class in a derived class so that they are accessible in that derived class.

There are two types of inheritances:
  • Implementation inheritance (class inheritance):
  • Interface inheritance (type inheritance):

73. What are the features of Java Language?
1) Simple, Small and familiar
2) Object oriented
3) Distributed
4) Robust
5) Secure
6) Platform independent
7) Portable
8) Compiled and Interpreted
9) High performance
10) MultiThreading and interactive
11) Dynamic and extensible

74. What is the need for Java Language?
Java is a programming language and computing platform first released by Sun Microsystems in 1995. There are lots of applications and websites that will not work unless you have Java installed, and more are created every day. Java is fast, secure, and reliable. From laptops to datacenters, game consoles to scientific supercomputers, cell phones to the Internet, Java is everywhere!

75. What is platform independency?
Java solves the problem of platform-independence by using byte code. The Java compiler does not produce native executable code for a particular machine like a C compiler would.

76. How Java supports platform independency?
Because that was one of Java's main design considerations. And the reason for that is because it allows running programs on different computers, without having to rewrite them.

77. What are the types of programs Java can handle?
2 types of java programs are:
• Application - application program is the one which run on ur computer under the O.S of ur computer.
• Applet - applet is an application designed to be transmitted over the Internet and executed java compatible web browser.

78. What is an applet program?
Applet is an application designed to be transmitted over the Internet and executed java compatible web browser.

79. Compare Application and Applet.

<table>
<thead>
<tr>
<th>S.NO</th>
<th>Application</th>
<th>Applet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Application runs stand-alone, with the support of a virtual machine</td>
<td>An applet runs under the control of a browser</td>
</tr>
<tr>
<td>2.</td>
<td>An application can have free reign over</td>
<td>Applet is subjected to more stringent</td>
</tr>
</tbody>
</table>
80. **What are the advantages of Java Language?**

- Java is simple.
- Java is object-oriented.
- Java is platform-independent.
- Java is distributed.
- Java is interpreted.

81. **Give the contents of Java Environment (JDK).**

The JDK has as its primary components a collection of programming tools, including:

- **appletviewer** – this tool can be used to run and debug Java applets without a web browser
- **apt** – the annotation-processing tool
- **extcheck** – a utility which can detect JAR-file conflicts.

82. **Give any 4 differences between C++ and Java.**

<table>
<thead>
<tr>
<th>S.NO</th>
<th>C++</th>
<th>Java</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>C++ uses pointers and have memory leaks</td>
<td>java doesn't have pointers and there are no memory leaks</td>
</tr>
<tr>
<td>2.</td>
<td>C++ compiles to machine language</td>
<td>Java compiles to byte code</td>
</tr>
<tr>
<td>3.</td>
<td>In C++ the programmer needs to worry about freeing the allocated memory</td>
<td>Java the Garbage Collector takes care of the unneeded / unused variables</td>
</tr>
</tbody>
</table>

83. **What are the different types of comment symbols in Java?**

- **// comments -- one line**
  - After the two // characters, Java ignores everything to the end of the line. This is the most common type of comment.

- **/* ... */ comments -- multiple lines**
  - After the /* characters, Java will ignore everything until it finds a */. This kind of comment can cross many lines, and is commonly used to "comment out" sections of code -- making Java code into a comment while debugging a program.

- **javadoc comments**
  - Comments that start with /** are used by the javadoc program to produce HTML documentation for the program. The Java documentation from Sun Microsystems is produced using javadoc. It is essential to use this kind of comment for large programs.

84. **What are the data types supported in Java?**

<table>
<thead>
<tr>
<th>C++</th>
<th>Java</th>
</tr>
</thead>
<tbody>
<tr>
<td>Int</td>
<td>&gt;Byte</td>
</tr>
<tr>
<td></td>
<td>&gt;Short</td>
</tr>
<tr>
<td>Float</td>
<td>&gt;Double</td>
</tr>
<tr>
<td></td>
<td>&gt;Char</td>
</tr>
<tr>
<td></td>
<td>&gt;Boolean</td>
</tr>
</tbody>
</table>

85. **What is the use of final keyword?**

Using `final`:

- It clearly states your intent. >It clearly flags items with simple behavior:
- a final variable can not be corrupted and is thread-safe, an object of a final class has limited polymorphism.
- It allows the compiler and virtual machine to perform performance optimizations.

86. (a) (i) Write a program to find whether a number is a palindrome or not. (8)
(ii) Discuss the working and meaning of the “static” modifier with suitable examples. (8) (APR/MAY 2011)
87. (b) Explain in detail as to how inheritance and polymorphism are supported in Java with necessary examples. (16) (APR/MAY 2011)
88. Explain briefly the following object oriented concepts. (NOV/DEC 2010)
   (i) Abstraction and Encapsulation. (4)
   (ii) Methods and messages. (4)
   (iii) Inheritance. (4)
   (iv) Polymorphism. (4)

89. (i) How objects are constructed? Explain constructor overloading with an example. (10)
    (NOV/DEC 2010)                          (ii) Write short notes
    on access specifiers in java. (6) (NOV/DEC 2010)

90. (i). What is inheritance? Explain with examples. (8) (NOV/DEC 2011)
    (ii). What are access specifiers? Discuss them in the context of Java. (8)

91. Write a detailed discussion on constructors. (16) (NOV/DEC 2011)

92. Describe the structure of Java program. (16) (NOV/DEC 2012)

93. Describe the features of Java Language. (16) (NOV/DEC 2012)

94. Explain OOP Principles.

95. Compare and Contrast Java with C.

96. Compare and Contrast Java with C++.

97. Explain Constructors with examples.

98. Explain the methods available under String and String Buffer Class.

99. Explain the Date Class methods with examples.

100. Discuss in detail the access specifiers available in Java.

101. Explain the different visibility controls and also compare with each of them.

102. Explain the different methods in java.Util.Arrays class with example.

103. Explain Packages in detail.

104. Discuss the methods under Array Class.

105. Discuss some of the classes available under Lang package.

106. Illustrate with examples: static and final.

107. Explain method overriding with example program.

108. What is javaDoc? Explain the comments for classes, methods, fields and link.

109. Application Programs in Java.

UNIT-II

PART-A

(1 MARK)

110. Which of the following are the java keywords?
    A) final B) Abstract C) Long D) static

111. The synchronized is used in which of the following?
    A) Class declarations. B) Method declarations. C) Block of code declarations
    D) Variable declarations.

112. What will be printed when you execute the code?
    class A {
    A() {  
      System.out.println("Class A Constructor"); } }
    public class B extends A {
    B() {  
      System.out.println("Class B Constructor"); }
    public static void main(String args[]) {
      B b = new B(); }
    }
    A) "Class A Constructor" followed by "Class B Constructor"
    B) "Class B Constructor" followed by "Class A Constructor"
    C) Compile time error D) Run time error
113. Given the piece of code, select the correct to replace at the comment line?

```java
class A {
    A(int i) { } 
}
public class B extends A {
    B() {
        // xxxxx 
    }
    public static void main(String args[]) {
        B b = new B(); 
    }
}
```
A) super(100);  B) this(100);  C) super();  D) this();

114. What is the output when you execute the following code?
```java
int i = 100;
switch (i) {
case 100:
    System.out.println(i);
case 200:
    System.out.println(i);
case 300:
    System.out.println(i);
}
```
A) Nothing is printed   B) Compile time error  C) The values 100,100,100 printed  D) Only 100 is printed

115. Which statements about garbage collection are true?
A) The garbage collector runs in low memory situations  B) You can run the garbage collector when ever you want.  C) When it runs, it releases the memory allocated by an object.  D) Garbage collector immediately runs when you set the references to null.

116. From the following code how many objects are garbage collected?
```java
String string1 = "Test";
String string2 = "Today";
string1 = null;
string1 = string2;
```
A) 1   B) 2   C) 3   D) 0

117. Select all correct list of keywords?
A) superclass  B) goto  C) open  D) integer  E) import, package  F) They are all java keywords

118. Which are the following are java keywords ?
A) goto B) synchronized C) extends D) implements E) this  F) All OF THE ABOVE

119. Which of the following assignment statements is invalid?
A) long l = 698.65;  B) float f = 55.8;  C) double d = 0x45876; D) All of the above

120. What is the numeric range for a Java int data type?
A) 0 to (2^32)    B) -(2^31) to (2^31)
C) -(2^31) to (2^31 - 1)  D) -(2^15) to (2^15 - 1)

121. What is correct about event handling in Java?
A) Java 1.0 event handling is compatible with event delegation model in Java 1.1  B) Java 1.0 and Java 1.1 event handling models are not compatible  C) Event listeners are the objects that implements listener interfaces.  D) You can add multiple listeners to any event source, and then there is no guarantee that the listeners will be notified in the order in which they were added.

122. Which of the following will compile without error?
A) char c = 'a';  B) double d = 45.6;  C) int i = d;  D) int k = 8;
123. The statement $X \% 5$, can best described as?
   A) $A$ equals $a$ divided by 5;  
   B) $A$ equals $A$ in 5 digit percentage form
   C) $A$ equals $A$ modulus 5.  
   D) None of the above

124. How can you implement encapsulation?
   A) By making methods private and variable private
   B) By making methods public and variables as private
   C) Make all variable are public and access them using methods
   D) Making all methods and variables as protected.

125. What's the difference between a queue and a stack?
   Stacks works by last-in-first-out rule (LIFO), while queues use the FIFO rule

126. You can create an abstract class that contains only abstract methods. On the other hand, you can create an interface that declares the same methods. So can you use abstract classes instead of interfaces?
   Sometimes. But the class may be a descendent of another class and in this case the interface is only option.

127. What comes to mind when you hear about a young generation in Java?
   Garbage collection.

128. What is meant by Inheritance?
   Inheritance is a relationship among classes, wherein one class shares the structure or behaviour defined in another class. This is called Single Inheritance. If a class shares the structure or behaviour from multiple classes, then it is called Multiple Inheritance. Inheritance defines “is-a” hierarchy among classes in which one subclass inherits from one or more generalised superclasses.

129. What is meant by Inheritance and what are its advantages?
   Inheritance is the process of inheriting all the features from a class. The advantages of inheritance are reusability of code and accessibility of variables and methods of the super class by subclasses.

130. What is the difference between superclass and subclass?
   A superclass is a class that is inherited whereas sub class is a class that does the inheriting.

131. Differentiate between a Class and an Object?
   The Object class is the highest-level class in the Java class hierarchy. The Class class is used to represent the classes and interfaces that are loaded by a Java program. The Class class is used to obtain information about an object's design. A Class is only a definition or prototype of real life object. Whereas an object is an instance or living representation of real life object. Every object belongs to a class and every class contains one or more related objects.

132. What is meant by Binding?
   Binding denotes association of a name with a class

133. What is meant by Polymorphism?
   Polymorphism literally means taking more than one form. Polymorphism is a characteristic of being able to assign a different behavior or value in a subclass, to something that was declared in a parent class.

134. What is Dynamic Binding?
   Binding refers to the linking of a procedure call to the code to be executed in response to the call. Dynamic binding (also known as late binding) means that the code associated with a given procedure call is not known until the time of the call at run-time. It is associated with polymorphism and inheritance.
135. What is final modifier?
The final modifier keyword makes that the programmer cannot change the value anymore. The actual meaning depends on whether it is applied to a class, a variable, or a method. **final**
- Classes: A final class cannot have subclasses.
- Variables: A final variable cannot be changed once it is initialized.
- Methods: A final method cannot be overridden by subclasses.

136. What is an Abstract Class?
Abstract class is a class that has no instances. An abstract class is written with the expectation that its concrete subclasses will add to its structure and behaviour, typically by implementing its abstract operations.

137. What are inner class and anonymous class?
Inner class: classes defined in other classes, including those defined in methods are called inner classes. An inner class can have any accessibility including private.
Anonymous class: A class defined inside a method without a name and is instantiated and declared in the same place and cannot have explicit constructors.

138. What is an Interface?
Interface is an outside view of a class or object which emphasises its abstraction while hiding its structure and secrets of its behaviour.

139. What is a base class?
Base class is the most generalised class in a class structure. Most applications have such root classes. In Java, Object is the base class for all classes.

140. What is reflection in java?
Reflection allows Java code to discover information about the fields, methods and constructors of loaded classes and to dynamically invoke them.

141. Define superclass and subclass?
Superclass is a class from which another class inherits.
Subclass is a class that inherits from one or more classes.

142. What is meant by Binding, Static binding, Dynamic binding?
- **Binding**: Binding denotes association of a name with a class.
- **Static binding**: Static binding is a binding in which the class association is made during compile time. This is also called as Early binding.
- **Dynamic binding**: Dynamic binding is a binding in which the class association is not made until the object is created at execution time. It is also called as Late binding.

143. What is reflection API? How are they implemented?
Reflection is the process of introspecting the features and state of a class at runtime and dynamically manipulate at runtime. This is supported using Reflection API with built-in classes like Class, Method, Fields, Constructors etc. Example: Using Java Reflection API we can get the class name, by using the getName method.

144. What is the difference between a static and a non-static inner class?
A non-static inner class may have object instances that are associated with instances of the class's outer class. A static inner class does not have any object instances.

145. What is the difference between abstract class and interface?
a) All the methods declared inside an interface are abstract whereas abstract class must have at least one abstract method and others may be concrete or abstract.
b) In abstract class, keyword abstract must be used for the methods whereas interface we need not use that keyword for the methods.
c) Abstract class must have subclasses whereas interface can’t have subclasses.

146. Can you have an inner class inside a method and what variables can you access? Yes, we can have an inner class inside a method and final variables can be accessed.

147. What is interface and its use?
Interface is similar to a class which may contain method’s signature only but not bodies and it is a formal set of method and constant declarations that must be defined by the class that
implements it. Interfaces are useful for:
   a) Declaring methods that one or more classes are expected to implement
   b) Capturing similarities between unrelated classes without forcing a class relationship.
   c) Determining an object’s programming interface without revealing the actual body of the class.

148. How is polymorphism achieved in java?
    Inheritance, Overloading and Overriding are used to achieve Polymorphism in java.

149. What modifiers may be used with top-level class?
    public, abstract and final can be used for top-level class.

150. What is a cloneable interface and how many methods does it contain? It is not having any method because it is a TAGGED or MARKER interface.

151. What are the methods provided by the object class?
    The Object class provides five methods that are critical when writing multithreaded Java programs:
    ->Notify    -> notifyAll    ->wait (three versions)

152. Define: Dynamic proxy.
    A dynamic proxy is a class that implements a list of interfaces, which you specify at runtime when you create the proxy. To create a proxy, use the static method
    `java.lang.reflect.Proxy::newProxyInstance()`. This method takes three arguments:
    - The class loader to define the proxy class
    - An invocation handler to intercept and handle method calls
    - A list of interfaces that the proxy instance implements

153. What is object cloning?
    It is the process of duplicating an object so that two identical objects will exist in the memory at the same time.

154. What comes to mind when someone mentions a shallow copy in Java?
    Object cloning.

155. If we're overriding the method equals() of an object, which other method you might also consider?
    `hashCode()`

156. We are planning to do an indexed search in a list of objects. Which of the two Java collections should you use: ArrayList or LinkedList?
    `ArrayList`

157. How would we make a copy of an entire Java object with its state?
    Have this class implement Cloneable interface and call its method clone().

158. How can we minimize the need of garbage collection and make the memory use more effective?
    Use object pooling and weak object references.

159. There are two classes: A and B. The class B need to inform a class A when some important event has happened. What Java technique would you use to implement it?
    If these classes are threads consider notify() or notifyAll(). For regular classes we can use the Observer interface.

160. What access level do we need to specify in the class declaration to ensure that only classes from the same directory can access it?
    We do not need to specify any access level, and Java will use a default package access level.

161. What is garbage collection? What is the process that is responsible for doing that in java?
    Reclaiming the unused memory by the invalid objects. Garbage collector is responsible for this process

162. What kind of thread is the Garbage collector thread?
    It is a daemon thread.
163. What is a daemon thread?
   These are the threads which can run without user intervention. The JVM can exit when there are daemon threads by killing them abruptly.

164. How will you invoke any external process in Java?
   Runtime.getRuntime().exec(…).

165. What is the finalize method do?
   Before the invalid objects get garbage collected, the JVM give the user a chance to clean up some resources before it got garbage collected.

166. What is mutable object and immutable object?
   If a object value is changeable then we can call it as Mutable object. (Ex., StringBuffer, …) If you are not allowed to change the value of an object, it is immutable object. (Ex., String, Integer, Float, …)

167. What is the basic difference between string and stringbuffer object?
   String is an immutable object. StringBuffer is a mutable object.

168. What is the purpose of Void class?
   The Void class is an uninstantiable placeholder class to hold a reference to the Class object representing the primitive Java type void.

169. What is reflection?
   Reflection allows programmatic access to information about the fields, methods and constructors of loaded classes, and the use reflected fields, methods, and constructors to operate on their underlying counterparts on objects, within security restrictions.

170. What is the base class for Error and Exception?
   Throwable

171. Distinguish between static and dynamic binding. (APR/MAY 2011)

<table>
<thead>
<tr>
<th>S.NO</th>
<th>Static binding</th>
<th>Dynamic binding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>It means that references are resolved at compile time</td>
<td>It means that references are resolved at run time.</td>
</tr>
</tbody>
</table>
| 2.   | Animal a = new Animal(); a.Roar(); // The compiler can resolve this method call statically. | public void MakeSomeNoise(object a) {
|      |                                                     | // Things happen...
|      |                                                     | ((Animal) a).Roar(); // You won't know if this works until runtime!} |

172. What is the difference between the String and StringBuffer classes? (NOV/DEC 2010)

<table>
<thead>
<tr>
<th>S.NO</th>
<th>String classes</th>
<th>StringBuffer classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>It is used to manipulate character strings that cannot be changed (read-only and immutable).</td>
<td>It is used to represent characters that can be modified.</td>
</tr>
<tr>
<td>2.</td>
<td>String is immutable.</td>
<td>StringBuffer is faster when performing concatenations</td>
</tr>
</tbody>
</table>

   Yes, Final is a common keyword specifying that the reference declared as final cannot be modified once it is initialized.

174. How dynamic initialization of variables is achieved in java. (NOV/DEC 2012)
   Java allows variables to be initialized dynamically, using any expression valid at the time the variable is declared. double a= 3.0,b=4.0 double c=Math.sqrt( a * a + b * b); here "c" is initialized dynamically to the length of hypotenuse.

175. How is multiple inheritance achieved in java?
   Directly we can't achieve Multiple Inheritance in Java. Indirectly there are two ways, those are:
   1. We can achieve Multiple Inheritance by implementing more than one Interfaces, because we can have chance to implement more than one Interfaces in Java.
   2. Another indirect way to achieve Multiple Inheritance is, doing by repeated use of Single Inheritance.
**Example**: Class z extends A,B --- Inavlid (bcz direct way)
Class B extends A
} ---- those are valid (bcz indirect way)
Class Z extends B

So, here Class z can have all the features of Class B and Class A, but here we are doing indirect way with the help of **Single Inheritance**.

176. **What is the use of super keyword?**

The super keyword can be used by classes that are extended from virtual or abstract classes. By using super, you can override constructors and methods from the parent class.

**Example:**

```
public subclass() {
    super(‘Madam’, ‘Brenda’, ‘Clapentrap’);
}
```

177. **What are object wrappers? Give example.**

The most important Object Wrapper implementations that the Free Marker core provides are:

- **ObjectWrapper.DEFAULT_WRAPPER**: It replaces String with SimpleScalar, Number with SimpleNumber, List and array with SimpleSequence, Map with SimpleHash, Boolean with TemplateBooleanModel.
- **ObjectWrapper.BEANS_WRAPPER**: It can expose java Bean properties and other members of arbitrary objects using Java reflection.

For example if we add a String to the container, perhaps it will be replaced with a SimpleScalar instance which stores the same text.

178. **What is Inheritance Hierarchy?**

**Hierarchical inheritance** in simple sentence "creating one or more child classes from the parent class".

**Example:**

```
class A {
    ............
}
class B extends A {
    ............
}
class C extends B {
    ............
}
class D {
    public static void main (string args[]) {.....}
}
```

179. **Differentiate overloading and overriding.**

<table>
<thead>
<tr>
<th>S.NO</th>
<th>Overloading</th>
<th>Overriding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>There is a relationship between methods available in the same class</td>
<td>There is relationship between a superclass method and subclass method.</td>
</tr>
<tr>
<td>2.</td>
<td>Overloading does not block inheritance from the superclass</td>
<td>Overriding blocks inheritance from the superclass.</td>
</tr>
<tr>
<td>3.</td>
<td>Separate methods share the same name</td>
<td>Subclass method replaces the superclass</td>
</tr>
<tr>
<td>4.</td>
<td>Overloading must have different method signatures</td>
<td>Overriding must have same signature.</td>
</tr>
</tbody>
</table>
180. **When will a class be declared as final?**

A compile-time error occurs if a class is declared both final and abstract, because the implementation of such a class could never be completed.

Because a final class never has any subclasses, the methods of a final class are never overridden.

181. **When will a method be declared final?**

We declare a method final in java when we don’t want any subclasses of the class to be able to override the method.

182. **What is the need for abstract classes?**

Abstract keyword will be used in method declaration to declare that method without providing the implementation in that java program.

183. **Explain about protected visibility control.**

Visibility is another term used for Access Specifiers for java variables and objects. Public is the most liberal access specifier and Private is the most restrictive access specifier.

184. **What are the methods under "object" class / java.lang.Object.**

[L.java.lang.Object; is the name for Object[].class, the java.lang.Class representing the class of array of Object.

185. **Explain toString method of object class.**

The toString method for class Object returns a string consisting of the name of the class of which the object is an instance, the at-sign character `@', and the unsigned hexadecimal representation of the hash code of the object. In other words, this method returns a string equal to the value of:

```java
getClass().getName() + '@' + Integer.toHexString(hashCode())
```

186. **What is reflection?**

Reflection is a process that is used to examine the runtime behaviour of a running application in the JVM. Reflection API allows the creation of an instance of a class whose name is not known until runtime.

187. **What are the uses of reflection in Java.**

The name reflection is used to describe code which is able to inspect other code in the same system (or itself). For example, we have an object of an unknown type in Java, and we would like to call a 'doSomething' method on it if one exist.

188. **How will you create an instance of Class.**

There are two reflective methods for creating instances of classes:

- java.lang.reflect.Constructor.newInstance()
- Class.newInstance().

189. **What are the methods under reflection used to analyze the capabilities of classes?**

Reflection can be used for observing and/or modifying program execution at runtime. A reflection-oriented program component can monitor the execution of an enclosure of code and can modify itself according to a desired goal related to that enclosure. This is typically accomplished by dynamically assigning program code at runtime.

190. **How to create arrays dynamically using reflection package.**

To create arrays dynamically using reflection package as follows:

```java
public class genset<E> {
    private E a[];
    public genset(){
        a=new E[INITIAL_ARRAY_LENGTH];}
}
```

191. **Define an interface.**

**Interface in java** is core part of Java programming language and one of the way to achieve abstraction in Java along with abstract class (or)

An Interface is nothing but a contract as to how a class should behave. It just declares the behavior as empty methods and the implementing class actually writes the code that will determine the behavior.
192. **What is the need for an interface?**

The main use is polymorphism, or the ability to perform the same operation on a number of different objects. If different objects all implement the same interface and have the same method, you can store all of those objects in a Vector, for example, and iterate through the Vector calling that method on each one.

193. **What are the properties of an interface?**

- Interface must be declared with the key word ‘interface’.
- All interface methods are implicitly **public** and **abstract**. In another words you don’t need to actually type the public or abstract modifiers in the method declaration, but method is still always public and abstract.
- All variables defined in an interface is **public, static, and final**. In another words, interfaces can declare only constants, not instance variables.
- Interface methods must not be **static**.
- Because interface methods are abstract, they cannot be marked **final, strictfp, ornative**.
- An interfaces can extend one or more other interfaces.
- An interface cannot implement another interface or class.

### Differentiate Abstract classes and interface.

<table>
<thead>
<tr>
<th>S.NO</th>
<th>Abstract Class</th>
<th>Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Java abstract class can have instance methods that implements a default behavior</td>
<td>Java interface are implicitly abstract and cannot have implementations.</td>
</tr>
<tr>
<td>2.</td>
<td>An abstract class may contain non-final variables.</td>
<td>Variables declared in a Java interface is by default final.</td>
</tr>
<tr>
<td>3.</td>
<td>An abstract class should be extended using keyword <strong>extends</strong></td>
<td>Java interface should be implemented using keyword “implements”</td>
</tr>
<tr>
<td>4.</td>
<td>An abstract class definition begins with the keyword <strong>abstract</strong>.</td>
<td>An Interface definition begins with the keyword “interface”.</td>
</tr>
<tr>
<td>5.</td>
<td>An abstract class also cannot be instantiated, but can be invoked if a main() exists.</td>
<td>An Interface is absolutely abstract and cannot be instantiated.</td>
</tr>
<tr>
<td>6.</td>
<td>An abstract class little bit fast from Interface.</td>
<td>Java interfaces are slow as it requires extra indirection.</td>
</tr>
</tbody>
</table>

194. **What is object cloning?**

Cloning means creating a copy of the object. The precise meaning of "copy" may depend on the class of the object. The general intent is that, for any object x, the expression: x.clone() != x

195. **Differentiate cloning and copying.**

<table>
<thead>
<tr>
<th>S.NO</th>
<th>Cloning</th>
<th>Copying.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Create something new based on something that exists.</td>
<td>Copy from something that exists to something else (that also already exists).</td>
</tr>
<tr>
<td>2.</td>
<td>Shallow cloning just allows cloning the object but not their internal parts.</td>
<td>Shallow copy is a bit-wise copy of an object.</td>
</tr>
</tbody>
</table>

196. **Differentiate shallow copy and deep copy in cloning.**

<table>
<thead>
<tr>
<th>S.NO</th>
<th>Shallow copy</th>
<th>Deep copy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Shallow copy is a bit-wise copy of an object</td>
<td>A deep copy copies all fields, and makes copies of dynamically allocated memory pointed to by the fields.</td>
</tr>
<tr>
<td>2.</td>
<td>If any of the fields of the object are references to other objects, just the reference addresses are copied i.e., only the memory address is copied.</td>
<td>A deep copy occurs when an object is copied along with the objects to which it refers.</td>
</tr>
</tbody>
</table>
197. What is nested class or inner class? Mention its types.

An inner class or nested class is a class declared entirely within the body of another class or interface. It is distinguished from a subclass.

- Static
- Non-Static / Inner Classes

198. What is the need for inner classes?

We need inner classes for:

1) An object of an inner class can access the implementation of the object that created it- INCLUDING private data.
2) Inner classes can be hidden for other classes in the same package.
3) Anonymous inner classes are very useful when you want to define callbacks on the fly.

199. What is local inner class and anonymous inner class? Give their advantages.

Local inner class:

Local classes are never declared with an access specifier (that is, public or private). Their scope is always restricted to the block in which they are declared.

Advantage:

- They are completely hidden from the outside world.
- They can not only access the instance variables but local variables of the method (in which they are defined) as well, but the local variable has to be declared final.

Anonymous inner class:

When using local inner classes, you can often go a step further. If you want to make only a single object of this class, you don’t even need to give the class a name. Such a class is called an anonymous inner class. Usually the inner class extend some interface or extend other class.

200. Write the advantages and disadvantages of static nested class.

Advantage:

- A Static nested class doesn't depend on the outer class instance, it can run on it's own.
- Even a main function can be written inside the static nested class and invoked directly.
- Less number of objects created at runtime which wouldn't be the case with other types of nested classes.

Disadvantage:

- A static nested class has access to both the protected and private members of the outer class.

201. Define proxies.

A proxy server is an intermediary computer that is between the user's computer and the Internet. It can be used to log Internet usage and also to block access to a web site. The firewall at the proxy server blocks some web sites or web pages for various reasons.

PART-C                                   16 MARKS

202. (a) (i) Write a Java program to perform matrix multiplication using arrays.   (8)  (APR/MAY 2011)
203. (ii) Write a java program to search for a number in the given array using binary search.   (8)  (APR/MAY 2011)
204. (b) Give a detailed explanation of packages in Java. (APR/MAY 2011)
205. (a) What is a Package? What are the benefits of using packages? Write down the steps in creating a package and using it in a java program with an example. (16)(NOV/DEC 2010)
206. (b) What is Dynamic binding? Show with an example how dynamic binding works. (16) (NOV/DEC 2010)
207. (i). What is dynamic binding. Explain with a real time examples. (8) (NOV/DEC 2011)
208. (ii). Write a note on class hierarchy. How do you create hierarchical classes in Java? (8) (NOV/DEC 2011)
209. Give a brief overview on java packages. Write necessary code snippets. (16) (NOV/DEC 2011)
211. Explain about packages. Write a java program using packages. (16) (NOV/DEC 2012)
212. Explain the concept of inheritance and its types.
213. Explain the concept of overriding with examples.
214. What is dynamic binding? Explain with example.
215. Explain the uses of reflection with examples.
216. Define an interface. Explain with example.
217. Explain the methods under “object” class and “class” class.
218. What is object cloning? Explain deep copy and shallow copy with examples.
219. Explain static nested class and inner class with examples.
220. With an example explain proxies.
221. Develop a message abstract class which contains playMessage abstract method
222. Write a different sub-classes like TextMessage, VoiceMessage and FaxMessage classes for to implementing the playMessage method.
223. Develop a abstract Reservation class which has Reserve abstract method. Implement the sub-classes like ReserveTrain and ReserveBus classes and implement the same.
224. Develop an Interest interface which contains simpleInterest and compInterest methods and static final field of Rate 25%. Write a class to implement those methods.
225. Develop a Library interface which has drawbook(), returnbook() (with fine), checkstatus() and reservebook() methods. All the methods tagged with public.
226. Develop an Employee class which implements the Comparable and Cloneable interfaces. Implement the sorting of persons (based on name in alphabetical). Also implement the shallow copy (for name and age) and deep copy (for DateOfJoining).
227. Explain the different methods supported in Object class with example.
228. Explain the methods supported in Class class.
229. Explain the Methods supported in reflect package. Also write a program to implement the reflection of a particular class details like constructors, methods and fields with its modifiers.
230. Develop a static Inner class called Pair which has MinMax method for finding min and max values from the array.
231. What is proxy class? Develop a code for constructing a proxy objects to trace a binary search method with explanations.

UNIT-III

PART-A (1 MARK)

232. Given the following class definition, which of the following methods could be legally placed after the comment?
   public class Test{
   public void amethod(int i, String s){}
   /*Here*/
   A) public void amethod(String s, int i){}
   B) public int amethod(int i, String s){}
   C) public void amethod(int i, String mystring){}
   D) public void Amethod(int i, String s) {}
233. Given the following class definition which of the following can be legally placed after the comment line?

```java
class Base{
    public Base(int i){} }

public class Derived extends Base{
    public static void main(String arg[]){
        Derived d = new Derived(10); }
    Derived(int i){
        super(i); }
    Derived(String s, int i){
        this(i); /*Here*/
    }
    A) Derived d = new Derived();  B) super();
    C) this("Hello",10);    D) Base b = new Base(10);
}
```

234. Which of the following statements are true?

A) An anonymous inner class cannot have any constructors.
B) An anonymous inner class can created only inside a method.
C) An anonymous inner class can only access static fields of the enclosing class.
D) An anonymous inner class can implement an interface.

235. What does the following code does?

```java
public class R Thread implements Runnable {
    public void run (String s ) {
        System.out.println("Executing Runnable Interface Thread");
    }
    public static void main ( String args [] ) {
        RThread rt = new RThread ( );
        Thread t = new Thread (rt);
        t.start ( );
    }
}
```

A) The compiler error  B) The runtime error
C) Compiles and prints "Executing Runnable Interface Thread" on the screen.
D) Compiles and does not print anything on the screen.

236. Which statements are true?

A) Threads start() method automatically calls run() method.
B) Thread dies after the run() returns.
C) A dead Thread can be started again.
D) A stop() method kills the currently running Thread.

237. The ThreadGroup class instance?

A) Allow threads to be manipulated as group.
B) Provide support for ThreadDeath listeners.
C) May contain other ThreadGroups.
D) Must contain threads of the same type.

238. Default Layout Managers are concerned?

A) Frame's default Layout Manager is Border.
B) Applet's is FlowLayout
C) Panel's is FlowLayout
D) A Dialog is a pop up window and used as BorderLayout as default.

239. Which statements are true about GridBagLayout?

A) Weight x and weight y should be 0.0 and 1.0.
B) If fill is both, anchor does not make sense.
C) It divides its territory into an array of cells.
D) While constructing GridBagLayout, you won't tell how many rows and columns the underlying grid has.
240. Which of the following are true?
   A) gridwidth, gridheight, specifies how many columns and rows to span.
   B) gridx, gridy has GridBagConstraints.RELATIVE which adds left to right and
top to bottom, still you can specify gridwidth and gridheight except for last
component, which you have to set GridBagConstraints.REMAINDER.

241. Which of the following statements are true about the fragment below?
   import java.lang.Math;
   public class Test {
      public static void main(String args[]) {
         Math m = new Math();
         System.out.println(m.abs(2.6));
      }
   }
   A) Compiler fails at line 1  B) Compiler fails at line 2
   C) Compiler fails at the time of Math class instantiation  D) Compiler succeeds.

242. What will be the output of the following line?
   public class TestFC {
      public static void main(String args[]) {
         System.out.println(Math.floor(145.1));
         System.out.println(Math.ceil(-145.4));
      }
   }
   A) 145.0 followed by -145.0  B) 150.0 followed by -150.0  C) 145.1 followed by -145.4

243. Which of the following implement clear notion of one item follows another
(order)?
   A) List   B) Set   C) Map   D) Iterator

244. Collection interface iterator method returns Iterator(like Enumerator),
   through you can traverse a collection from start to finish and safely remove
   elements.
   A) true    B) false

245. Which of the following places no constraints on the type of elements, order
   of elements, or repetition of elements with in the collection.?
   A) Collection  B) collection  C) Map   D) Set

246. Which of the following gives Stack and Queue functionality.?
   A) Map  B) Collection  C) List  D) Set

247. What is the byte range? & What is the implementation of destroy method in java.. is it
   native or java code?
   128 to 127 .This method is not implemented.

248. What is a package?
   To group set of classes into a single unit is known as packaging. Packages provides wide
   namespace ability.

249. What are the approaches that we will follow for making a program very efficient?
   By avoiding too much of static methods avoiding the excessive and unnecessary use of
   synchronized methods Selection of related classes based on the application (meaning
   synchronized classes for multiuser and non-synchronized classes for single user) Usage of
   appropriate design patterns Using cache methodologies for remote invocations Avoiding
   creation of variables within a loop and lot more.

250. What is Locale?
   A Locale object represents a specific geographical, political, or cultural region

251. How will you load a specific locale?
   Using ResourceBundle.getBundle(…);
252. What is JIT and its use?
   Really, just a very fast compiler… In this incarnation, pretty much a one-pass compiler
   — no offline computations. So you can’t look at the whole method, rank the expressions
   according to which ones are re-used the most, and then generate code. In theory terms, it’s an
   on-line problem.

253. Is JVM a compiler or an interpreter?
   Interpreter

254. When you think about optimization, what is the best way to find out the time/memory
   consuming process?
   Using profiler

255. What is the purpose of assert keyword used in JDK1.4.x?
   In order to validate certain expressions. It effectively replaces the if block and
   automatically throws the AssertionError on failure. This keyword should be used for the critical
   arguments. Meaning, without that the method does nothing.

256. How will you get the platform dependent values like line separator, path separator, etc.?
   Using System.getProperty(…) (line.separator, path.separator, …)

257. What is skeleton and stub? What is the purpose of those?
   Stub is a client side representation of the server, which takes care of communicating with
   the remote server. Skeleton is the server side representation. But that is no more in use… it is
   deprecated long before in JDK.

258. What is the final keyword denotes?
   Final keyword denotes that it is the final implementation for that method or variable or
   class. You can’t override that method/variable/class any more.

259. What is the significance of ListIterator?
   We can iterate back and forth.

260. What is the major difference between LinkedList and ArrayList?
   LinkedList are meant for sequential accessing. ArrayList are meant for random
   accessing.

261. What is nested class?
   If all the methods of a inner class is static then it is a nested class.

262. What is inner class?
   If the methods of the inner class can only be accessed via the instance of the inner class,
   then it is called inner class.

263. What is composition?
   Holding the reference of the other class within some other class is known as
   composition.

264. What is aggregation?
   It is a special type of composition. If you expose all the methods of a composite class
   and route the method call to the composite method through its reference, then it is called
   aggregation.

265. What are the methods in Object?
   clone, equals, wait, finalize, getClass, hashCode, notify, notifyAll, toString

266. Can we instantiate the Math class?
   We can’t instantiate the math class. All the methods in this class are static. And the
   constructor is not public.

267. What is singleton?
   It is one of the design patterns. This falls in the creational pattern of the design pattern.
   There will be only one instance for that entire JVM. You can achieve this by having the private
   constructor in the class. For eg., public class Singleton { private static final Singleton s = new
   Singleton(); private Singleton() {} public static Singleton getInstance() { return s; } // all non
   static methods … }
268. What is DriverManager?
   The basic service to manage set of JDBC drivers.

269. What is Class.forName() does and how it is useful?
   It loads the class into the ClassLoader. It returns the Class. Using that you can get the instance (―class-instance||.newInstance() ).

270. What is the relationship between the Canvas class and the Graphics class?
   A Canvas object provides access to a Graphics object via its paint() method.

271. How would you create a button with rounded edges?
   There’s 2 ways. The first thing is to know that a JButton’s edges are drawn by a Border. so you can override the Button’s paintComponent(Graphics) method and draw a circle or rounded rectangle (whatever), and turn off the border. Or you can create a custom border that draws a circle or rounded rectangle around any component and set the button’s border to it.

272. What is the difference between the ‘Font’ and ‘FontMetrics’ class?
   The Font Class is used to render ‘glyphs’ - the characters you see on the screen. FontMetrics encapsulates information about a specific font on a specific Graphics object. (width of the characters, ascent, descent)

273. What is the difference between the paint() and repaint() methods?
   The paint() method supports painting via a Graphics object. The repaint() method is used to cause paint() to be invoked by the AWT painting thread.

274. Which containers use a border Layout as their default layout?
   The window, Frame and Dialog classes use a border layout as their default layout.

275. What is the difference between applications and applets?
   a) Application must be run on local machine whereas applet needs no explicit installation on local machine.
   b) Application must be run explicitly within a java-compatible virtual machine whereas applet loads and runs itself automatically in a java-enabled browser.
   c) Application starts execution with its main method whereas applet starts execution with its init method.
   d) Application can run with or without graphical user interface whereas applet must run within a graphical user interface.

276. Difference between Swing and AWT?
   AWT are heavy-weight componenets. Swings are light-weight components. Hence swing works faster than AWT.

277. What is a layout manager and what are different types of layout managers available in java AWT?
   A layout manager is an object that is used to organize components in a container. The different layouts are available are FlowLayout, BorderLayout, CardLayout, GridLayout and GridBagLayout.

278. How are the elements of different layouts organized?
   FlowLayout: The elements of a FlowLayout are organized in a top to bottom, left to right fashion.
   BorderLayout: The elements of a BorderLayout are organized at the borders (North, South, East and West) and the center of a container.
   CardLayout: The elements of a CardLayout are stacked, on top of the other, like a deck of card
   GridLayout: The elements of a GridLayout are of equal size and are laid out using the square of a grid.
   GridBagLayout: The elements of a GridBagLayout are organized according to a grid. However, the elements are of different size and may occupy more than one row or column of the grid. In addition, the rows and columns may have different sizes. The default Layout Manager of Panel and Panel sub classes is FlowLayout.

279. Why would you use SwingUtilities.invokeAndWait or SwingUtilities.invokeLater?
   I want to update a Swing component but I’m not in a callback. If I want the update to happen immediately (perhaps for a progress bar component) then I’d use invokeAndWait. If I don’t care when the update occurs, I’d use invokeLater.
An event is an event object that describes a state of change in a source. In other words, event occurs when an action is generated, like pressing button, clicking mouse, selecting a list, etc. There are two types of models for handling events and they are:

a) event-inheritance model and
b) event-delegation model

A Scrollbar is a Component, but not a Container whereas Scrollpane is a Container and handles its own events and perform its own scrolling.

The AWT event dispatcher thread is not a daemon thread. You must explicitly call System.exit to terminate the JVM.

Controls are components that allow a user to interact with your application and the AWT supports the following types of controls: Labels, Push Buttons, Check Boxes, Choice Lists, Lists, Scrollbars, and Text Components. These controls are subclasses of Component.

A Choice is displayed in a compact form that requires you to pull it down to see the list of available choices. Only one item may be selected from a Choice. A List may be displayed in such a way that several List items are visible. A List supports the selection of one or more List items.

The enableEvents() method is used to enable an event for a particular object. Normally, an event is enabled when a listener is added to an object for a particular event. The enableEvents() method is used by objects that handle events by overriding their event dispatch methods.

The File class encapsulates the files and directories of the local file system. The RandomAccessFile class provides the methods needed to directly access data contained in any part of a file.

The init() method - Can be called when an applet is first loaded start() method - Can be called each time an applet is started. paint() method - Can be called when the applet is minimized or maximized. stop() method - Can be used when the browser moves off the applet’s page. destroy() method - Can be called when the browser is finished with the applet.

The CheckboxMenuItem class extends the MenuItem class to support a menu item that may be checked or unchecked.

The java.awt.AWTEvent class is the highest-level class in the AWT event-class hierarchy.

source : A source is an object that generates an event. This occurs when the internal state of that object changes in some way.
listener : A listener is an object that is notified when an event occurs. It has two major requirements. First, it must have been registered with one or more sources to receive notifications about specific types of events. Second, it must implement methods to receive and process these notifications.

Use a JEditorPane or JTextPane and set it with an HTMLEditorKit, then load the text into the pane.

This is a trick. most people would say ‘add a KeyListener to the JComboBox’ - but the right answer is ‘add a KeyListener to the JComboBox’s editor component.’
293. **What an I/O filter?**
   An I/O filter is an object that reads from one stream and writes to another, usually altering the data in some way as it is passed from one stream to another.

294. **How can I create my own GUI components?**
   Custom graphical components can be created by producing a class that inherits from `java.awt.Canvas`. Your component should override the paint method, just like an applet does, to provide the graphical features of the component.

295. **What is a DatabaseMetaData?**
   Comprehensive information about the database as a whole.

296. **What is reflection and how does it help to manipulate java code? (APR/MAY 2011)**

297. **Consider a class person with attributes firstname and lastname.Write a java program to create and clone instances of the Person class. (APR/MAY 2011)**

298. **What is object cloning? Why it is needed? Explain how objects are cloned. (16)**
   (NOV/DEC 2010)

299. **How is a Frame created? Write a java program that creates a product enquiry form using frames. (16)**
   (NOV/DEC 2010)

300. (i). **What is object cloning? Discuss with examples. (8)**
   (NOV/DEC 2011)
   (ii). **What is reflection. Explain. (8)**

301. **Write short notes on:**
   (NOV/DEC 2011)
   (i). **Graphics programming. (8)**
   (ii). **Frame. (8)**

302. **Explain about the Applet life cycle? How Applets are prepared and executed? (16)**
   (NOV/DEC 2012)

303. **Describe about the different input and output streams and their classes. (16)**
   (NOV/DEC 2012)

304. **Explain the classes under 2D shapes.**

305. **Explain event handling with examples.**

306. **Explain action event with an example.**

307. **What are the swing components. Explain.**

308. **Describe the AWT event hierarchy.**

---

**PART –C 16 MARKS**

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**UNIT-IV**

**PART-A 1 MARK**

309. **What is the name of the method used to start a thread execution?**
   A). `init`(); (B). `start`(); (C). `run`(); (D). `resume`();

310. **Which two are valid constructors for Thread?**
   1. `Thread(Runnable r, String name)`
   2. `Thread()`
   3. `Thread(int priority)`
   4. `Thread(Runnable r, ThreadGroup g)`
   5. `Thread(Runnable r, int priority)`
   (A)1 and 3 (B) 2 and 4 (C) 1 and 2 (D) 2 and 5

311. **Which three are methods of the Object class?**
   1. `notify()`;
   2. `notifyAll()`;
   3. `isInterrupted()`;
   4. `synchronized()`;
   5. `interrupt()`;
   6. `wait(long msecs)`;
   7. `sleep(long msecs)`;
   8. `yield()`;
   (A) 1, 2, 4 (B) 2, 4, 5 (C) 1, 2, 6 (D) 2, 3, 4
312. class X implements Runnable { public static void main(String args[]) { /* Missing code? */ } 
   public void run() {} } 

Which of the following line of code is suitable to start a thread?
(A) Thread t = new Thread(X);
(B) Thread t = new Thread(X); t.start();
(C) X run = new X(); Thread t = new Thread(run); t.start();
(D) Thread t = new Thread(); x.run();

313. Which cannot directly cause a thread to stop executing?
(A) Calling the SetPriority() method on a Thread object.
(B) Calling the wait() method on an object.
(C) Calling notify() method on an object.
(D) Calling read() method on an InputStream object.

314. Which two of the following methods are defined in class Thread?
1. start() 2. wait() 3. notify() 4. run() 5. terminate()
(A) 1 and 4 (B) 2 and 3 (C) 3 and 4 (D) 2 and 4

315. Which of the following will directly stop the execution of a Thread?
(A) wait() (B) notify() (C) notifyAll() (D) exits synchronized block

316. Which method must be defined by a class implementing the java.lang.Runnable interface?
(A) void run() (B) public void run() (C) public void start() (D) void run(int priority)

317. Which will contain the body of the thread?
(A) run(); (B) start(); (C) stop(); (D) main();

318. Which method registers a thread in a thread scheduler?
(A) run(); (B) construct(); (C) start(); (D) register();

319. Assume the following method is properly synchronized and called from a thread A on an object B: 
   wait(2000); After calling this method, when will the thread A become a candidate to get another turn at the CPU?
   (A) After thread A is notified, or after two seconds.
   (B) After the lock on B is released, or after two seconds.
   (C) Two seconds after thread A is notified.
   (D) Two seconds after lock B is released.

320. Which of the following will not directly cause a thread to stop?
(A) notify() (B) wait() (C) InputStream access (D) sleep()

321. Which class or interface defines the wait(), notify(), and notifyAll() methods?
(A) Object (B) Thread (C) Runnable (D) Class

322. public class MyRunnable implements Runnable {
   public void run() { // some code here }
} which of these will create and start this thread?
(A) new 
   Runnable(MyRunnable).start();
   (B) new 
   Thread(MyRunnable).run();
   (C) new 
   Thread(new MyRunnable()).start();
   (D) new 
   MyRunnable().start();

323. How could Java classes direct program messages to the system console, but error messages, say to a file?
   The class System has a variable out that represents the standard output, and the variable err that represents the standard error device. By default, they both point at the system console.
This how the standard output could be re-directed: Stream st = new Stream (new FileOutputStream ("techinterviews_com.txt")); System.setErr(st); System.setOut(st);

324. What’s the difference between an interface and an abstract class?
An abstract class may contain code in method bodies, which is not allowed in an interface. With abstract classes, you have to inherit your class from it and Java does not allow multiple inheritance. On the other hand, you can implement multiple interfaces in your class.

325. Why would you use a synchronized block vs. synchronized method?
Synchronized blocks place locks for shorter periods than synchronized methods.

326. Explain the usage of the keyword transient?
This keyword indicates that the value of this member variable does not have to be serialized with the object. When the class will be de-serialized, this variable will be initialized with a default value of its data type (i.e. zero for integers).

327. How can you force garbage collection?
We can’t force GC, but could request it by calling System.gc(). JVM does not guarantee that GC will be started immediately.

328. How do you know if an explicit object casting is needed?
If we assign a superclass object to a variable of a subclass’s data type, you need to do explicit casting. For example: Object a; Customer b; b = (Customer) a; When you assign a subclass to a variable having a superclass type, the casting is performed automatically.

329. What’s the difference between the methods sleep() and wait()
The code sleep(1000); puts thread aside for exactly one second. The code wait(1000), causes a wait of up to one second. A thread could stop waiting earlier if it receives the notify() or notifyAll() call. The method wait() is defined in the class Object and the method sleep() is defined in the class Thread.

330. Can we write a Java class that could be used both as an applet as well as an application?
Yes. Add a main() method to the applet.

331. What’s the difference between constructors and other methods?
Constructors must have the same name as the class and can not return a value. They are only called once while regular methods could be called many times.

332. Can we call one constructor from another if a class has multiple constructors?
Yes. Use this() syntax.

333. Explain the usage of Java packages.
This is a way to organize files when a project consists of multiple modules. It also helps resolve naming conflicts when different packages have classes with the same names. Packages access level also allows you to protect data from being used by the non-authorized classes.

334. If a class is located in a package, what do you need to change in the OS environment to be able to use it?
We need to add a directory or a jar file that contains the package directories to the CLASSPATH environment variable. Let’s say a class Employee belongs to a package com.xyz.hr; and is located in the file c:/dev/com.xyz.hr.Employee.java. In this case, you’d need to add c:/dev to the variable CLASSPATH. If this class contains the method main(), you could test it from a command prompt window as follows: c:\java com.xyz.hr.Employee

335. What’s the difference between J2SDK 1.5 and J2SDK 5.0?
There’s no difference, Sun Microsystems just re-branded this version.

336. What would you use to compare two String variables - the operator == or the method equals()?
We’d use the method equals() to compare the values of the Strings and the = = to check if two variables point at the same instance of a String object.

337. Does it matter in what order catch statements for FileNotFoundException and IOException are written?
Yes, it does. The FileNotFoundException is inherited from the IOException. Exception’s subclasses have to be caught first.
338. Can an inner class declared inside of a method access local variables of this method? It’s possible if these variables are final.

339. What is an exception? An exception is an event, which occurs during the execution of a program, that disrupts the normal flow of the program's instructions.

340. What is error? An Error indicates that a non-recoverable condition has occurred that should not be caught. Error, a subclass of Throwable, is intended for drastic problems, such as OutOfMemoryError, which would be reported by the JVM itself.

341. Which is superclass of Exception? "Throwable", the parent class of all exception related classes.

342. What are the advantages of using exception handling? Exception handling provides the following advantages over "traditional" error management techniques:
   - Separating Error Handling Code from "Regular" Code.
   - Propagating Errors Up the Call Stack.
   - Grouping Error Types and Error Differentiation.

343. What are the types of Exceptions in Java? There are two types of exceptions in Java, unchecked exceptions and checked exceptions. Checked exceptions: A checked exception is some subclass of Exception (or Exception itself), excluding class RuntimeException and its subclasses. Each method must either handle all checked exceptions by supplying a catch clause or list each unhandled checked exception as a thrown exception.
   Unchecked exceptions: All Exceptions that extend the RuntimeException class are unchecked exceptions. Class Error and its subclasses also are unchecked.

344. Why Errors are Not Checked? A unchecked exception classes which are the error classes (Error and its subclasses) are exempted from compile-time checking because they can occur at many points in the program and recovery from them is difficult or impossible. A program declaring such exceptions would be pointlessly.

345. How does a try statement determine which catch clause should be used to handle an exception? When an exception is thrown within the body of a try statement, the catch clauses of the try statement are examined in the order in which they appear. The first catch clause that is capable of handling the exception is executed. The remaining catch clauses are ignored.

346. What is the purpose of the finally clause of a try-catch-finally statement? The finally clause is used to provide the capability to execute code no matter whether or not an exception is thrown or caught.

347. What is the difference between checked and Unchecked Exceptions in Java? All predefined exceptions in Java are either a checked exception or an unchecked exception. Checked exceptions must be caught using try..catch () block or we should throw the exception using throws clause. If you dont, compilation of program will fail.

348. What is the difference between exception and error? The exception class defines mild error conditions that your program encounters. Exceptions can occur when trying to open the file, which does not exist, the network connection is disrupted, operands being manipulated are out of prescribed ranges, the class file you are interested in loading is missing. The error class defines serious error conditions that you should not attempt to recover from. In most cases it is advisable to let the program terminate when such an error is encountered.

349. What is the catch or declare rule for method declarations? If a checked exception may be thrown within the body of a method, the method must either catch the exception or declare it in its throws clause.
350. **When is the finally clause of a try-catch-finally statement executed?**

The finally clause of the try-catch-finally statement is always executed unless the thread of execution terminates or an exception occurs within the execution of the finally clause.

351. **What if there is a break or return statement in try block followed by finally block?**

If there is a return statement in the try block, the finally block executes right after the return statement encountered, and before the return executes.

352. **What are the different ways to handle exceptions?**

There are two ways to handle exceptions:

- Wrapping the desired code in a try block followed by a catch block to catch the exceptions.
- List the desired exceptions in the throws clause of the method and let the caller of the method handle those exceptions.

353. **How to create custom exceptions?**

By extending the Exception class or one of its subclasses.

**Example:**

```java
class MyException extends Exception {
    public MyException() { super(); }
    public MyException(String s) { super(s); }
}
```

354. **Can we have the try block without catch block?**

Yes, we can have the try block without catch block, but finally block should follow the try block.

**Note:** It is not valid to use a try clause without either a catch clause or a finally clause.

355. **What is the difference between swing and applet?**

Swing is a light weight component whereas Applet is a heavy weight Component. Applet does not require main method, instead it needs init method.

356. **What is the use of assert keyword?**

Assert keyword validates certain expressions. It replaces the if block effectively and throws an AssertionError on failure. The assert keyword should be used only for critical arguments (means without that the method does nothing).

357. **How does finally block differ from finalize() method?**

Finally block will be executed whether or not an exception is thrown. So it is used to free resources. finalize() is a protected method in the Object class which is called by the JVM just before an object is garbage collected.

358. **What is the difference between throw and throws clause?**

throw is used to throw an exception manually, where as throws is used in the case of checked exceptions, to tell the compiler that we haven't handled the exception, so that the exception will be handled by the calling function.

359. **What are the different ways to generate and Exception?**

There are two different ways to generate an Exception.

- Exceptions can be generated by the Java run-time system.
- Exceptions thrown by Java relate to fundamental errors that violate the rules of the Java language or the constraints of the Java execution environment. Exceptions can be manually generated by your code.
- Manually generated exceptions are typically used to report some error condition to the caller of a method.

360. **Where does Exception stand in the Java tree hierarchy?**

- java.lang.Object
- java.lang.Throwable
- java.lang.Exception
- java.lang.Error

361. **What is StackOverflowError?**

The StackOverflowError is an Error Object thorwn by the Runtime System when it Encounters that your application/code has ran out of the memory. It may occur in case of recursive methods or a large amount of data is fetched from the server and stored in some object. This error is generated by JVM.
e.g. void swap()
    { swap(); }

362. Explain the exception hierarchy in java.
    The hierarchy is as follows: Throwable is a parent class off all Exception classes. They are two
    types of Exceptions: Checked exceptions and UncheckedExceptions. Both type of exceptions
    extends Exception class

363. How do you get the descriptive information about the Exception occurred during the
    program execution?
    The exceptions inherit a method printStackTrace() from the Throwable class. This method prints
    the stack trace from where the exception occurred. It prints the most recently entered method
    first and continues down, printing the name of each method as it works its way down the call
    stack from the top.

364. What can go wrong if you replace && with & in the following code: String a=null; if
    (a!=null && a.length()>10) {...}
    A single ampersand here would lead to NullPointerException.

PART – C         16 MARKS

365. Write a program to create a calculator using swings with the four basic arithmetic
    operations : +, –, *, ./ (APR/MAY 2011)

366. Draw the exception hierarchy in java and explain with examples throwing and catching
    exceptions and the common exceptions. (APR/MAY 2011)

367. With a neat diagram explain the Model view controller design pattern
    and list out the advantages and disadvantages of using it in designing an
    application. (16). (NOV/DEC 2010)

368. What is an Exception? Explain how to throw, catch and handle
    Exceptions. (16) (NOV/DEC 2010)

369. (i).Give an introduction to swings. (8) (NOV/DEC 2011)
    (ii).What is an adapter class? Explain its purpose and functionality. (8)

370. Discuss the concept of exception handling with an application of your choice. Write
    necessary code snippets. (16) (NOV/DEC 2011)

371. Explain in detail about AWT event hierarchy? (16) (NOV/DEC 2012)

372. Discuss about throwing and catching exceptions. (16) (NOV/DEC 2012)

373. Explain generic classes and methods.

374. Explain exception hierarchy.

375. What are the advantages of Generic Programming?

376. Explain the different ways to handle exceptions.

UNIT-V

PART A                                              1 MARK

378. Select all correct answers?
    A) public abstract void Test() { }   B) public void abstract Test();
    C) public abstract void Test();  D) native void doSomthing( int i );

379. Please select all correct answers?
    A) toString() method is defined in Object class.
    B) toString() method is defined in Class class.
    C) wait(), notify(), notifyAll() methods are defined in Object class and used
    for Thread communication.
    D) toString() method provides string representation of an Object state.
380. From the following definitions select correct ones?
   Button bt = new Button("Hello");
   A) public transient int val;
   B) public synchronized void Test();
   C) bt.addActionListener(new ActionListener());
   D) synchronized (this) {
       // Assume that "this" is an arbitrary object instance.
   }

381. Which of the following classes will throw "NumberFormatException"?
   A) Double   B) Boolean   C) Integer   D) Byte

382. What is the reason using $ in inner class representation?
   A) Because the inner classes are defined inside of any class
   B) Due to the reason that inner classes can be defined inside any method
   C) This is convention adopted by Sun, to ensure that there is no ambiguity
      between packages and inner classes.
   D) Because if use getClass().getName() will give you the error

383. What is output on screen when compile and run the following code?
   public class TestComp {
       public static void main(String args[]) {
           int x = 1;
           System.out.println("The value of x is " + (~x >> x));
       }
   }
   A) 1   B) 2   C) -1   D) -2

384. The method `getWhen()` is defined in which of the following class?
   A) AWTEvent   B) EventObject   C) InputEvent   D) MouseEvent

385. Select all correct answer?
   A) getSource() method is defined in java.awt.AWTEvent class
   B) getSource() method is defined in java.awt.EventObject class
   C) getID() method is defined in java.awt.AWTEvent class
   D) getID() method is defined in java.awt.EventObject class

386. Which of the following are correct answers?
   A) A listener object is an instance of a class that implements a listener interface.
   B) An event source is an object, which can register listener objects and sends notifications
      whenever an event occurs.
   C) Event sources raise events.  D) Event listeners raise events.

387. What are possible ways to implement LinkedList class?
   A) As a HashMap   B) As a Queue   C) As a TreeSet   D) As a Stack

388. Do I need to use synchronized on setValue(int)?
   It depends whether the method affects method local variables, class static or instance
   variables. If only method local variables are changed, the value is said to be confined by the
   method and is not prone to threading issues.

389. What is the SwingUtilities.invokeLater(Runnable) method for?
   The static utility method invokeLater(Runnable) is intended to execute a new runnable
   thread from a Swing application without disturbing the normal sequence of event dispatching
   from the Graphical User Interface (GUI). The method places the runnable object in the queue of
   Abstract Windowing Toolkit (AWT) events that are due to be processed and returns
   immediately.
390. What is the volatile modifier for?
The volatile modifier is used to identify variables whose values should not be optimized by the Java Virtual Machine, by caching the value for example. The volatile modifier is typically used for variables that may be accessed or modified by numerous independent threads and signifies that the value may change without synchronization.

391. Which class is the wait() method defined in?
The wait() method is defined in the Object class, which is the ultimate superclass of all others. So the Thread class and any Runnable implementation inherit this method from Object. The wait() method is normally called on an object in a multi-threaded program to allow other threads to run. The method should only be called by a thread that has ownership of the object's monitor, which usually means it is in a synchronized method or statement block.

392. What is a working thread?
A working thread, more commonly known as a worker thread is the key part of a design pattern that allocates one thread to execute one task. When the task is complete, the thread may return to a thread pool for later use. In this scheme a thread may execute arbitrary tasks, which are passed in the form of a Runnable method argument, typically execute(Runnable).

393. What is a green thread?
A green thread refers to a mode of operation for the Java Virtual Machine (JVM) in which all code is executed in a single operating system thread. If the Java program has any concurrent threads, the JVM manages multi-threading internally rather than using other operating system threads. There is a significant processing overhead for the JVM to keep track of thread states and swap between them, so green thread mode has been deprecated and removed from more recent Java implementations. Current JVM implementations make more efficient use of native operating system threads.

394. What are native operating system threads?
Native operating system threads are those provided by the computer operating system that plays host to a Java application, be it Windows, Mac or GNU/Linux. Operating system threads enable computers to run many programs simultaneously on the same central processing unit (CPU) without clashing over the use of system resources or spending lots of time running one program at the expense of another. Operating system thread management is usually optimised to specific microprocessor architecture and features so that it operates much faster than Java green thread.

395. What's the main difference between a Vector and an ArrayList Java?
Vector class is internally synchronized and ArrayList is not.

396. When should the method invokeLater() be used?
This method is used to ensure that Swing components are updated through the event-dispatching thread.

397. How can a subclass call a method or a constructor defined in a superclass?
Use the following syntax: super.myMethod(); To call a constructor of the superclass, just write super(); in the first line of the subclass’s constructor.

398. What's the difference between a queue and a stack?
Stacks works by last-in-first-out rule (LIFO), while queues use the FIFO rule.

399. We can create an abstract class that contains only abstract methods. On the other hand, you can create an interface that declares the same methods. So can you use abstract classes instead of interfaces?
Sometimes. But the class may be a descendent of another class and in this case the interface is the only option.

400. What comes to mind when you hear about a young generation in Java?
Garbage collection.

401. What comes to mind when someone mentions a shallow copy in Java?
Object cloning.
402. If we’re overriding the method equals() of an object, which other method you might also consider?
   hashCode()

403. We are planning to do an indexed search in a list of objects. Which of the two Java collections should you use: ArrayList or LinkedList?
   ArrayList

404. How would you make a copy of an entire Java object with its state?
   Have this class implement Cloneable interface and call its method clone().

405. How can you minimize the need of garbage collection and make the memory use more effective?
   Use object pooling and weak object references.

406. Explain different way of using thread?
   The thread could be implemented by using runnable interface or by inheriting from the Thread class. The former is more advantageous, 'cause when you are going for multiple inheritance...the only interface can help.

407. What are the different states of a thread?
   The different thread states are ready, running, waiting and dead.

408. Why are there separate wait and sleep methods?
   The static Thread.sleep(long) method maintains control of thread execution but delays the next action until the sleep time expires. The wait method gives up control over thread execution indefinitely so that other threads can run.

409. What is multithreading and what are the methods for inter-thread communication and what is the class in which these methods are defined?
   Multithreading is the mechanism in which more than one thread run independent of each other within the process. wait(), notify() and notifyAll() methods can be used for inter-thread communication and these methods are in Object class. wait() : When a thread executes a call to wait() method, it surrenders the object lock and enters into a waiting state. notify() or notifyAll() : To remove a thread from the waiting state, some other thread must make a call to notify() or notifyAll() method on the same object.

410. What is synchronization and why is it important?
   With respect to multithreading, synchronization is the capability to control the access of multiple threads to shared resources. Without synchronization, it is possible for one thread to modify a shared object while another thread is in the process of using or updating that object's value. This often leads to significant errors.

411. How does multithreading take place on a computer with a single CPU?
   The operating system's task scheduler allocates execution time to multiple tasks. By quickly switching between executing tasks, it creates the impression that tasks execute sequentially.

412. What is the difference between process and thread?
   Process is a program in execution whereas thread is a separate path of execution in a program.

413. What happens when you invoke a thread's interrupt method while it is sleeping or waiting?
   When a task's interrupt() method is executed, the task enters the ready state. The next time the task enters the running state, an Interrupted Exception is thrown.

414. How can we create a thread?
   A thread can be created by extending Thread class or by implementing Runnable interface. Then we need to override the method public void run().

415. What are three ways in which a thread can enter the waiting state?
   A thread can enter the waiting state by invoking its sleep() method, by blocking on I/O, by unsuccessfully attempting to acquire an object's lock, or by invoking an object's wait() method. It can also enter the waiting state by invoking its (deprecated) suspend() method.
416. How can I tell what state a thread is in?
Prior to Java 5, isAlive() was commonly used to test a thread's state. If isAlive() returned false the thread was either new or terminated but there was simply no way to differentiate between the two.

417. What is synchronized keyword? In what situations will you use it?
Synchronization is the act of serializing access to critical sections of code. We will use this keyword when we expect multiple threads to access/modify the same data. To understand synchronization we need to look into thread execution manner.

418. What is serialization?
Serialization is the process of writing complete state of a java object into output stream, that stream can be file or byte array or stream associated with TCP/IP socket.

419. What does the Serializable interface do?
Serializable is a tagging interface; it prescribes no methods. It serves to assign the Serializable data type to the tagged class and to identify the class as one which the developer has designed for persistence. ObjectOutputStream serializes only those objects which implement this interface.

420. When will you synchronize a piece of your code?
When you expect your code will be accessed by different threads and these threads may change a particular data causing data corruption.

421. What is daemon thread and which method is used to create the daemon thread?
Daemon thread is a low priority thread which runs intermittently in the background doing the garbage collection operation for the java runtime system. setDaemon method is used to create a daemon thread.

422. What is the difference between yielding and sleeping?
When a task invokes its yield() method, it returns to the ready state. When a task invokes its sleep() method, it returns to the waiting state.

423. What is casting?
There are two types of casting, casting between primitive numeric types and casting between object references. Casting between numeric types is used to convert larger values, such as double values, to smaller values, such as byte values. Casting between object references is used to refer to an object by a compatible class, interface, or array type reference.

424. What classes of exceptions may be thrown by a throw statement?
A throw statement may throw any expression that may be assigned to the Throwable type.

425. A Thread is runnable, how does that work?
The Thread class' run method normally invokes the run method of the Runnable type it is passed in its constructor. However, it is possible to override the thread's run method with your own.

426. Can I implement my own start() method?
The Thread start() method is not marked final, but should not be overridden. This method contains the code that creates a new executable thread and is very specialised. Your threaded application should either pass a Runnable type to a new Thread, or extend Thread and override the run() method.

427. Do I need to use synchronized on setValue(int)?
It depends whether the method affects method local variables, class static or instance variables. If only method local variables are changed, the value is said to be confined by the method and is not prone to threading issues.

428. What is thread priority?
Thread Priority is an integer value that identifies the relative order in which it should be executed with respect to others. The thread priority values ranging from 1-10 and the default value is 5. But if a thread have higher priority doesn't means that it will execute first. The thread scheduling depends on the OS.
429. What are the different ways in which a thread can enter into waiting state?
There are three ways for a thread to enter into waiting state. By invoking its sleep() method, by blocking on I/O, by unsuccessfully attempting to acquire an object's lock, or by invoking an object's wait() method.

430. How would you implement a thread pool?
The ThreadPool class is a generic implementation of a thread pool, which takes the following input: Size of the pool to be constructed and name of the class which implements Runnable (which has a visible default constructor) and constructs a thread pool with active threads that are waiting for activation. Once the threads have finished processing they come back and wait once again in the pool.

431. What is a thread group?
A Thread group is a data structure that controls the state of collection of thread as a whole managed by the particular runtime environment.

PART-C (16 MARKS)

432. With suitable examples consider the number of restrictions to consider when working with java generics. (APR/MAY 2011)

433. Write short notes on what thread are and the thread states and properties. (16) (APR/MAY 2011)

434. What is Generic programming and why is it needed? List the limitations and restrictions of generic programming. (16) (NOV/DEC 2010)

435. Explain how to create threads. Write a java program that prints numbers from 1 to 10 line by line after every 5 seconds. (16) (NOV/DEC 2010)

436. (i). Where can we write generic? Explain with a simple example. (6) (NOV/DEC 2011)
   (ii). What is multithreading? What are the methods available in Java for inter-thread communication? Discuss with an example. (10) (NOV/DEC 2011)

437. (i). Write short notes on thread synchronization. (6) (NOV/DEC 2011)
   (ii). When will you synchronize pieces of your code? Explain with examples. (10) (NOV/DEC 2011)

438. Explain in detail about inheritance, generics and reflection. (16) (NOV/DEC 2012)

439. What are interrupting threads? Explain thread states and synchronization. (16) (NOV/DEC 2012)

440. Explain the different states of a thread.

441. Explain thread synchronization with examples.

442. Explain the algorithm used for thread scheduling.

443. Describe multi threading.

444. Explain Deadlocks.

SUBJECT NAME: ENGINEERING ECONOMICS & FINANCIAL ACCOUNTING
SUBJECT CODE: MG2452

UNIT-1 INTRODUCTION

PART-A (1 MARK)

1. The crucial problem of economics is
   a. establishing a fair tax system.  b. providing social goods and services.
   c. developing a price mechanism that reflects the relative scarcities of products and resources.
   d. allocating scarce productive resources to satisfy wants.
2. What is mean by macro?
   a. large  b. small  c. medium
3. Who develop managerial economics?
   a. Dean   b) Pappas   c. Brigham
4. Economics is the science of wealth” is defined by
5. Micro economics is the study of
   a. Firm level   b. Nation level   c. State level
6. What is mean by normative economics?
   a. Involves judgement   b. involve precepts   c. involve interest
7. When one decision is made, the next best alternative not selected is called
   a. economic resource. b. opportunity cost. c. scarcity. d. comparative disadvantage.
   e. production.
8. To be considered scarce, an economic resource must be which of the following?
   I. Limited   II. Free   III. Desirable
   a. I only   b.I and II only c. II and III only   d.I and III only e. I, II and III
9. The basic economic problem is reflected In which of the following concepts?
   I. Opportunity cost   II. Production possibilities   III. The fallacy of composition
   IV. Ceteris paribus
   a. I only   b. IV only   c. I and II only d. II and III only e. II, III and IV only
10. The value of the best alternative forgone when a decision is made defines
    a. economic good. b. opportunity cost. c. scarcity. d. trade-off. e. comparative
11. In Mars, the opportunity cost of obtaining the first two units of food is how many units of clothing?
    a. 2   b. 3   c. 6 d. 8 e. 12
12. ÒIf you want to have anything done correctly, you have to do it yourself.Ó This quote violates the principle of which of the following economic concepts?
13. Which of the following would cause an outward or rightward shift in the production possibilities curve?
    a. An increase in unemployment   b.An increase in inflation   c.An increase in capital equipment
    d.A decrease in natural resources e. A decrease in the number of workers
14. Which of the following problems do all economic systems face?
    I. How to allocate scarce resources among unlimited wants
    II. How to distribute income equally among all the citizens
    III. How to decentralize markets
    IV. How to decide what to produce, how to produce and for whom to produce
    a. I only   b. I and IV only c. II and III only
    d. I, II and III only e. I, II, III and IV
15. Which of the following goods would be considered scarce?
    I. Education   II. Gold   III. Time
    a. I only   b. II only c. III only d.I and II only e. I, II and III

ANSWERS

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16. Define Managerial economics.
Managerial economics defined by BRIGHAM AND PAPPA, “the application of economic theory and methodology to business administration practice.

17. What are the features of Economics?
> Unlimited wants
> Scarce resources
> Alternative uses
> Making choice

18. Give the meaning of Engineering Economics.
It deals with the concepts and techniques of analysis useful in evaluating the worth of system, products and services in relation to their costs. The essential prerequisite of successful engineering application is to get the greatest result per unit of resource input.

19. What is Demand?
Every want supported by the willingness to buy and ability to buy.

20. State the types of demand.
Price demand Income demand Cross demand

21. Give the meaning of law of Demand.
Other things remaining the same, the amount of quantity demanded rises with every fall in the price and vice versa. It states that the relationship between price and demand of a particular product or service.

22. What is Elasticity of demand?
The term elasticity is defined as the rate of responsiveness in the demand of commodity for a given change in price or any other determinants of demand.

23. Mention two important features of price elasticity
Proportionate changes in the quantity demand for product Proportionate change in the price of another product.

24. Give the meaning of fixed cost and variable cost
Fixed cost is not varied according to the level of productivity, but the variable cost depends upon the level of productivity.

25. What is elasticity of demand?
The rate of responsiveness in the demand of a commodity for a given changes in prices or any other determinants of demand.

26. What do you mean by marginal utility?
Additional productivity of additional demand is known as marginal utility.

27. State any two types of Elasticity.
Price elasticity Income elasticity Cross elasticity Advertising elasticity of demand.

28. Discuss the nature and scope of managerial economics?

29. How far is profit maximization the basic objective of a firm? What are the reasons for?

30. Explain Baume’s sales maximization theory? Explain different types of managerial decisions.

31. Decision making is central in the process of management—Discuss.

32. What do you understand by the process of decision making?

33. Explain the objectives of the firm and analyze different theories governing the same

34. Write short notes on programmed and non-programmed decisions.

35. Enumerate the nature of Managerial Economics
UNIT-II   DEMAND & SUPPLY ANALYSIS

PART-A     (1MARK)

36. Both auditing and accounting are concerned with financial statements. Which of the Following
   a) Auditing uses the theory of evidence to verify the financial information made available by Accountancy.
   b) Auditing lends credibility dimension and quality dimension to the financial statements prepared by the accountant.
   c) Auditor should have through knowledge of accounting concepts and convention to enable him to express an opinion on financial statements. d) All of the above.

37. Goods and services are demanded by
   a. Consumer  b. Producer  c. Market

38. A hypothetical income demand schedule and its corresponding income demand curve is
   a. Engle b. Parabola  c demand curve

39. In demand function I is for
   a. income  b. price  c. function

40. Law of demand explains the direction of change in
   a. demand  b. elasticity  c. utility

41. If a big change in price is followed by a small change in demand is
   a. elasticity  b. in elasticity  c. forecasting

42. The risk of management fraud increases in the presence of:
   a) Frequent changes in supplies, b) Improved internal control system, c) Substantial increases in sales, d) Management incentive system based on sales done in a quarter

43. Auditing standards differ from audit procedures in that procedures relate to
   a) Audit assumptions, b) acts to be performed, c) quality criterion, d) methods of work

44. Which of the following factors likely to be identified as a fraud factor by the auditor?
   a) The company is planning a initial public offer of quality shares to raise additional capital for expansion.
   b) Bank reconciliation statement includes deposits in transit.
   c) Plant and machinery is sold at a loss. d) The company has made political contributions.

45. The most difficult type of misstatement to detect fraud is based on:
   a) Related party purchases b) Related party sales c) The restatement of sales d) Omission of a sales transaction from being recorded.

46. An auditor who accepts an audit but does not possess the industry expertise of the business entity should
   a) engage experts b) obtain knowledge of matters that relate to the nature of entity. business
   c) inform management about it d) take help of other auditors

47. The least important element in the evaluation of an audit firm’s system of quality control would relate to
   a) assignment of audit assistants b) system of determining audit fees c) consultation with experts d) confidentiality of client’s information

48. Audit of banks is an example of –
   a) Statutory audit b) Balance sheet audit c) Concurrent audit d) Both (a) and (b) e) All of the above
49. Concurrent audit is a part of  
   a) Internal check system  b) Continuous audit  c) Internal audit system  d) None

50. In determining the level of materiality for an audit, what should not be considered?  
   a) Prior year”s errors  b) The auditor”s remuneration  c) Adjusted interim financial statements  d) 
   Prior year”s financial statements

ANSWERS

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PART-B  
(2MARKS)

51. What is meant by price elasticity?  
Quantity demanded of a commodity in response to a given change in price.

52. What do you mean by cross elasticity of demand?  
Cross elasticity of demand refers to the quantity demanded of a commodity in response to a change in 
the price of a related goods, which may be substitute or complementary.

53. What is indifference curve?  
A curve which reveals certain combination of goods and services that yield a consumer the same 
utility.

54. Mention any 4 assumptions of Law of diminishing marginal utility  
Nature of product or service Size of the business Quality of the sweets Zero time intervals

55. Define market demand.  
Market demand for a particular product is the total volume that would be bought by a defined 
customer group in a marked geographical area in a certain marketing programming.

56. Mention the methods of demand forecasting.  
Survey methods Statistical methods Expert opinion method Test marketing Controlled experiments 
Judgmental approach

57. What do you mean by Income elasticity of demand?  
Income elasticity of demand refers to the quantity demanded of a commodity in response to a given 
change of the consumer.

58. What are the types of elasticity?  
Perfect elasticity, perfectly inelasticity, Unit elasticity, relatively elastic supply, relatively in 
elasticity supply

59. What is income demand?  
Income demand refers to the quantity of commodity purchased by a consumer at different levels of 
income.

PART-C  
(16MARKS)

60. What is demand function? Explain the importance determinants of demand?

61. Define price elasticity of demand. Describe the various methods of measuring the Same.

62. Define elasticity of demand and distinguish its types. Discuss the role of elasticity of 
demand.

63. Distinguish between price elasticity, income elasticity, and cross elasticity of Demand.

64. Define Supply and discuss the law of supply.

65. What is meant by demand forecasting? Explain the methods used in demand Forecasting 
and their limitations.
UNIT-III PRODUCTION AND COST ANALYSIS

PART-A (1MARK)

66. Which of the following affects audit effectiveness?
   a) Risk of over reliance
   b) Risk of incorrect rejection
   c) Risk of incorrect acceptance
   d) Both (a) and (c)

67. What would most effectively describe the risk of incorrect acceptance in terms of substantive audit testing?
   a) The auditor has ascertained that the balance is materially correct when in actual fact it is not
   b) The auditor concludes the balance is materially misstated when in actual fact is not
   c) The auditor has rejected an item from sample which was not supported by documentary evidence
   d) He applies random sampling on data which is inaccurate and inconsistent

68. Audit programme is prepared by
   a) the auditor
   b) the client
   c) the audit assistants
   d) the auditor and his audit assistants

69. The working papers which auditor prepares for financial statements audit are:
   a) evidence for audit conclusions
   b) owned by the client
   c) owned by the auditor d) retained in auditor”s office until a change in auditors

70. The quantity of audit working papers complied on engagement would most be affected by
   a) management”s integrity
   b) auditor”s experience and professional judgment
   c) auditor”s qualification
   d) control risk

71. The auditor’s permanent working paper file should not normally, include
   a) extracts from client.s bank statements
   b) past year.s financial statements
   c) attorney.s letters
   d) debt agreements

72. The main advantage of using statistical sampling techniques is that such techniques:
   a) mathematically measure risk
   b) eliminate the need for judgmental sampling
   c) defines the values of tolerable error
   d) all of the them

73. Objective of pricing is
   a. profit maximization
   b. stabilization
   c. prevention

74. Monopoly describes
   a. single seller
   b. large buyers
   c. more seller

75. What are the public sector companies
   a. railways
   b. posts
   c. both

ANSWERS

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PART-B (2MARKS)

76. What is production function?
   Production function is defined at a given stage of technical knowledge. It means that if there is any technological breakthrough there could be further jump in the volume of production for a given set up of inputs.
77. **What is Isoquants?**
   Iso means equal. Quant means quantit, Isoquant means that quantities throughout the given isoquant are equal. It is otherwise called as isoproduct curves.

78. **What are the characters of Isoquants?**
   Downward sloping Convex to origin Do not intersect Does not touch axes

79. **Give the meaning of Isocosts.**
   This curves represent the combination of inputs that will cost a producer the same amount of moneys.

80. **What is the rule of COBB-DOUGLAS function?**
    
    \[ P = bL^a c^{1-a} \]
    
    Where \( P \) is the total output
    
    \( L \) is the index of employment of labour in manufacturing
    
    \( C \) = index of fixed capital in manufacturing.

81. **Define long run curve**
   It defined as a period of adequate length in which a company may alter all factors of a production with a high degree of flexibility. It covers the cost of changes in the size and kind of plant.

82. **What is demand forecasting?**
   The results of demand forecasting guide the entrepreneurs to set up their business.

83. **What is increase and decrease in demand?**
   Increase demand means need of particular commodity is richer than the existing productivity due to the heavy demand of the product or service. Decrease in demand is lower than that of exiting demand.

84. **What is demand schedule?**
   Systematic arrangement of demand is demand schedule.

85. **What is decision making?**
   Choosing from the various alternatives, which can able to use and give the better results.

86. **What is sunk costs?**
   Sunk costs are those that have already been committed or spent in the past They do not any more affect the current production. The cost of storing in the case of a firm having unused warehouse space otherwise stand empty is the sunk costs.

87. **Mention the characteristics of perfect competition.**
   A large number of buyers and sellers.
   Homogeneous products or services.
   Freedom to enter or exit the market
   Perfect mobility of factors of production.
   Each firm is a price taker.

88. **What is monopoly?**
   Monopoly refers to a situation where a single firm is in a position to control either supply or price of a particular product or service.

89. **Define oligopoly.**
   It is the form of organization in the market where there are few sellers of a homogeneous or differentiated product or services.

90. **Mention the causes of monopoly.**
   Government policies and legal provisions.
   Mergers and acquisitions
   Research and development
   Control over key inputs.

91. **What collusion?**
   To protect the business interest at large, oligopoly firms may have a tacit collusion among themselves to fix prices and quatos for each of them.
PART-C  (16MARKS)

92. Explain the nature and managerial uses of production?
93. Explain the law of diminishing marginal returns?
94. Explain and discuss the production function of Cobb- Douglas type.
95. What is the difference between return to scale and return to production?
96. Discuss the properties of ‘Isoquants’.
97. Explain the features of Short-run Average Cost curve and Long-run Average Cost Curve?
98. Write an essay on Cost-Output relation in the short run and long run?

UNIT-IV PRICING

PART-A  (1MARK)

100. Which of the following is true when a debtor pays his dues?
a. The asset side of the balance sheet will decrease
b. The asset side of the balance sheet will increase
C. The liability side of the balance sheet will increase
d. There is no change in total assets or total liabilities

101. Withdrawal of goods from stock by the owner of the business for personal use should be recorded by debiting
a. Drawings account and crediting cash account
b. Drawings account and crediting purchases account
C. Capital account and crediting drawings account
d. Purchases account and crediting drawings account

102. The cost price of a machine is Rs.1,20,000 and the depreciated value of the machine after 3 years will be Rs.66,000. If the company charges depreciation under straight-line method, the rate of depreciation will be
a. 25% b. 20% C. 18% d. 15%

103. Consider the following data pertaining to a firm:
Credit balance as per bank column of cash book Rs.13,500
Bank interest on overdraft appeared only in the pass book Rs.2,100
Cheques deposited but not collected by the bank Rs.5,000
The balance as per pass book is
a. Rs.20,600 (Dr. balance)  b. Rs.18,500 (Dr. balance)
C. Rs.18,500 (Cr. balance)  d. Rs.15,600 (Dr. balance)

104. Consider the following data pertaining to a company for the year 2011-2012:
Opening balance of sundry debtors Rs. 45,000
Credit sales Rs.4,25,000
Cash sales Rs. 20,000
Cash collected from debtors Rs.4,00,000
Closing balance of sundry debtors Rs. 50,000
The bad debts of the company during the year are
a. Rs.40,000  b. Rs.35,000  C. Rs.30,000  d. Rs.20,000

105. The opening stock of a company is Rs.40,000 and the closing stock is Rs.50,000. If the purchases during the year are Rs.2,00,000 the cost of goods sold will be
a. Rs.2,10,000  b. Rs.2,00,000  C. Rs.1,90,000  d. Rs.1,80,000
106. The balance as per bank statement of a company is Rs.12,500 (Dr.). The company deposited two cheques worth Rs.8,500, out of which one cheque for Rs.2,800 was dishonoured which was not entered in the cash book. The credit balance as per cash book is
a. Rs.21,000  
b. Rs.15,300  
c. Rs.23,800  
d. Rs. 9,700

107. During the year 2002-03, the profit of a business before charging manager’s commission was Rs.1,89,000. If the manager’s commission is 5% on profit after charging his commission, then the total amount of commission payable to manager is
a. Rs.10,000  
b. Rs. 9,450  
c. Rs. 9,000  
d. Rs. 8,500

108. Which of the following statements is true?
a. The losses from the sale of capital assets need not be deducted from the revenue to ascertain net income
b. Going concern concept requires that always non-monetary assets should be valued and recorded at market value
C. According to consistency concept, the results of one accounting period of a business cannot be compared with that of in the past
d. In terms of conservatism concept all probable losses must be considered in computation of income

109. Which of the following ratios indicates the short-term liquidity of a business?
a. Inventory turnover ratio  
b. Debt-equity ratio
C. Acid test ratio  
d. Proprietary ratio

110. Which of the following should be deducted in the Balance Sheet of a company from the share capital to find out paid-up capital?
a. Calls-in-advance  
b. Calls-in-arrears  
c. Share forfeited. Discount on issue of shares

111. Which of the following statements is false?
a. The forfeited shares should not be issued at a premium
b. At the time of forfeiture of shares, share premium should not be debited with the amount of premium already received
C. Shares can be issued at a discount only after one year from the commencement of business
d. Share premium cannot be utilized to redeem preference shares

112. Which of the following accounting treatments is/are true in respect of accrued commission appearing on the debit side of a trial balance?
a. It is shown on the debit side of the profit and loss account
b. It is shown on the credit side of the profit and loss account
C. It is shown on the liabilities side of the balance sheet
d. It is shown on the assets side of the balance sheet

113. The maximum amount beyond which a company is not allowed to raise funds by issue of shares is
a. Issued capital  
b. Reserve capital  
c. Nominal capital  
d. Subscribed capital

114. The discount allowed on re-issue of forfeited shares is debited to
a. Discount on re-issue of shares account  
b. Profit and loss account
C. Share premium account  
d. Forfeited shares account

ANSWERS

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PART-B

115. **What is pricing policy?**

   Pricing policies are intended to bring consistency in the pricing pattern, they define how to handle complex issues such as price discrimination.

116. **What are the methods of pricing?**

   - Cost-based pricing
   - Competition based pricing
   - Demand based pricing
   - Strategy based pricing.

117. **What is meant by skimming pricing?**

   It refers to the practice of offering products at the highest possible price which has only creamy layer of customer can offered.

118. **Brainstorming—meaning.**

   It is a technique used to generate as many ideas as possible from a group of people on a selected problem.

119. **What are the types of decision making?**

   - Personal and organizational decisions
   - Basic and routine decision
   - Programmed and non-programming decision

120. **State the meaning of Synectics**

   The main idea for synetics is to stimulate novel and even bizarre alternatives through the joining together of distinct and apparently irrelevant ideas.

121. **What is meant by opportunity cost?**

   It refers to the value that must be foregone in using a resource for one specific purpose or in undertaking one specific activity.

122. **What is Accounting?**

   Accounting is an art of recording classifying and summarizing in a significant manner and in terms of money and equivalent thereof, in part at least, of a financial character interpreting the results.

123. **What are the fundamental principles of Accounting?**

   - Personal Account: DEBIT THE RECEIVER AND CREDIT THE GIVER.
   - Real Account: DEBIT WHAT COMES IN AND CREDIT WHAT GOES OUT.
   - Nominal Account: DEBIT ALL THE EXPENSES AND LOSSES AND CREDIT ALL INCOMES AND GAINS.

124. **State any three concepts of accounting**

   - Business entity concept
   - Going concern concept
   - Dual aspect concept
   - Money measurement concept
   - Accounting period concept.

PART-C

125. **What are the different pricing methods adopted in practice?**

126. **What is pricing? Explain any four different methods of pricing known to you.**

127. **Discuss various techniques of price formulation in actual business situation.**

128. **Distinguish between perfect competition and monopoly.**

129. **Explain different types of competitive situations that may possibly be found in a Market.**

130. **Define oligopoly. State its importance features.**

131. **Discuss the uses and limitation of marginal cost pricing.**

132. **Distinguish between Cost approach to pricing and market approach to pricing.**
UNIT-V FINANCIAL ACCOUNTING (ELEMENTARY TREATMENT)

PART-A (1MARK)

133. Which of the following expenses should not be treated as capital expenditure?
   a) Expenses paid on installation of a plant. b) Cost of dismantling a building in case a new building is
to be constructed on the land. c) Legal expenses incurred to defend a suit related to title of patent. The
suit has been lost. d) The fees paid to engineer who constructed the plant.

134. Which of the following is not a revenue expense?
   a) Cost of raising a loan, b) Cost of accessories of motor vehicles spent at the time of purchase c)
   Expenses incurred for laying of sewers on land purchased, d) Insurance premium paid at the time of
   registration of the ship.

135. Depreciation does not arise from:
   a) effluxion of time b) use c) obsolescence through technology be market changes d) remarket
   expectation

136. If the book value of an asset stands at ……..per cent of the original cost, a company need
   not provide depreciation on it.
   a) two b) fifteen c) five d) ten

137. A company has bought patents. Which of the following methods is most suitable for
   providing depreciation on them?
   a) SLM b) WDV c) Sum of year digits d) Any of the above

138. Which of the following is a revenue reserve?
   a) Capital redemption reserve b) Security premium account
   c) Debenture redemption reserve d) Capital reserve

139. Which of the following will not lead to creation of secret reserve?
   a) Undervaluation of closing stock b) Charging capital expenditure to revenue c) Goods sent on
   consignment being shown as actual sales d) Charging higher rates of depreciation on fixed assets than
   actually required

140. Which of the following statement is not true?
   a) A partnership firm can be appointed as a statutory auditor of limited company
   b) Appointment can be made in the name of the firm
   c) Majority of the partners should be practicing in India
   d) All partners should be chartered accountants

141. Which of the following report not result in qualification of the auditor’s opinion
   due to a scope limitation?
   a) Restrictions the client imposed b) Reliance on the report of other auditor
   c) Inability to obtain sufficient appropriate evidential matter d) Inadequacy of accounting records

142. The inventory consists of about one per cent of all assets. The client has imposed
   restriction on auditor to prohibit observation of stock take. The auditor cannot apply
   alternate audit procedures.
   a) unqualified opinion b) qualified opinion c) disclaimer of opinion d) adverse opinion

ANSWERS

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PART-B (2MARKS)

143. Who are the users of accounting?
Owners
Creditors
Managers
Government
Tax authorities
Employees.

144. What is current asset?
These are expected to be realized in cash or near cash with in shorter period of 12 months and
which can used for business operation Example, cash, stock, Bills receivables, etc.,

145. What is current liabilities?
What the firm has to pay legally, they are called liabilities, when it can be mature d with in an
year is called current liabilities

146. What is journal?
Journal is the first record in which transactions are recorded in a chronological order the
moment they make place in the business.

147. What is accounting cycle?
It covers all the important stages in accounting, which includes preparing journal, ledger
subsidiary books, trial balance and final account.

148. What is Ledger?
The process of preparation of accounts from the journal into ledger, it consists of several books.

149. What do you mean by journal proper?
When a transaction enter in a subsidiary books are known as journal proper, for example, Opening
entries, closing entries, adjustment entries, transfer entries etc.,

150. What is trial balance?
Trial balance is a statement containing debit and credit balances of various
accounts taken out from ledger books as on a particular date.

151. What is meant by profit and loss account?
It shows the net profit or net loss of an operation at the end of the financial period ended. It consider
only the revenue income and expenditure items.

152. What is Balance sheet?
It presents the true and fair view of the financial position of the business in a given date and it shows
the position of total assets and its total liabilities.

153. What is ratio?
Ratios are expressed in terms of numerical aspects, in the format of percentages, proportions and
quotients.

154. Define Funds.
Funds means working capital or net working capital, geneally which means cash which is used for
operation of the business.

155. What is meant by cash flow statement?
A statement of changes in cash flows that explains the various sources of cash get into the business
and go out by the business during a given period.
156. Explain the purpose of preparing balance sheet and list out important details furnished in a balance sheet of company.

157. Explain Average Rate of Return method in detail.

158. Explain the purpose of Profit & Loss Account

159. Following is the Balance Sheet of M/s. ………………. Ltd.

<table>
<thead>
<tr>
<th>Liabilities Amount</th>
<th>Assets in Rs.</th>
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<tbody>
<tr>
<td>Equity share capital 1,25,000</td>
<td>Fixed assets 2,30,000</td>
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<td>10% preference share capital 75,000</td>
<td>8% Debentures 50,000</td>
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<td>Cash 20,000</td>
<td>Bills receivables 40,000</td>
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<td>Reserves and surplus 60,000</td>
<td>Debtors 25,000</td>
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<td>Outstanding expenses 5,000</td>
<td>Overdraft 20,000</td>
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<td>Debtors 25,000</td>
<td>Stock 35,000</td>
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</table>
| Creditors 15,000 | Net profit before interest and tax = Rs. 20,000.

Calculate: (i) Current ratio (ii) Liquidity ratio (iii) Proprietary ratio (iv) Debt-Equity ratio.

(b) From the following balances sheets of Ranjit Ltd. prepare fund flow statement.

160. Explain the following evaluation methods with illustrations:

(i) Average Rate of Return
(ii) Pay Back Period
(iii) Net Present Value.

161. Find out accounting rate of return and suggest to themanagementregarding the selection of the proposals if the desired rate of return is 20%. Assume that there is no scrap value.

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<th>Particulars</th>
<th>Proposals A (in Rs.)</th>
<th>Proposal B (in Rs.)</th>
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<td>Investment</td>
<td>10,000</td>
<td>20,000</td>
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<tr>
<td>Expected life in years</td>
<td>3 4</td>
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<tr>
<td>Net Income - Year 1</td>
<td>3,000</td>
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<td>Year 2</td>
<td>2,500</td>
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<td>Year 4</td>
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<td>2,500</td>
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Or

162. M/s. Sreedharan Ltd. is considering the purchase of a machine whichcost Rs. 1,50,000. Expected cash flows from the above investment areasfollows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Cash flow in Rs.</th>
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<td>1</td>
<td>50,000</td>
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Assuming the discount rate as 10% suggest whether purchase of that machine is worth or not?

UNIT-VI CAPITAL BUDGETING. (ELEMENTARY TREATMENT)

PART-A (1MARK)

163. Which of the following documents is not relevant for vouching cash sales?

a) Daily cash sales summary  
b) Salesmen.s summary

c) Monthly statements sent to customers  
d) Bank statement
164. The auditor should examine subsequent realization of revenue such as dividends, interest, commission, etc to
   a) identify cases of unrecorded revenue b) ensure proper disclosure in the balance sheet c) recompute accrued income on the data of balance sheet d) Any of these

165. To test whether sales have been recorded, the auditor should draw a sample from a file of
   a) purchase orders b) sales orders c) sales invoices d) bill of loading

166. For vouching of which item, the auditor is most likely to examine cost records?
   a) Commission earned b) Bad debts recorded c) Credit sales d) Sale of scrap

167. The Guidance Note on Revenue issued by the ICAI does not deal with
   a) Sales revenue b) Revenue rendering service c) Revenue from sale of fixed assets
d) Income from interest, dividend

168. In case of unclaimed wages, the auditor should examine whether
   a) the amount has been deposited in a separate bank account b) deposited with the cashier c) held in a safe deposit box d) All of these

169. Which of the following is most crucial to a purchase department?
   a) Reducing the cost of acquisition b) Selecting supplies c) Authorizing the acquisition of goods d) Assuring the quality of goods

170. The auditor is most likely to examine related party transactions very carefully while vouching
   a) credit sales b) sales returns c) credit purchases d) cash purchases

171. Analytical procedures are least likely to be used in the audit of –
   a) cash balance b) investments c) bills receivables d) debtors

172. The balance of cash in often between one to five percent of total assets. Tick the most appropriate statement with regard to verification of cash in context of this
   a) Cash in always material as materiality is qualitative concept
   b) No audit of cash is needed when, in auditor opinion, cash is immaterial.
   c) The cash balance need only be audited if the balance is in over draft
   d) Cash is to be verified if control risk is assessed as high

ANSWERS

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PART-B (2MARKS)

173. What are the methods of capital budgeting?
   Traditional Methods Payback period Accounting rate of return (or) Average rate of return Discounted cash flow method.
   Internal rate of return Net present value method.

174. What is meant by pay back method?
   Payback method is based on the period of investment result, of an investment which can give the shortest duration of beneficiary that can be chosen by the capital budgeting decision.

175. What is meant by NPV?
   NPV means net present value of any investment. It is the difference of present value of the future cash inflows and the original investment.

176. Give the significance of capital budgeting?
   They involve substantial capital outlay They affect the future of the business.
177. What are the techniques of financial analysis?
Ratio analysis Fundflow and cash flow Common size statement Comparative statement.
178. What are the limitations of cash flow analysis?
Cash flow statement be equated with the income statement
Cash flow cannot replace the income statement

PART-C (16MARKS)

179. What are isoquants? What are its types? What are the properties of isoquants?
180. What is concept of Elasticity of demand? Discuss the various types of elasticity of demand with illustrations.
181. Discuss various methods of demand forecasting and their merits and demerits.
182. Discuss cost-output relationship in both short-run and long-run.
183. Explain the limitations of financial statements.
184. Illustrate a profit and loss statement with assumed data.

SUBJECT NAME: SYSTEM SOFTWARE
SUBJECT CODE: CS2304

UNIT -I FUNDAMENTALS

PART-A (1 MARK)

1. Machine language is
   a. Machine dependent b. Difficult to program  c. Error prone  d. All of above
2. Mnemonic a memory trick is used in which of the following language?
3. The translator program used in assembly language is called
   a. Compiler  b. Interpreter  c. Assembler  d. Translator
4. Easily re-locatable language is
5. Which of the following is called low level languages?
   a. Machine language  b. Assembly language  c. Both of the above  d. None of above
6. Which of the following is problem oriented language?
7. A compiler is a translating program which
   a. Translates instruction of a high level language into machine language  b. Translates entire source program into machine language program  c. It is not involved in program’s execution  d. All of above
8. Which of the following is machine independence program?
9. Which statement is valid about interpreter?
   a. It translates one instruction at a time     b. Object code is saved for future use
   c. Repeated interpretation is not necessary    d. All of above

10. Which is the limitation of high level language?
   a. Lower efficiency    b. Machine dependence    c. machine level coding    d. None of above

11. High level language is also called
   a. Problem oriented language    b. Business oriented language    c. mathematically oriented language    d. All of the above

12. A computer programmer
   a. Does all the thinking for a computer    b. Can enter input data quickly
   c. Can operate all types of computer equipments    d. Can draw only flowchart

13. CD-ROM is a
   a. Semiconductor memory    b. Memory registers    c. Magnetic memory    d. None of above

14. Which of the following is not a primary storage device?
   a. Magnetic tape    b. Magnetic disk    c. Optical disk    d. None of above

15. A name or number used to identify a storage location device?
   a. A byte    b. A record    c. An address    d. All of above

16. Which of the following is a secondary memory device?
   a. Keyboard    b. Disk    c. ALU    d. All of the above

17. The difference between memory and storage is that memory is … and storage is …
   a. Temporary, permanent    b. Permanent, temporary    c. Slow, fast    d. All of above

18. A floppy disk contains
   a. Circular tracks only    b. Sectors only    c. Both circular tracks and sectors    d. All of the above

19. The octal equivalent of 111010 is
   a. 81    b. 72    c. 71    d. None of above

20. The first electronic computer in the world was
   a. UNIVAC    b. EDVAC    c. ENIAC    d. All of above

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   It consists of variety of programs that supports the operation of the computer. This software makes it possible for the user to focus on the other problems to be solved without needing to know how the machine works internally.
Eg: operating system, assembler, and loader.

22. Give some applications of operating system. (A.U.APRIL/MAY 2008)

- to make the computer easier to use
- to manage the resources in computer
- process management
- data and memory management
- to provide security to the user.

Operating system acts as an interface between the user and the system
Eg: windows, linux, unix, dos


Compiler is a set of program which converts the whole high level language program to machine language program.
Interpreter is a set of programs which converts high level language program to machine language program line by line.


Loader is a set of program that loads the machine language translated by the translator into the main memory and makes it ready for execution.

25. What is the need of MAR register. (A.U.APRIL/MAY 2009)

MAR (memory address register) is used to store the address of the memory from which the data is to be read or to which the data is to be written.


opcode L B1 D1 B2 D2 0 7 8 15 16 19 20 31 32 35 36 47
It is a 6 byte instruction used to move L+I bytes data from the storage location1 to the storage location2.
Storage location1 = D1+[B1] Storage location2 = D2+[B2]
Eg: MOV 60,400(3),500(4)

27. Give any two differences between base relative addressing and program counter relative addressing used in SIC/XE. (A.U.NOV/DEC 2011)

Base relative addressing PC relative addressing aTarget address is calculated using the formula Target address = Displacement + [B] B-base register Here The target address is calculated using the formula Target address = Displacement + [PC] PC-program counter Displacement lies between 0 to 4095 Displacement lies between –2048 to 2047


In the case of immediate addressing the operand field gives the memory location. The word from the given address is fetched and it gives the address of the operand. Eg: ADD R5, [600] Here the second operand is given in indirect addressing mode. First the word in memory location 600 is fetched and which will give the address of the operand.
29. Define immediate addressing.

In this addressing mode the operand value is given directly. There is no need to refer memory. The immediate addressing is indicated by the prefix ‘#’.

Eg: ADD #5

In this instruction one operand is in accumulator and the second operand is a immediate value the value 5 is directly added with the accumulator content and the result is stored in accumulator.

30. List out any two CISC and RISC machine. (A.U.APRIL/MAY 2011)

CISC – Power PC, Cray T3E
RISC – VAX, Pentium Pro architecture

31. Following is a memory configuration: (A.U.NOV/DEC 2011)

Address Value Register R
1 5 5
5 7
6 5

32. Following is a memory configuration: (NOV/DEC 2011)

Address Value Register R
4 9 6
5 7
6 2

What is the result of the following statement?
SUB 4(direct) to R (direct)

Here one operand is in the address location 4(direct addressing) and the next operand is in the register (register direct).
The resultant value is 9 – 6 = 3.

33. What is the name of X and L register in SIC machine and also specify its use.

A-accumulator Used for arithmetic operation, i.e. in the case of arithmetic operations one operand is in the accumulator, and other operand may be a immediate value, register operand or memory content. The operation given in the instruction is performed and the result is stored in the accumulator register.
L-linkage register It is used to store the return address in the case of jump to subroutine (JSUB) instructions.

34. What are the instruction formats used in SIC/XE architecture? Give any one format.

Format 1 (1 byte), Format 2 (2 bytes), Format 3 (3 bytes) & Format 4 (4 bytes)

Are the different instructions used in SIC/XE architecture?

Format 2:
8 4 4
OPCODE R1 R2
35. Consider the instructions in SIC/ XE programming (A.U.APRIL/MAY 2010)

10 1000 LENGTH RESW 4
20 ----- NEW WORD 3
What is the value assign to the symbol NEW.
In the line 10 the address is 1000 and the instruction is RESW 4.It reserves 4 word (3 x 4 =12) area for the symbol LENGTH.hence 12 is added to the LOCCTR.
Thus the value of the symbol NEW is 1000+12 =100C.

36. **What is the difference between the instructions LDA # 3 and LDA THREE?**
In the first instruction immediate addressing is used. Here the value 3 is directly loaded into the accumulator register.
In the second instruction the memory reference is used. Here the address (address assigned for the symbol THREE) is loaded into the accumulator register.

37. **Differentiate trailing numeric and leading separate numeric.**
The numeric format is used to represent numeric values with one digit per byte. In the numeric format if the sign appears in the last byte it is known as the trailing numeric. If the sign appears in a separate byte preceding the first digit then it is called as leading separate numeric.

38. **What are the addressing modes used in VAX architecture? (A.U.NOV/DEC 2010)**
Register direct, register deferred, auto increment and decrement, program counter relative, base relative, index register mode and indirect addressing are the various addressing modes in VAX architecture.

39. **How do you calculate the actual address in the case of register indirect with immediate index mode?**
Here the target address is calculated using the formula T.A =(register) + displacement.

40. **Write the sequence of instructions to perform the operation BETA = ALPHA + 1 using SIC instructions.**
LDA ALPHA
ADD ONE
STA BETA
ALPHA RESW 1
BETA RESW 1
ONE RESW 1

41. **Write the sequence of instructions to perform the operation BETA = ALPHA+5(APRIL 2006)**
using SIC/XE instructions.
LDA ALPHA
ADD #1
STA BETA
ALPHA RESW 1
BETA RESW 1
42. What is the use of TD instruction in SIC architecture?
The test device (TD) instruction tests whether the addressed device is ready to send or receive a byte of data. The condition code is set to indicate the result of this test. Setting of < means the device is ready to send or receive, and = means the device is not ready.

PART –C (16 MARKS)

43. Explain about the Cray T3E architecture (A.U.APRIL/MAY 2011)
44. Write in detail about Pentium Pro architecture. (A.U.APRIL/MAY 2010)
45. Explain the architecture of SIC/XE machine. (A.U.NOV/DEC 2012)
46. Explain the General structure of IBM 370 system with a neat sketch and also explain the different instruction formats used in it. Give one example for each instruction format.
47. Mention the differences between SIC and SIC/XE. (A.U.APRIL/MAY 12)

NIT II-ASSEMBLERS

PART -A 1 MARKS

49. The most commonly used standard data code to represent alphabetical, numerical and punctuation characters used in electronic data processing system is called
   a. ASCII   b. EBCDIC  c. BCD   d. All of above. 50. __________
tags, when placed on an animal, can be used to record and track in a database all of the animal movements.
A. POS  B. RFID  C. PPS  D. GPS

51. Surgeons can perform delicate operations by manipulating devices through computers instead of manually. This technology is known as:

52. Technology no longer protected by copyright, available to everyone, is considered to be:

53. __________ is the study of molecules and structures whose size ranges from 1 to 100 nanometers.
A. Nanoscience  B. Microelectrodes  C. Computer forensics  D. Artificial intelligence

54. __________ is the science that attempts to produce machines that display the same type of intelligence that humans do.
A. Nanoscience  B. Nanotechnology  C. Simulation  D. Artificial intelligence (AI)

55. __________ is data that has been organized or presented in a meaningful fashion.
A. A process  B. Software  C. Storage  D. Information
56. The name for the way that computers manipulate data into information is called:

57. Computers gather data, which means that they allow users to __________ data.
A. present  B. input  C. output  D. store

58. After a picture has been taken with a digital camera and processed appropriately, the actual print of the picture is considered:
A. data.  B. output.  C. input.  D. the process.

59. Computers use the ___________ language to process data.
A. processing  B. kilobyte  C. binary  D. representational

60. Computers process data into information by working exclusively with:

61. In the binary language each letter of the alphabet, each number and each special character is made up of a unique combination of:
A. eight bytes.  B. eight kilobytes.  C. eight characters.  D. eight bits.

62. The term bit is short for:

63. A string of eight 0s and 1s is called a:

64. A ____________ is approximately one billion bytes.
A. kilobyte  B. bit  C. gigabyte  D. megabyte

65. A ____________ is approximately a million bytes.
A. gigabyte  B. kilobyte  C. megabyte  D. terabyte

66. ____________ is any part of the computer that you can physically touch.
A. Hardware  B. A device  C. A peripheral  D. An application

67. The components that process data are located in the:

68. All of the following are examples of input devices EXCEPT

69. Define the basic functions of assembler.
*translating mnemonic operation codes to their machine language equivalents.
*Assigning machine addresses to symbolic labels used by the programmer.
70. **What is meant by assembler directives? Give example.**

These are the statements that are not translated into machine instructions, but they provide instructions to assembler itself.

Example START, END, BYTE, WORD, RESW and RESB.

71. **What is forward references? (A.U.NOV/DEC 2010)**

It is a reference to a label that is defined later in a program.

Consider the statement

10 1000 STL RETADR

. . . .

. . . .

80 1036 RETADR RESW 1

The first instruction contains a forward reference RETADR. If we attempt to translate the program line by line, we will unable to process the statement in line 10 because we do not know the address that will be assigned to RETADR. The address is assigned later (in line 80) in the program.

72. **What are the three different records used in object program?**

The header record, text record, and the end record are the three different records used in object program. The header record contains the program name, starting address, and length of the program. Text record contains the translated instructions and data of the program. End record marks the end of the object program and specifies the address in the program where execution is to begin.

73. **What is the need of SYMTAB (symbol table) in assembler?**

The symbol table includes the name and value for each symbol in the source program, together with flags to indicate error conditions. Sometimes it may contain details about the data area. SYMTAB is usually organized as a hash table for efficiency of insertion and retrieval.

74. **What is the need of OPTAB (operation code table) in assembler? (A.U.APRIL/MAY 2012)**

The operation code table contains the mnemonic operation code and its machine language equivalent. Some assemblers may also contain information about instruction format and length. OPTAB is usually organized as a hash table, with mnemonic operation code as the key.

75. **What are the symbol defining statements generally used in assemblers?**

* ‘EQU’ - it allows the programmer to define symbols and specify their values directly. The general format is symbol EQU value

* ‘ORG’ - it is used to indirectly assign values to symbols. When this statement is encountered, the assembler resets its location counter to the specified value. The general format is

ORG value

In the above two statements, value is a constant or an expression involving constants and previously defined symbols.
76. **Define relocatable program. (A.U.APRIL/MAY 2012)**
An object program that contains the information necessary to perform required modification in the object code depends on the starting location of the program during load time is known as relocatable program.

77. **Differentiate absolute expression and relative expression. (A.U.APRIL/MAY 2010)**
If the result of the expression is an absolute value (constant) then it is known as absolute expression.
Eg: BUFEND – BUFFER
If the result of the expression is relative to the beginning of the program then it is known as relative expression.
label on instructions and data areas and references to the location counter values are relative terms.
Eg: BUFEND + BUFFER

78. **Write the steps required to translate the source program to object program.**
1. Convert mnemonic operation codes to their machine language equivalents.
2. Convert symbolic operands to their equivalent machine addresses
3. Build the machine instruction in the proper format.
4. Convert the data constants specified in the source program into their internal machine representation
5. Write the object program and assembly listing.

79. **What is the use of the variable LOCCTR(location counter) in assembler?**
This variable is used to assign addresses to the symbols.
LOCCTR is initialized to the beginning address specified in the START statement.
After each source statement is processed the length of the assembled instruction or data area to be generated is added to LOCCTR and hence whenever we reach a label in the source program the current value of LOCCTR gives the address associated with the label.

80. **Define load and go assembler. (A.U.NOV/DEC12)**
One pass assembler that generate their object code in memory for immediate execution is known as load and go assembler. Here no object programmer is written out and hence no need for loader.

81. **What are the two different types of jump statements used in MASM assembler? (A.U.APRIL 2007)**
1. Near jump
A near jump is a jump to a target in the same segment and it is assembled by using a current code segment CS.
2. Far jump
A far jump is a jump to a target in a different code segment and it is assembled by using different segment registers.
82. What is the use of base register table in AIX assembler?
A base register table is used to remember which of the general purpose registers are currently available as base registers and also the base addresses they contain. .USING statement causes entry to the table and .DROP statement removes the corresponding table entry.

83. Differentiate the assembler directives RESW and RESB. (A.U.NOV/DEC 2010)
RESW – It reserves the indicated number of words for data area.
Eg: 10 1003 THREE RESW 1
In this instruction one word area (3 bytes) is reserved for the symbol THREE. If the memory is byte addressable then the address assigned for the next symbol is 1006.
RESB – It reserves the indicated number of bytes for data area.
Eg: 10 1008 INPUT RESB 1
In this instruction one byte area is reserved for the symbol INPUT. Hence the address assigned for the next symbol is 1009.

PART- C (16 MARKS)

84. Explain in detail about basic assembler functions. (A.U.APRIL/MAY 2010)
85. Explain about the machine-Dependent Assembler features. (A.U.NOV/DEC 12)
86. Discuss in detail about the machine-Independent Assembler features. (A.U.APR/MAY 09)
87. Explain in detail about the assembler Design options. (A.U.APRIL/MAY 2012)
88. Discuss in detail about MASM Assembler (A.U.NOV/DEC 2010)

UNIT III - LOADERS AND LINKERS

PART-A (1 MARK)

89. Which of the following is an example of an input device?
A. scanner  B. speaker  C. CD  D. printer

90. All of the following are examples of storage devices EXCEPT:

91. The ____________, also called the brain of the computer, is responsible for processing data.
A. motherboard  B. memory  C. RAM  D. central processing unit (CPU)

94. The CPU and memory are located on the:

95. Word processing, spreadsheet, and photo-editing are examples of:
A. application software .  B. system software.  C. operating system software.
D. platform software.
96. _________ is a set of computer programs used on a computer to help perform tasks.
A. An instruction  B. Software  C. Memory  D. A processor

97. System software is the set of programs that enables your computer's hardware devices and _________ software to work together.
A. management  B. processing  C. utility  D. application

98. The PC (personal computer) and the Apple Macintosh are examples of two different:

99. Apple Macintoshes (Macs) and PCs use different _________ to process data and different operating systems.
A. languages  B. methods  C. CPUs  D. storage devices

100. Servers are computers that provide resources to other computers connected to a:

101. Translator for low level programming language were termed as
A. Assembler  B. Compiler  C. Linker  D. Loader

102. Analysis which determines the meaning of a statement once its grammatical structure becomes known is termed as
A. Semantic analysis  B. Syntax analysis  C. Regular analysis  D. General analysis

103. Load address for the first word of the program is called
(A) Linker address origin  (B) load address origin (C) Phase library (D) absolute library

104. Load address for the first word of the program is called
(A) Linker address origin  (B) load address origin (C) Phase library (D) absolute library

105. Symbolic names can be associated with
(A) Information  (B) data or instruction (C) operand  (D) mnemonic operation

106. The translator which perform macro expansion is called a
(A) Macro processor  (B) Macro pre-processor  (C) Micro pre-processor  (D) assembler

107. Shell is the exclusive feature of
(A) UNIX  (B) DOS  (C) System software  (D) Application software

108. A program in execution is called
(A) Process  (B) Instruction  (C) Procedure  (D) Function

109. Interval between the time of submission and completion of the job is Called
(A) Waiting time  (B) Turnaround time  (C) Throughput  (D) Response time

110. A scheduler which selects processes from secondary storage device is Called
A. Short term scheduler  B. Long term scheduler  C. Medium term scheduler  D. Process scheduler

111. The scheduling in which CPU is allocated to the process with least CPU-burst time is called
A. Priority Scheduling  B. Shortest job first Scheduling  C. Round Robin Scheduling  D. Multilevel Queue Scheduling

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111. What are the basic functions of loaders (A.U.APRIL/MAY 2010)
Loading – brings the object program into memory for execution
Relocation – modifies the object program so that it can be loaded at an address different from the location originally specified
Linking – combines two or more separate object programs and also supplies the information needed to reference them.

112. Define absolute loader (A.U.APRIL/MAY 2012)
The loader, which is used only for loading, is known as absolute loader.
e.g. Bootstrap loader

113. What is meant by bootstrap loader?
This is a special type of absolute loader which loads the first program to be run by the computer. (usually an operating system)

114. What are relative (relocative) loaders? (A.U.APRIL/MAY 2011)
Loaders that allow for program relocation are called relocating (relocative) loaders.

115. What is the use of modification record?
Modification record is used for program relocation. Each modification record specifies the starting address and the length of the field whose value is to be altered and also describes the modification to be performed.

116. What are the 2 different techniques used for relocation?
Modification record method and relocation bit method.

117. Relocation bit method
If the relocation bit corresponding to a word of object code is set to 1, the program’s starting address is to be added to this word when the program is relocated. Bit value 0 indicates no modification is required.

118. Define bit mask
The relocation bits are gathered together following the length indicator in each text record and which is called as bit mask. For e.g. the bit mask FFC(111111111100) specifies that the first 10 words of object code are to be modified during relocation.

119. What is the need of ESTAB? (A.U.NOV/DEC 2011)
It is used to store the name and address of the each external symbol. It also indicates in which control section the symbol is defined.

120. What is the use of the variable PROG ADDR.
It gives the beginning address in memory where the linked program is to be loaded. The starting address is obtained from the operating system.

121. Write the two passes of a linking loader.
Pass1: assigns address to all external symbols
Pass2: it performs actual loading, relocation and linking.
122. **Define automatic library search.**

In many linking loaders the subroutines called by the program being loaded are automatically fetched from the library, linked with the main program and loaded. This feature is referred to as automatic library search.

123. **List the loader options INCLUDE & DELETE.** (A.U.APRIL/MAY 2010)

The general format of INCLUDE is INCLUDE program_name (library name) This command directs the loader to read the designated object program from a library and treat it as the primary loader input.

The general format of DELETE command is DELETE Csect-name It instructs the loader to delete the named control sections from the sets of programs loaded.

124. **Give the functions of the linking loader.**

The linking loader performs the process of linking and relocation. It includes the operation of automatic library search and the linked programs are directly loaded into the memory.

125. **Give the difference between linking loader and linkage editors.**

Linking loader

Linkage editor

The relocation and linking is performed each time the program is loaded. It produces a linked version of a program which is written in a file for later execution. Here the loading can be accomplished in a single pass.

126. **Explain in detail about basic loader functions.** (A.U.NOV/DEC 2010)

127. **Explain about Machine-Dependent Loader Features.** (A.U.APRIL/MAY 2012)

128. **Discuss in detail about Machine-independent Loader features.** (A.U.NOV/DEC 2012)

129. **Explain about the Loader Design Options.**

130. **Explain in detail about MS-DOS Linker.** (A.U.APRIL/MAY 2011)

**UNIT IV (MACRO PROCESSORS)**

**PART- A**

130. **Machine language is**

a. Machine dependent   b. Difficult to program   c. Error prone   d. All of above

131. **Mnemonic a memory trick is used in which of the following language?**


132. **The translator program used in assembly language is called**

a. Compiler   b. Interpreter   c. Assembler   d. Translator

133. **Easily relocatable language is**
134. Which of the following is called low level languages?
   a. Machine language     b. Assembly language   c. Both of the above     d. None of above

135. Which of the following is problem oriented language?

136. A compiler is a translating program which
   a. Translates instruction of a high level language into machine language
   b. Translates entire source program into machine language program
   c. It is not involved in program’s execution
   d. All of above

137. Which of the following is machine independence program?

138. Which statement is valid about interpreter?
   a. It translates one instruction at a time
   b. Object code is saved for future use
   c. Repeated interpretation is not necessary
   d. All of above

139. Which is the limitation of high level language?

140. High level language is also called
   d. All of the above

141. A computer programmer
   a. Does all the thinking for a computer b. Can enter input data quickly    c. Can operate all types of computer equipments    d. Can draw only flowchart

142. CD-ROM is a
   a. Semiconductor memory b. Memory registers c. Magnetic memory d. None of above

143. Which of the following is not a primary storage device?
   a. Magnetic tape b. Magnetic disk c. Optical disk d. None of above

144. A name or number used to identify a storage location device?
   a. A byte b. A record c. An address d. All of above

145. Which of the following is a secondary memory device?
   a. Keyboard b. Disk c. ALU d. All of the above

146. The difference between memory and storage is that memory is … and storage is …
   a. Temporary, permanent b. Permanent, temporary c. Slow, fast d. All of above

147. A floppy disk contains
   a. Circular tracks only b. Sectors only c. Both circular tracks and sectors d. All of the above
149. The octal equivalent of 111010 is
   a. 81    b. 72    c. 71    d. None of above

150. The first electronic computer in the world was
   a. UNIVAC    b. EDVAC    c. ENIAC    d. All of above

   Macro processor is system software that replaces each macroinstruction with the corresponding group of source language statements. This is also called as expanding of macros.

152. What do macro expansion statements mean?
   These statements give the name of the macroinstruction being invoked and the arguments to be used in expanding the macros. These statements are also known as macro call.

153. What are the directives used in macro definition? (A.U.APRIL/MAY 2011)
   MACRO - it identifies the beginning of the macro definition
   MEND - it marks the end of the macro definition

154. What are the data structures used in macro processor?
   DEFTAB – the macro definitions are stored in a definition table ie it contains a macro prototype and the statements that make up the macro body.
   NAMTAB – it is used to store the macro names and it contains two pointers for each macro instruction which indicate the starting and end location of macro definition in DEFTAB.it also serves as an index to DEFTAB ARGTAB – it is used to store the arguments during the expansion of macro invocations.

   If the macro is expanded depends upon some conditions in macro definition (depending on the arguments supplied in the macro expansion) then it is called as conditional macro expansion.

155. What is the use of macro time variable?
   Macro time variable can be used to store working values during the macro expansion. Any symbol that begins with the character & and then is not a macro instruction parameter is assumed to be a macro time variable.

156. What are the statements used for conditional macro expansion?
   IF-ELSE-ENDIF statement
   WHILE-ENDW statement
157. **What is meant by positional parameters? (APRIL/MAY 2009)**

If the parameters and arguments were associated with each other according to their positions in the macro prototype and the macro invocation statement, then these parameters in macro definitions are called as positional parameters.

158. **Consider the macro definition** 

\#Define DISPLAY (EXPR) Printf(“EXPR = %d\n”,EXPR)

Expand the macro instruction DISPLAY (ANS)

Ans.: Printf (“EXPR = %d\n”, ANS)

159. **What are known as nested macro call?**

The statement in which a macro calls on another macro, is called nested macro call. In the nested macro call, the call is done by outer macro and the macro called is the inner macro.

160. **How the macro is processed using two passes?**

Pass 1: processing of definitions
Pass 2: actual-macro expansion.

161. **Give the advantage of line by line processors.**

* It avoids the extra pass over the source program during assembling
* It may use some of the utility that can be used by language translators so that can be loaded once.

162. **What is meant by line by line processor (A.U.NOV/DEC 2010)**

This macro processor reads the source program statements, process the statements and then the output lines are passed to the language translators as they are generated, instead of being written in an expanded file.

163. **Give the advantages of general-purpose macroprocessors.**

* The programmer does not need to learn about a macro facility for each compiler.
* Overall saving in software development cost and a maintenance cost

164. **What is meant by general-purpose macro processors?**

The macro processors that are not dependent on any particular programming language, but can be used with a variety of different languages are known as general purpose macro processors. Eg. The ELENA macro processor.

**PART – C**

165. **Explain in detail about the basic Macro Processor functions. (A.U.APRIL/MAY 11)**

166. **Discuss in detail about the Machine-independent macro processor features. (A.U.NOV/DEC 2009)**


168. **Explain in detail about MASM Macro Processor (A.U.APRIL/MAY 2012)**

169. **Explain in detail about ANSI C macro Language (A.U.APRIL/MAY 2010)**
UNIT V - TEXT EDITORS

PART - A                                          1 MARKS

170. The term ‘page traffic’ describes
(A) number of pages in memory at a given instant. (B) number of papers required to be brought in at a
given page request. (C) the movement of pages in and out of memory. (D) number of pages of
executing programs loaded in memory.

171. The “turn-around” time of a user job is the
(A) time since its submission to the time its results become available. (B) time duration for which the
CPU is allotted to the job. (C) total time taken to execute the job. (D) time taken for the job to move
from assembly phase to completion phase.

172. Which of the following can be used as a criterion for classification of data
structures used in language processing.
(A) nature of a data structure (B) purpose of a data structure (C) lifetime of a data structure (D) all of
the above.

173. Memory utilization factor shall be computed as follows
(A) memory in use/allocated memory. (B) memory in use/total memory connected.
(C) memory allocated/free existing memory. (D) memory committed/total memory available.

174. Program ‘preemption’ is
(A) forced de allocation of the CPU from a program which is executing on the
CPU. (B) release of CPU by the program after completing its task. (C) forced allotment of CPU by a
program to itself. (D) a program terminating itself due to detection of an error.

175. An assembler is
(A) programming language dependent. (B) syntax dependant. (C) machine dependant.
(D) data dependant.

176. Which of the following is not a fundamental process state
(A) ready (B) terminated (C) executing (D) blocked

177. ‘LRU’ page replacement policy is
(A) Last Replaced Unit. (B) Last Restored Unit. (C) Least Recently Used. (D) Least Required Unit.

178. Which of the following is true?
A. Block cipher technique is an encryption technique. B. Steam cipher technique is an encryption
technique. C. Both (A) and (B). D. Neither of (A) and (B).

179. Which of the following approaches do not require knowledge of the system state?

180. Program generation activity aims at
A. Automatic generation of program B. Organize execution of a program written in PL
C. Skips generation of program D. Speeders generation of program
181. Which amongst the following is not an advantage of Distributed systems?
(A) Reliability  (B) Incremental growth  (C) Resource sharing  (D) None of the above

182. An imperative statement
(A) Reserves areas of memory and associates names with them  (B) Indicates an action to be performed during execution of assembled program  (C) Indicates an action to be performed during optimization  (D) None of the above

183. Which of the following loader is executed when a system is first turned on or restarted
(A) Boot loader  (B) Compile and Go loader  (C) Bootstrap loader  (D) Relating loader

184. Poor response time is usually caused by
(A) Process busy  (B) High I/O rates  (C) High paging rates  (D) Any of the above

185. “Throughput” of a system is
(A) Number of programs processed by it per unit time  (B) Number of times the program is invoked by the system  (C) Number of requests made to a program by the system  (D) None of the above

186. The “blocking factor” of a file is
(A) The number of blocks accessible to a file  (B) The number of blocks allocated to a file  (C) The number of logical records in one physical record  (D) None of the above

187. Which of these is a component of a process precedence sequence?
(A) Process name  (B) Sequence operator ‘;’  (C) Concurrency operator ‘,’  (D) All of the above

188. Which amongst the following is valid syntax of the Fork and Join Primitive?
(A) Fork <label> (B) Fork <label> Join <var> (C) For <var> (D) Fork <var> Join <var>

189. Nested Macro calls are expanded using the
(A) FIFO rule (First in first out)  (B) LIFO (Last in First out)  (C) FILO rule (First in last out)

An interactive editor is a computer program that allows a user to create and revise a target document. The term document includes objects such as computer programs, text, equations, tables, diagrams, line art, and photographs any thing that one might find on a printed page.

191. What are the tasks performed in the editing process?
4 tasks
1. Select the part of the target document to be viewed and manipulated.
2. Determine how to format this view on-line and how to display it.
3. Specify and execute operations that modify the target document.
4. Update the view appropriately.

192. What are the three categories of editor’s devices?
1. Text device/ String devices
2. Button device/Choice devices
3. Locator device
193. What is the function performed in editing phase? (A.U.NOV/DEC 2010)
In the actual editing phase, the target document is created or altered with a set of operations such as insert, delete, replace, move and copy.

194. Define Locator device? (A.U.APRIL/MAY 12)
Locator devices are two-dimensional analog-to-digital converters that position a cursor symbol on the screen by observing the user’s movement of the device. The most common such devices for editing applications are the mouse and the data tablet.

195. What is the function performed in voice input device?
Voice-input devices, which translate spoken words to their textual equivalents, may prove to be the text input devices of the future. Voice recognizers are currently available for command input on some systems.

196. What are called tokens? (A.U.APRIL/MAY 2011)
The lexical analyzer tracks the source program one character at a time by making the source program into sequence of atomic units is called tokens.

197. Name some of typical tokens.
Identifiers, keywords, constants, operators and punctuation symbols such as commas and parentheses are typical tokens.

198. What is meant by lexeme?
The character that forms a token is said to be a lexeme.

199. Mention the main disadvantage of interpreter. (A.U.NOV/DEC 2009)
The main disadvantage of interpreter is that the execution time of interpreted program is slower than that of a corresponding compiled object program.

PART- C

200. Explain in detail about the following (A.U.APRIL/MAY 2010)
201. Explain about the editor structure. (A.U.NOV/DEC 2012)
202. Discuss in detail about debugging functions and capabilities (A.U.APRIL/MAY 12)
203. Explain in detail about the following (A.U.APRIL/MAY 2011)
204. Explain about various software tools. (A.U.NOV/DEC 2010)

SUBJECT NAME: COMPUTER NETWORKS
SUBJECT CODE: CS2302

UNIT-I

1. In OSI network architecture, the dialogue control and token management are responsibility of a. session layer b. network layer c. transport layer d. data link layer
2. In OSI network architecture, the routing is performed by a. network layer b. data link layer c. transport layer d. session layer
3. Which of the following performs modulation and demodulation? a. fiber optics b. satellite c. coaxial cable d. modem
4. The process of converting analog signals into digital signals so they can be processed by a receiving computer is referred to as: a. modulation b. demodulation c. synchronizing d. digitising
6. Layer one of the OSI model is a. physical layer b. link layer c. transport layer d. network layer
7. The x.25 standard specifies a
   a. technique for start-stop data   b. technique for dial access
   c. DTE/DCE interface   d. data bit rate

8. Which of the following communication modes support two-way traffic but in only one
direction at a time?
   a. simplex   b. half-duplex   c. three-quarters duplex   d. all of the above

9. Which of the following might be used by a company to satisfy its growing communications needs?
   a. front end processor   b. multiplexer   c. controller   d. all of the above

10. What is the number of separate protocol layers at the serial interface gateway specified by the X.25
    standard?
    a. 4   b. 2   c. 6   d. 3

11. The interactive transmission of data within a time sharing system may be best suited to
    a. simplex lines   b. half-duplex lines   c. full duplex lines   d. biflex-lines

12. Which of the following statement is incorrect?
    a. The difference between synchronous and asynchronous transmission is the clocking derived
       from the data in synchronous transmission.
    b. Half duplex line is a communication line in which data can move in two directions, but not
       at the same time.
    c. Teleprocessing combines telecommunications and DP techniques in online activities
    d. Batch processing is the preferred processing mode for telecommunication operation.

13. Which of the following is considered a broad band communication channel?
    a. coaxial cable   b. fiber optics cable   c. microwave circuits   d. all of above

14. Which of the following is not a transmission medium?
    a. telephone lines   b. coaxial cables   c. modem   d. microwave systems

15. Which of the following does not allow multiple uses or devices to share one communication line?
    a. doubleplexer   b. multiplexer   c. concentrator   d. controller

16. Which of the following signal is not standard RS-232-C signal?
    a. VDR   b. RTS   c. CTS   d. DSR

17. Which of the following statement is incorrect?
    a. Multiplexers are designed to accept data from several I/O devices and transmit a unified
       stream of data on one communication line
    b. HDLC is a standard synchronous communication protocol.
    c. RTS/CTS is the way the DTE indicates that it is ready to transmit data and the way the
       DCW indicates that it is ready to accept data
    d. RTS/CTS is the way the terminal indicates ringing

18. Which of the following is an advantage to using fiber optics data transmission?
    a. resistance to data theft   b. fast data transmission rate   c. low noise level
    d. all of above including access to transmission medium

19. Which of the following is required to communicate between two computers?
    a. communications software   b. protocol   c. communication hardware   d. all of above

20. The transmission signal coding method of T1 carrier is called
    a. Bipolar   b. NRZ   c. Manchester   d. Binary

ANSWERS:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
a a d d b a c b d d b d d c a a d d d a
21. What are the three criteria necessary for an effective and efficient network?

The most important criteria are performance, reliability and security. **Performance** of the network depends on number of users, type of transmission medium, and the capabilities of the connected h/w and the efficiency of the s/w. **Reliability** is measured by frequency of failure, the time it takes a link to recover from the failure and the network’s robustness in a catastrophe. **Security** issues include protecting data from unauthorized access and viruses.

22. Group the OSI layers by function?

The seven layers of the OSI model belonging to three subgroups. Physical, data link and network layers are the **network support layers**; they deal with the physical aspects of moving data from one device to another. Session, presentation and application layers are the **user support layers**; they allow interoperability among unrelated software systems. The transport layer ensures **end-to-end reliable data transmission**.

23. What are header and trailers and how do they get added and removed?

Each layer in the sending machine adds its own information to the message it receives from the layer just above it and passes the whole package to the layer just below it. This information is added in the form of headers or trailers. Headers are added to the message at the layers 6,5,4,3, and 2. A trailer is added at layer2. At the receiving machine, the headers or trailers attached to the data unit at the corresponding sending layers are removed, and actions appropriate to that layer are taken.

24. What are the features provided by layering?

Two nice features:
- It decomposes the problem of building a network into more manageable components.
- It provides a more modular design.

25. Why are protocols needed?

In networks, communication occurs between the entities in different systems. Two entities cannot just send bit streams to each other and expect to be understood. For communication, the entities must agree on a protocol. A protocol is a set of rules that govern data communication.

26. What are the two interfaces provided by protocols?

- Service interface
- Peer interface

Service interface- defines the operations that local objects can perform on the protocol. Peer interface- defines the form and meaning of messages exchanged between protocol peers to implement the communication service.

27. Mention the different physical media?

- Twisted pair(the wire that your phone connects to)
- Coaxial cable(the wire that your TV connects to)
- Optical fiber(the medium most commonly used for high-bandwidth, long-distance links)
- Space(the stuff that radio waves, microwaves and infra red beams propagate through)
28. **Define Signals?**
   Signals are actually electromagnetic waves traveling at the speed of light. The speed of light is, however, medium dependent—electromagnetic waves traveling through copper and fiber do so at about two-thirds the speed of light in vacuum.
29. **What is wave’s wavelength?**
   The distance between a pair of adjacent maxima or minima of a wave, typically measured in meters, is called wave’s wavelength.
30. **Define Modulation?**
   Modulation - varying the frequency, amplitude or phase of the signal to effect the transmission of information. A simple example of modulation is to vary the power (amplitude) of a single wavelength.
31. **Explain the two types of duplex?**
   - *Full duplex*- two bit streams can be simultaneously transmitted over the links at the same time, one going in each direction.
   - *Half duplex*- it supports data flowing in only one direction at a time.
32. **What is CODEC?**
   A device that encodes analog voice into a digital ISDN link is called a CODEC, for *coder/decoder*.
33. **What is spread spectrum and explain the two types of spread spectrum?**
   Spread spectrum is to spread the signal over a wider frequency band than normal in such a way as to minimize the impact of interference from other devices.
   - > Frequency Hopping
   - > Direct sequence
34. **What are the different encoding techniques?**
   - NRZ
   - > NRZI
   - > Manchester
   - > 4B/5B
35. **How does NRZ-L differ from NRZ-I?**
   In the NRZ-L sequence, positive and negative voltages have specific meanings: positive for 0 and negative for 1. in the NRZ-I sequence, the voltages are meaningless. Instead, the receiver looks for changes from one level to another as its basis for recognition of 1s.
36. **What are the responsibilities of data link layer?**
   Specific responsibilities of data link layer include the following. a) Framing b) Physical addressing c) Flow control d) Error control e) Access control.
37. **What are the ways to address the framing problem?**
   - Byte-Oriented Protocols(PPP)
   - Bit-Oriented Protocols(HDLC)
   - Clock-Based Framing(SONET)
38. **Distinguish between peer-to-peer relationship and a primary-secondary relationship. peer-to-peer relationship?**
   All the devices share the link equally.
   **Primary-secondary relationship**: One device controls traffic and the others must transmit through it.
39. **Mention the types of errors and define the terms?**
   There are 2 types of errors
   - Single-bit error.
   - Burst-bit error.
   Single bit error: The term single bit error means that only one bit of a given data unit (such as byte character/data unit or packet) is changed from 1 to 0 or from 0 to 1.
   Burst error: Means that 2 or more bits in the data unit have changed from 1 to 0 from 0 to 1.
40. List out the available detection methods.
There are 4 types of redundancy checks are used in data communication.
- Vertical redundancy checks (VRC).
- Longitudinal redundancy checks (LRC).
- Cyclic redundancy checks (CRC).
- Checksum.

41. Write short notes on VRC.
The most common and least expensive mechanism for error detection is the vertical redundancy check (VRC) often called a parity check. In this technique a redundant bit called a parity bit, is appended to every data unit so, that the total number of 0’s in the unit (including the parity bit) becomes even.

42. Write short notes on LRC.
In longitudinal redundancy check (LRC), a block of bits is divided into rows and a redundant row of bits is added to the whole block.

43. Write short notes on CRC.
The third and most powerful of the redundancy checking techniques is the cyclic redundancy checks (CRC) CRC is based on binary division. Here a sequence of redundant bits, called the CRC remainder is appended to the end of data unit.

44. Write short notes on CRC checker.
A CRC checker functions exactly like a generator. After receiving the data appended with the CRC it does the same modulo-2 division. If the remainder is all 0’s the CRC is dropped and the data accepted. Otherwise, the received stream of bits is discarded and the dates are resent.

45. Define checksum.
The error detection method used by the higher layer protocol is called checksum. Checksum is based on the concept of redundancy.

46. What are the steps followed in checksum generator?
The sender follows these steps a) the units are divided into k sections each of n bits. b) All sections are added together using 2’s complement to get the sum. c) The sum is complemented and become the checksum. d) The checksum is sent with the data.

47. Mention the types of error correcting methods.
There are 2 error-correcting methods.
- Single bit error correction
- Burst error correction.

48. Write short notes on error correction?
It is the mechanism to correct the errors and it can be handled in 2 ways.
- When an error is discovered, the receiver can have the sender retransmit the entire data unit.
- A receiver can use an error correcting coder, which automatically corrects certain errors.

49. What is the purpose of hamming code?
A hamming code can be designed to correct burst errors of certain lengths. So the simple strategy used by the hamming code to correct single bit errors must be redesigned to be applicable for multiple bit correction.
50. What is redundancy?
   It is the error detecting mechanism, which means a shorter group of bits or extra bits may be appended at the destination of each unit.

51. Define flow control?
   Flow control refers to a set of procedures used to restrict the amount of data. The sender can send before waiting for acknowledgment.

52. Mention the categories of flow control?
   There are 2 methods have been developed to control flow of data across communication links.
   a) Stop and wait- send one from at a time. b) Sliding window- send several frames at a time.

53. What is a buffer?
   Each receiving device has a block of memory called a buffer, reserved for storing incoming data until they are processed.

54. What is mean by data communication?
   Data communication is the exchange of data (in the form of 1s and 0s) between two devices via some form of transmission medium (such as a wire cable).

55. What are the three criteria necessary for an effective and efficient network?
   The most important criteria are performance, reliability and security.
   Performance of the network depends on number of users, type of transmission medium, the capabilities of the connected h/w and the efficiency of the s/w.
   Reliability is measured by frequency of failure, the time it takes a link to recover from the failure and the network’s robustness in a catastrophe.
   Security issues include protecting data from unauthorized access and viruses.

56. What are the three fundamental characteristics determine the effectiveness of the data communication system?
   The effectiveness of the data communication system depends on three fundamental characteristics:
   Delivery: The system must deliver data to the correct destination.
   Accuracy: The system must deliver data accurately.
   Timeliness: The system must deliver data in a timely manner.

57. What are the advantages of distributed processing?
   Advantages of distributed processing include security/encapsulation, distributed databases, faster problem solving, security through redundancy and collaborative processing.

58. Why are protocols needed?
   In networks, communication occurs between the entities in different systems. Two entities cannot just send bit streams to each other and expect to be understood. For communication, the entities must agree on a protocol. A protocol is a set of rules that govern data communication.

59. Why are standards needed?
   Co-ordination across the nodes of a network is necessary for an efficient communication. If there are no standards, difficulties arise. A standard provides a model or basis for development to which everyone has agreed.

60. For n devices in a network, what is the number of cable links required for a mesh and ring topology?
   Mesh topology – n (n-1)/2
   Ring topology – n
61. **What is the difference between a passive and an active hub?**
An active hub contains a repeater that regenerates the received bit patterns before sending them out. A passive hub provides a simple physical connection between the attached devices.

62. **Distinguish between peer-to-peer relationship and a primary-secondary relationship**
Peer-to-peer relationship: All the devices share the link equally.
Primary-secondary relationship: One device controls traffic and the others must transmit through it.

63. **Assume 6 devices are arranged in a mesh topology. How many cables are needed? How many ports are needed for each device?**
Number of cables = \( n(n-1)/2 \) = 6(6-1)/2 = 15
Number of ports per device = \( n-1 \) = 6-1 = 5

64. **Group the OSI layers by function.**
The seven layers of the OSI model belonging to three subgroups. Physical, data link and network layers are the network support layers; they deal with the physical aspects of moving data from one device to another. Session, presentation and application layers are the user support layers; they allow interoperability among unrelated software systems. The transport layer ensures end-to-end reliable data transmission.

65. **What are header and trailers and how do they get added and removed?**
Each layer in the sending machine adds its own information to the message it receives from the layer just above it and passes the whole package to the layer just below it. This information is added in the form of headers or trailers. Headers are added to the message at the layers 6, 5, 4, 3, and 2. A trailer is added at layer 2. At the receiving machine, the headers or trailers attached to the data unit at the corresponding sending layers are removed, and actions appropriate to that layer are taken.

66. **What are the three events involved in a connection?**
Creating a connection involves three steps: connection establishment, data transfer and connection release.

67. **What is the DC component?**
Direct current is a zero-frequency signal with constant amplitude.

68. **How does NRZ-L differ from NRZ-I?**
In the NRZ-L sequence, positive and negative voltages have specific meanings: positive for 0 and negative for 1. In the NRZ-I sequence, the voltages are meaningless. Instead, the receiver looks for changes from one level to another as its basis for recognition of 1s.

69. **What are the functions of a DTE? What are the functions of a DCE?**
Data terminal equipment is a device that is an information source or an information sink. It is connected to a network through a DCE.

60. **What does the electrical specification of EIA-232 describe?**
The electrical specification of EIA-232 defines that signals other than data must be sent using OFF as less than -3 volts and ON as greater than +3 volts. The data must be transmitted using NRZ-L encoding.
71. **Discuss the mode for propagating light along optical channels.**

There are two modes for propagating light along optical channels, multimode and single mode.
- **Multimode:** Multiple beams from a light source move through the core in different paths.
- **Single mode:** Fiber with extremely small diameter that limits beams to a few angles, resulting in an almost horizontal beam.

72. **What is refraction?**

The phenomenon related to the bending of light when it passes from one medium to another.

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**PART – C**

73. Explain in detail the error detection and error corrections. (AU-NOV 2010)

74. Discuss in detail about the layers of OSI model. (AU-NOV 2010)

75. Discuss in detail about HDLC.

76. Discuss in detail about SONET.

77. Explain the different approaches of framing in detail.

78. Write the Sliding Window Algorithm and explain it in detail.

79. Compare Stop and Wait ARQ scheme with sliding window ARQ scheme.

80. Write in detail about the flow control mechanisms.

81. Explain the ISO-OSI model of computer network with a neat diagram.

82. Discuss the major functions performed by the Presentation layer and Application layer of the ISO OSI model.

83. Explain Transport Layer and Physical Layer.

84. What are the major components of an optical communication system? Discuss.

85. Distinguish between point to point links and multi point links. Give relevant diagrams.

86. Explain Data Link Layer and Network Layer.

87. Compare Connection oriented and connectionless service.

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**UNIIT-II**

**PART – A**

88. Which data communication method is used to transmit the data over a serial communication link?

   a. simplex  
   b. half-duplex  
   c. full-duplex  
   d. b and c

89. What is the minimum number of wires needed to send data over a serial communication link layer?

   a. 1  
   b. 2  
   c. 4  
   d. 6

90. Which of the following types of channels moves data relatively slowly?

   a. wide band channel  
   b. voice band challen  
   c. narrow band channel

91. Most data communications involving telegraph lines use:

   a. simplex lines  
   b. wideband channelec. narrowband channel  
   d. dialed service

92. A communications device that combines transmissions from several I/O devices into one line is a

   a. concentrator  
   b. modifier  
   c. multiplexer  
   d. full-duplex line

93. How much power (roughly) a light emitting diode can couple into an optical fiber?

   a. 100 microwatts  
   b. 440 microwatts  
   c. 100 picowatts  
   d. 10 miliwatts

94. The synchronous modems are more costly than the asynchronous modems because

   a. they produce large volume of data  
   b. they contain clock recovery circuits  
   c. they transmit the data with stop and start bits  
   d. they operate with a larger bandwidth
95. Which of the following statement is correct?
   a. terminal section of a synchronous modem contains the scrambler
   b. receiver section of a synchronous modem contains the scrambler
   c. transmission section of a synchronous modem contains the scrambler
   d. control section of a synchronous modem contains the scrambler

96. In a synchronous modem, the digital-to-analog converter transmits signal to the
   a. equilizer     b. modulator     c. demodulator     d. terminal

97. Which of the following communications lines is best suited to interactive processing applications?
   a. narrow band channel  b. simplex lines  c. full duplex lines  d. mixed band channels

98. A remote batch-processing operation in which data is solely input to a central computer would require
   a. telegraph line  b. simplex lines  c. mixed bad channel  d. all of above

99. A band is always equivalent to
   a. a byte    b. a bit    c. 100 bits    d. none of above

100. The loss in signal power as light travels down the fiber is called
    a. attenuation    b. progragation    c. scattering    d. interruption

101. Avalanche photodiode receivers can detect bits of transmitted data by receiving
    a. 100 photons    b. 200 photons    c. 2000 photons    d. 300 photons

102. Communication circuits that transmit data in both directions but not at the same time are operating in
    a. a simplex mode    b. a half duplex mode    c. a full duplex mode    d. an asynchronous mode

103. An example of a medium speed, switched communications service is
    a. series 1000    b. data phone 50    c. DDD    d. All of the above

104. In communication satellite, multiple repeaters are known as
    a. detector    b. modulator    c. stations    d. transponders

105. While transmitting odd-parity coded symbols, the number of zeros in each symbol is
    a. odd    b. even    c. a and b both    d. unknown

106. Data communications monitors available on the software marked include
    a. ENVIRON/1    b. TOTAL    c. BPL    d. Telnet

107. An example of an analog communication method is
    a. laser beam    b. microwave    c. voice grade telephone line    d. all of the above

ANSWERS

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PART – B (2 MARKS)

108. What are the functions of MAC?

   MAC sub layer resolves the contention for the shared media. It contains synchronization, flag, flow and error control specifications necessary to move information from one place to another, as well as the physical address of the next station to receive and route a packet.

109. What are the responsibilities of data link layer?

   Specific responsibilities of data link layer include the following.
   a) Framing     b) Physical addressing     c) Flow control
   d) Error control     e) Access control
10. **Mention the types of errors.**
   There are 2 types of errors
   a) Single-bit error.  
   b) Burst-bit error.

11. **Define the following terms.**
   Single bit error: The term single bit error means that only one bit of a given data unit (such as byte character/data unit or packet) is changed from 1 to 0 or from 0 to 1.
   Burst error: Means that 2 or more bits in the data unit have changed from 1 to 0 from 0 to 1.

12. **What is redundancy?**
   It is the error detecting mechanism, which means a shorter group of bits or extra bits may be appended at the destination of each unit.

13. **List out the available detection methods.**
   There are 4 types of redundancy checks are used in data communication.
   a) Vertical redundancy checks (VRC).
   b) Longitudinal redundancy checks (LRC).
   c) Cyclic redundancy checks (CRC).
   d) Checksum.

14. **Write short notes on VRC.**
   The most common and least expensive mechanism for error detection is the vertical redundancy check (VRC) often called a parity check. In this technique a redundant bit called a parity bit, is appended to every data unit so, that the total number of 0’s in the unit (including the parity bit) becomes even.

15. **Write short notes on LRC.**
   In longitudinal redundancy check (LRC), a block of bits is divided into rows and a redundant row of bits is added to the whole block.

16. **Write short notes on CRC.**
   The third and most powerful of the redundancy checking techniques is the cyclic redundancy checks (CRC) CRC is based on binary division. Here a sequence of redundant bits, called the CRC remainder is appended to the end of data unit.

17. **Write short notes on CRC generator.**
   A CRC generator uses a modulo-2 division.
   In the first step, the 4-bit divisor is subtracted from the first 4 bit of the dividend.
   Each bit of the divisor is subtracted from the corresponding bit of the dividend without disturbing the next higher bit.

18. **Write short notes on CRC checker.**
   A CRC checker functions exactly like a generator. After receiving the data appended with the CRC it does the same modulo-2 division. If the remainder is all 0’s the CRC is dropped and the data accepted. Otherwise, the received stream of bits is discarded and the dates are resent.

19. **Give the essential properties for polynomial.**
   A polynomial should be selected to have at least the following properties.
   a) It should not be  
   b) It should be divisible by(x+1).

20. **Define checksum.**
   The error detection method used by the higher layer protocol is called checksum. Checksum is based on the concept of redundancy.

21. **What are the steps followed in checksum generator?**
   The sender follows these steps
   a) The units are divided into k sections each of n bits.
b) All sections are added together using 2’s complement to get the sum.
c) The sum is complemented and become the checksum.
d) The checksum is sent with the data.

**122. List out the steps followed is checksum checker side.**
The receiver must follow these steps
a) The unit is divided into k section each of n bits.
b) All sections are added together using 1’s complement to get the sum.
c) The sum is complemented.     d) If the result is zero.

**123. Write short notes on error correction.**
It is the mechanism to correct the errors and it can be handled in 2 ways.
a) When an error is discovered, the receiver can have the sender retransmit the entire data unit.
b) A receiver can use an error correcting coder, which automatically corrects certain errors.

**124. Mention the types of error correcting methods.**
There are 2 error-correcting methods.
a) Single bit error correction  b) Burst error correction.

**125. What is the purpose of hamming code?**
A hamming code can be designed to correct burst errors of certain lengths. So the simple strategy used by the hamming code to correct single bit errors must be redesigned to be applicable for multiple bit correction.

**126. Define flow control.**
Flow control refers to a set of procedures used to restrict the amount of data. The sender can send before waiting for acknowledgment.

**127. What is a buffer?**
Each receiving device has a block of memory called a buffer, reserved for storing incoming data until they are processed.

**128. Mention the categories of flow control.**
There are 2 methods have been developed to control flow of data across communication links.
a) Stop and wait- send one from at a time.
b) Sliding window- send several frames at a time.

**129. What are the functions of LLC?**
The IEEE project 802 models take the structure of an HDLC frame and divides it into 2 sets of functions. One set contains the end user portion of the HDLC frame – the logical address, control information, and data. These functions are handled by the IEEE 802.2 logical link control (LLC) protocol.

**130. What is Ethernet?**
Ethernet is a multiple-access network, meaning that a set of nodes send and receive frames over a shared link.

**131. Define the term carrier sense in CSMA/CD?**
All the nodes can distinguish between idle and a busy-link and “collision detect” means that a node listens as it transmits and can therefore detect when a frame it is transmitting has interfered (collided) with a frame transmitted by another node.

**132. Define Repeater?**
A repeater is a device that forwards digital signals, much like an amplifier forwards analog signals. However, no more than four repeaters may be positioned between any pairs of hosts, meaning that an Ethernet has a total reach of only 2,500m.
133. **Define collision detection?**
   In Ethernet, all these hosts are competing for access to the same link, and as a consequence, they are said to be in the same collision detection.

134. **Why Ethernet is said to be a I-persistent protocol?**
   An adaptor with a frame to send transmits with probability '1' whenever a busy line goes idle.

135. **What is exponential back off?**
   Once an adaptor has detected a collision and stopped its transmission, it waits a certain amount of time and tries again. Each time it tries to transmit but fails, the adaptor doubles the amount of time it waits before trying again. This strategy of doubling the delay interval between each transmission attempt is a general technique known as exponential back off.

136. **What is token holding time (THT)?**
   It defines that how much data a given node is allowed to transmit each time it possesses the token or equivalently, how long a given node is allowed to hold the token.

137. **What are the two classes of traffic in FDDI?**
   - Synchronous
   - Asynchronous

138. **What are the four prominent wireless technologies?**
   - Bluetooth
   - Wi-Fi(formally known as 802.11)
   - WiMAX(802.16)
   - Third generation or 3G cellular wireless.

139. **Define Bluetooth?**
   Bluetooth fills the niche of very short-range communication between mobile phones, PDAs, notebook computers, and other personal or peripheral devices. For example, Bluetooth can be used to connect mobile phones to a headset, or a notebook computer to a printer.

140. **What are the four steps involves in scanning?**
   1. The node sends a Probe frame.
   2. All APs within reach reply with a Probe Response frame.
   3. The node selects one of the access points, and sends that AP an Association Request frame.
   4. The AP replies with an Association Response frame.

141. **Explain the term handoff?**
   If the phone is involved in a call at the time, the call must be transferred to the new base station in what is called a hand off.

142. **Define satphones?**
   Satphones use communication satellites as base stations, communicating on frequency bands that have been reserved internationally for satellite use.

143. **How to mediate access to a shared link?**
   Ethernet, token ring, and several wireless protocols. Ethernet and token ring media access protocols have no central arbitrator of access. Media access in wireless networks is made more complicated by the fact that some nodes may be hidden from each other due to range limitations of radio transmission.
144. **Define Aggregation points?**

It collects and processes the data they receive from neighboring nodes, and then transmit the processed data. By processing the data incrementally, instead of forwarding all the raw data to the base station, the amount of traffic in the network is reduced.

145. **Define Beacons?**

Beacon to determine their own absolute locations based on GPS or manual configuration. The majority of nodes can then derive their absolute location by combining an estimate of their position relative to the beacons with the absolute location information provided by the beacons.

146. **What is the use of Switch?**

It is used to forward the packets between shared media LANs such as Ethernet. Such switches are sometimes known by the obvious name of LAN switches.

147. **Explain Bridge?**

It is a collection of LANs connected by one or more bridges is usually said to form an extended LAN. In their simplest variants, bridges simply accept LAN frames on their inputs and forward them out on all other outputs.

148. **What is Spanning tree?**

It is for the bridges to select the ports over which they will forward frames.

149. **What are the three pieces of information in the configuration messages?**

1. The ID for the bridge that is sending the message.
2. The ID for what the sending bridge believes to the root bridge.
3. The distance, measured in hops, from the sending bridge to the root bridge.

150. **What is broadcast?**

Broadcast is simple – each bridge forwards a frame with a destination broadcast address out on each active (selected) port other than the one on which the frame was received.

151. **What is multicast?**

It can be implemented with each host deciding for itself whether or not to accept the message.

152. **What are the network support layers and the user support layers?**

Network support layers:
The network support layers are Physical layer, Data link layer and Network layer. These deals with electrical specifications, physical connection, transport timing and reliability.

User support layers:
The user support layers are: Session layer, Presentation layer, Application layer. These allow interoperability among unrelated software system.

153. **With a neat diagram explain the relationship of IEEE Project to the OSI model?**

The IEEE has subdivided the data link layer into two sub layers:

* Logical link control (LLC)
* Medium access control (MAC)

LLC is non-architecture specific. The MAC sub layer contains a number of distinct modules, each carries proprietary information specific to the LAN product being used.

154. **What are the functions of LLC?**

The IEEE project 802 models takes the structure of an HDLC frame and divides it into 2 sets of functions. One set contains the end user portion of the HDLC frame – the Other layers

<table>
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<th>Network</th>
<th>Data link</th>
<th>Physical</th>
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<tr>
<td>Other layers</td>
<td>Network</td>
<td>Logical Link Control</td>
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<tr>
<td>Media Access Control</td>
<td>Physical logical address, control information, and data. These functions are handled by the IEEE802.2 logical link control (LLC) protocol.</td>
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155. **What are the functions of MAC?**
MAC sub layer resolves the contention for the shared media. It contains synchronization, flag, flow and error control specifications necessary to move information from one place to another, as well as the physical address of the next station to receive and route a packet.

156. **What is protocol data unit?**
The data unit in the LLC level is called Protocol Data Unit (PDU). It contains four fields:
- Destination Service Point Address (DSAP)
- Source Service Access Point
- Control field
- Information field

157. **What are headers and trailers and how do they get added and removed?**
The control data added to the beginning of a data is called headers. The control data added to the end of a data is called trailers. At the sending machine, when the message passes through the layers each layer adds the headers or trailers. At the receiving machine, each layer removes the data meant for it and passes the rest to the next layer.

158. **What are the responsibilities of network layer?**
The network layer is responsible for the source-to-destination delivery of packet across multiple network links. The specific responsibilities of network layer include the following:
- Logical addressing.
- Routing.

159. **What is a virtual circuit?**
A logical circuit made between the sending and receiving computers. The connection is made after both computers do handshaking. After the connection, all packets follow the same route and arrive in sequence.

160. **What are data grams?**
In datagram approach, each packet is treated independently from all others. Even when one packet represents just a place of a multipacket transmission, the network treats it although it existed alone. Packets in this technology are referred to as datagram.

161. **What are the two types of implementation formats in virtual circuits?**
Virtual circuit transmission is implemented in 2 formats:
- Switched virtual circuit
- Permanent virtual circuit

162. **What is meant by switched virtual circuit?**
Switched virtual circuit format is comparable conceptually to dial-up line in circuit switching. In this method, a virtual circuit is created whenever it is needed and exits only for the duration of specific exchange.

163. **What is meant by Permanent virtual circuit?**
Permanent virtual circuits are comparable to leased lines in circuit switching. In this method, the same virtual circuit is provided between two uses on a continuous basis. The circuit is dedicated to the specific uses.

164. **Define Routers.**
Routers relay packets among multiple interconnected networks. They Route packets from one network to any of a number of potential destination networks on Internet routers operate in the physical, data link and network layer of OSI model.
165. What is meant by hop count?
The pathway requiring the smallest number of relays, it is called hop-count routing, in which every link is considered to be of equal length and given the value one.

166. How can the routing be classified?
The routing can be classified as,
- Adaptive routing
- Non-adaptive routing.

167. What is time-to-live or packet lifetime?
As the time-to-live field is generated, each packet is marked with a lifetime, usually the number of hops that are allowed before a packet is considered lost and accordingly, destroyed. The time-to-live determines the lifetime of a packet.

168. What is meant by brouter?
A brouter is a single protocol or multiprotocol router that sometimes act as a router and sometimes act as a bridge.

169. Write the keys for understanding the distance vector routing.
The three keys for understanding the algorithm are
- Knowledge about the whole networks
- Routing only to neighbors
- Information sharing at regular intervals

170. Write the keys for understanding the link state routing.
The three keys for understanding the algorithm are
- Knowledge about the neighborhood.
- Routing to all neighbors.
- Information sharing when there is a range.

171. How the packet cost referred in distance vector and link state routing?
In distance vector routing, cost refer to hop count while in case of link state routing, cost is a weighted value based on a variety of factors such as security levels, traffic or the state of the link.

172. How does a given bridge learn whether it should forward a multicast frame over a given port?
It learns exactly the same way that a bridge learns whether it should forward a unicast frame over a particular port- by observing the source addresses that it receives over that port.

173. What are the limitations of bridges?
- Heterogeneity
- Scale

PART – C (16MARKS)

174. Name the four basic network topologies and explain them giving all the relevant features. (AU- NOV 2010)
175. Explain the functioning of wireless LAN in detail. (AU- NOV 2010)
176. Explain Ethernet in detail.
177. Discuss the frame format of token ring in detail.
178. Differentiate FDDI from token ring
179. Write in detail about Resilient Packet Ring.
180. Write short notes on WI-Fi, Wi-Max.
181. Write short notes on Cellphone technologies.

182. What is the need for data encoding and explain the various data encoding schemes and compare their features. (8)

183. Explain how hamming code can be used to correct burst errors. (8)

184. Explain the operation of the bit-oriented protocol HDLC with the required frames

185. Explain the various error detection and correction Mechanisms used in computer network.

186. Write short notes on:
   i. Go back NARQ (8)
   ii. Selective repeat ARQ (8)

187. Discuss the major functions performed by the Presentation layer and Application layer of the ISO - OSI model. (8)

188. Compare Connection oriented and connectionless service. (4)

189. What are the major components of an optical communication system? Discuss. (4)

190. a) A block of 32 bits has to be transmitted. Discuss how the thirty two bit block is transmitted to the receiver using Longitudinal Redundancy Check. (4)
   b) Consider a 32 bit block of data 11100111 11011101 00111001 10101001 that has to be transmitted. If Longitudinal Redundancy Check is used what is the transmitted bit stream? (4)
   c) In the Hamming code, for a data unit of 'm' bits how do you compute the number of redundant bits 'r' needed? (4)
   d) What kinds of errors can Vertical Redundancy check determine? What kinds of errors it cannot determine? (4)

191. Discuss stop and wait protocol

192. Discuss sliding window protocol using Go back n.
   How does a Token Ring LAN operate? Discuss.

UNIT-III

PART – A

193. Number of bits per symbol used in Baudot code is
   a. 7  b. 5  c. 8  d. 9

194. What is the main difference between DDCMP and SDLC?
   a. DDCMP does not need special hardware to final the beginning of a message
   b. DDCMP has a message header  c. SDLC has a IP address
   d. SDLC does not use CRC

195. An example of digital, rather than analog, communication is
   a. DDD  b. DDS  c. WATS  d. DDT

196. Terminals are required for
   a. real-time, batch processing & time-sharing
   b. real time, time-sharing & distributed message processing
   c. real time, distributed processing & manager inquiry
   d. real-time, time sharing & message switching

197. The receive equilizer reduces delay distortions using a
   a. tapped delay lines  b. gearshift  c. descrambler  d. difference engine

198. In a synchronous modem, the receive equilizer is known as
   a. adaptive equilizer  b. impairment equilizer  c. statistical equilizer  d. compromise equilizer
199. The channel in the data communication model can be
   a. postal mail services  b. telephone lines  c. radio lines  d. any of the above

200. A data terminal serves as an
   a. Effector    b. sensor      c. both a and b     d. neither a nor b

201. Which of the following transmission systems provide the highest data rate to in individual device?
   a. computer bus  b. telephone lines  c. voice and mode  d. lease lines

202. A protocol is a set of rules governing a time sequence of events that must take place
   a. between peers    b. between an interface  c. between modems  d. across an interface

203. Which Layer is not present in TCP/IP model?
   a. Application Layer  b. Internet Layer  c. Transport Layer  d. Presentation Layer

204. Let most segment of a name inn DNS represents

205. Address 192.5.48.3 belongs to
   a. class A  b. class B  c. class C  d. class D.

206. Unlike IPv4, IPv6 does not include the following field in the base header

207. The term byte stuffing refers to:
   a. data stuffing used with character oriented hardware.
   b. data stuffing used with bit oriented hardware.
   c. data stuffing used with both a. & b.
   d. data stuffing used with byte oriented hardware.

208. FDDI (Fiber Distributed Data Interconnect) is an example of
   a. token ring  b. token bus  c. star topology  d. multipoint network.

209. Hardware that calculates CRC(Cyclic Redundancy Check) uses:
   a. Shift register  b. Xor unit  c. Both a & b  d. Instruction register

210. In TCP protocol header “checksum” is of__________
   a. 8 bits  b. 16 bits  c. 32 bits  d. 64 bits

211. In IP addressing scheme, class used for multicasting is:
   a. Class A  b. Class B  c. Class C  d. Class D

212. Network address prefixed by 1110 is a
   a. Class A address  b. Multicast address  c. Class B address  d. Reserve address.

ANSWERS:

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 193| 194| 195| 196| 197| 198| 199| 200| 201| 202| 203| 204| 205| 206| 207| 208| 209| 210| 211| 212|
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PART – B  (2 MARKS)

213. Define packet switching?
    A packet switch is a device with several inputs and outputs leading to and from the hosts that the switch interconnects.

214. What is a virtual circuit?
    A logical circuit made between the sending and receiving computers. The connection is made after both computers do handshaking. After the connection, all packets follow the same route and arrive in sequence.
215. **What are datagrams?**
   In datagram approach, each packet is treated independently from all others. Even when one packet represents just a place of a multi packet transmission, the network treats it although it existed alone. Packets in this technology are referred to as datagram.

216. **What is meant by switched virtual circuit?**
   Switched virtual circuit format is comparable conceptually to dial-up line in circuit switching. In this method, a virtual circuit is created whenever it is needed and exits only for the duration of specific exchange.

217. **What is meant by Permanent virtual circuit?**
   Permanent virtual circuits are comparable to leased lines in circuit switching. In this method, the same virtual circuit is provided between two uses on a continuous basis. The circuit is dedicated to the specific uses.

218. **What are the properties in star topology?**
   - Even though a switch has a fixed number of inputs and outputs, which limits the number of hosts that can be connected to a single switch, large networks can be built by interconnecting a number of switches.
   - We can connect switches to each other and to hosts using point-to-point links, which typically means that we can build networks of large geographic scope.

219. **What is VCI?**
   A Virtual Circuit Identifier that uniquely identifies the connection at this switch, and which will be carried inside the header of the packets that belongs to this connection.

220. **What is hop-by-hop flow control?**
   Each node is ensured of having the buffers it needs to queue the packets that arrive on that circuit. This basic strategy is usually called hop-by-hop flow control.

221. **Explain the term best-effort?**
   If something goes wrong and the packet gets lost, corrupted, misdelivered, or in any way fails to reach its intended destination, the network does nothing.

222. **What is maximum transmission unit?**
   MTU- which is the largest IP datagram that it can carry in a frame.

223. **Define Routing?**
   It is the process of building up the tables that allow the network to determine the output for a packet.

224. **Define ICMP?**
   Internet Control Message Protocol is a collection of error messages that are sent back to the source host whenever a router or host is unable to process an IP datagram successfully.

225. **Write the keys for understanding the distance vector routing?**
   The three keys for understanding the algorithm are,
   - Knowledge about the whole networks
   - Routing only to neighbors
   - Information sharing at regular intervals

226. **Write the keys for understanding the link state routing?**
   The three keys for understanding the algorithm are,
   - Knowledge about the neighborhood.
   - Routing to all neighbors.
   - Information sharing when there is a range.
227. **How the packet cost referred in distance vector and link state routing?**
   In distance vector routing, cost refer to hop count while in case of link state routing, cost is a weighted value based on a variety of factors such as security levels, traffic or the state of the link.

228. **Define Reliable flooding?**
   It is the process of making sure that all the nodes participating in the routing protocol get a copy of the link state information from all the other nodes.

229. **What are the features in OSPF?**
   - Authentication of routing messages.
   - Additional hierarchy.
   - Load balancing.

230. **Define Subnetting?**
   Subnetting provides an elegantly simple way to reduce the total number of network numbers that are assigned. The idea is to take a single IP network number and allocate the IP address with that network to several physical networks, which are now referred to as subnets.

231. **What are the different types of AS?**
   - Stub AS
   - Multi homed AS
   - Transit AS

232. **What is an Area?**
   An Area is a set of routers that are administratively configured to exchange link-state information with each other. There is one special area- the backbone area, also known as area 0.

233. **What is Source Specific Multicast?**
   SSM, a receiving host specifies both a multicast group and a specific host. The receiving host would then receive multicast addressed to the specified group, but only if they are from the special sender.

234. **What is meant by congestion?**
   Congestion in a network occurs if user sends data into the network at a rate greater than that allowed by network resources.

235. **Why the congestion occurs in network?**
   Congestion occurs because the switches in a network have a limited buffer size to store arrived packets.

236. **What are the rules of non boundary-level masking?**
   - The bytes in the IP address that corresponds to 255 in the mask will be repeated in the sub network address
   - The bytes in the IP address that corresponds to 0 in the mask will change to 0 in the sub network address
   - For other bytes, use the bit-wise AND operator.

237. **What is LSP?**
   In link state routing, a small packet containing routing information sent by a router to all other router by a packet called link state packet.
238. Write notes on the following ((AU-NOV 2010))
   (i) Internet protocol.
   (ii) Routers.
239. Discuss in detail the various aspects of IPV6. ((AU-NOV 2010))
240. What are the different approaches in Packet Switching, Explain them in detail.
241. Write in detail about bridges.
242. Discuss the spanning tree algorithm in detail.
243. What are the limitations of bridges.
244. Explain in detail the ATM cell format.
245. Explain about the different AAL protocols.
246. Discuss DHCP in detail.
247. Explain Distance Vector routing in detail.
248. Explain OSPF in detail.
249. Discuss RIP in detail.
250. Problems in subnetting.
251. Write short notes on the following
   >Broadcasting  >Multicasting  >ARP  >RARP
252. Explain distance vector routing in detail.
253. Explain packet switching in detail.
254. What are routers? Explain in detail.
255. What are the services provided by DNS server? Explain in detail.
256. Find the class of each IP address. Give suitable explanation. (8 x 2 = 16)
   227.12.14.87  193.14.56.22  14.23.120.8
   252.5.15.111  134.11.78.56  172.18.58.1
   00000000 11110000 11111111 00110011
   10000000 11110000 11111111 00110011
257. State the major difference between Distance Vector Routing and Link State Routing. Discuss how these routing techniques work.
258. What is the sub network address if the destination address is 200.45.34.56 and the subnet mask is 255.255.240.0?
259. List and diagrammatically illustrate and discuss the four general categories of attack.
260. With relevant example discuss about Substitution Ciphers.
261. Briefly discuss how DES algorithm works.

UNIT-IV

262. FTP does not use
   a. Two transfer mode.
   b. Control connection to remote computer before file can be transfer red.
   d. Authorization of a user through login and password verification.
263. A Header in CGI document can represent
   a. format of the document  b. location if document used to different URL
   c. both a. & b.  d. None of the above.
264. 127.0.0.1 is a
   a. limited broadcast address  b. direct broadcast address
   c. multicast address  d. loop-back address
265. In cyclic redundancy checking CRC is the
   a. divisor  b. quotient  c. dividend  d. remainder.
266. Which one of the following uses the greatest number of layers in the OSI model?
267. Which of the following 802 standard provides for a collision free protocol?
   a. 802.2  b. 802.3  c. 802.5  d. 802.6
268. The addressing especially used by Transport Layer is
   a. Station address  b. Network address  c. Application port address  d. Dialog address
269. Which one of the following is an error reporting protocol?
   a. ARP  b. ICMP  c. TCP  d. UDP
270. Which type of web document is run at the client site
   a. Static  b. Dynamic  c. Active  d. All of the above
271. The main function of a browser is to
   a. compile HTML  b. interpret HTML  c. de-compile HTML  d. interpret CGI programs
272. Which of the following is associated with SNMP?
   a. SMI  b. BER  c. DNS  d. MIB
273. ATM is an example of
274. The first part of the address in electronic mailbox identifies:
   a. User’s mailbox  b. Computer on which mailbox resides
   c. Both a. & b.  d. None of the above
275. Protocol used to monitor and control network devices operates at
   a. Application layer  b. Transport layer  c. Network layer  d. Data Link layer
276. DHCP stands for
   c. Dynamic Host Connect ion Protocol  d. None of the above.
277. The transport protocol used by TFTP (Trivial File Transfer Protocol) is:
   a. FTP  b. UDP  c. TCP  d. IP
278. The Environment variable SCRIPT_NAME in CGI script specifies:
   a. Domain name of the computer running server  b. The path of URL after server name.
   c. Name of the server  d. None of the above.
279. Application layer (layer 4) in TCP/IP model corresponds to:
   a. Layer 4 and 5 in OSI model  b. Layer 5 and 6 in OSI model
   c. Layer 6 and 7 in OSI model  d. Layer 1 and 2 in OSI model
280. UDP (User Diagram Protocol) is
281. A network address prefixed by 1000 is:
   a. Class A address  b. Class B address  c. Class C address  d. Class D address

ANSWERS:
262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281
   c  b  d  d  c  b  b  c  b  d  b  a  a  b  b  b  c  d  b
282. **Explain the main idea of UDP?**
   The basic idea is for a source process to send a message to a port and for the destination process to receive the message from a port.

283. **What are the different fields in pseudo header?**
   - Protocol number
   - Source IP address
   - Destination IP addresses.

284. **Define TCP?**
   TCP guarantees the reliable, in order delivery of a stream of bytes. It is a full-duplex protocol, meaning that each TCP connection supports a pair of byte streams, one flowing in each direction.

285. **Define Congestion Control?**
   It involves preventing too much data from being injected into the network, thereby causing switches or links to become overloaded. Thus flow control is an end to an end issue, while congestion control is concerned with how hosts and networks interact.

286. **State the two kinds of events trigger a state transition?**
   - A segment arrives from the peer.
   - The local application process invokes an operation on TCP.

287. **What is meant by segment?**
   At the sending and receiving end of the transmission, TCP divides long transmissions into smaller data units and packages each into a frame called a segment.

288. **What is meant by segmentation?**
   When the size of the data unit received from the upper layer is too long for the network layer datagram or data link layer frame to handle, the transport protocol divides it into smaller usable blocks. The dividing process is called segmentation.

289. **What is meant by Concatenation?**
   The size of the data unit belonging to single sessions are so small that several can fit together into a single datagram or frame, the transport protocol combines them into a single data unit. The combining process is called concatenation.

290. **What is rate based design?**
   Rate- based design, in which the receiver tells the sender the rate-expressed in either bytes or packets per second – at which it is willing to accept incoming data.

291. **Define Gateway.**
   A device used to connect two separate networks that use different communication protocols.

292. **What is meant by quality of service?**
   The quality of service defines a set of attributes related to the performance of the connection. For each connection, the user can request a particular attribute each service class is associated with a set of attributes.

293. **What are the two categories of QoS attributes?**
   The two main categories are,
   - User Oriented
   - Network Oriented
294. List out the user related attributes?
User related attributes are SCR – Sustainable Cell Rate PCR – Peak Cell Rate MCR - Minimum Cell Rate CVDT – Cell Variation Delay Tolerance.

295. What are the networks related attributes?
The network related attributes are, Cell loss ratio (CLR) Cell transfer delay (CTD) Cell delay variation (CDV) Cell error ratio (CER).

296. What is RED?
Random Early Detection in each router is programmed to monitor its own queue length and when it detects that congestion is imminent, to notify the source to adjust its congestion window.

297. What is function of transport layer?
The protocol in the transport layer takes care in the delivery of data from one application program on one device to an application program on another device. They act as a link between the upper layer protocols and the services provided by the lower layer.

298. What are the duties of the transport layer?
The services provided by the transport layer
- End-to-end delivery
- Addressing
- Reliable delivery
- Flow control
- Multiplexing

299. What is the difference between network layer delivery and the transport layer delivery?
Network layer delivery
* The network layer is responsible for the source-to-destination delivery of packet
* The transport layer is responsible for source-to-destination delivery of the entire message.

Transport layer delivery across multiple network links.
The transport layer is responsible for source-to-destination delivery of the entire message.

300. What are the four aspects related to the reliable delivery of data?
The four aspects are Error control, Sequence control, Loss control, Duplication control.

301. What is meant by segment?
At the sending and receiving end of the transmission, TCP divides long transmissions into smaller data units and packages each into a frame called a segment.

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303. What is meant by Concatenation?
The size of the data unit belonging to single sessions are so small that several can fit together into a single datagram or frame, the transport protocol combines them into a single data unit. The combining process is called concatenation.

304. What are the types of multiplexing?
The types of multiplexing are,
Upward multiplexing
Downward multiplexing

305. What are the two possible transport services?
Two basic types of transport services are,
Connection service
Connectionless services
306. The transport layer creates the connection between source and destination. What are the three events involved in the connection?
For security, the transport layer may create a connection between the two end ports. A connection is a single logical path between the source and destination that is associated with all packets in a message. Creating a connection involves three steps:
- Connection establishment
- Data transfer & Connection release.

307. What is meant by congestion?
Congestion in a network occurs if user sends data into the network at a rate greater than that allowed by network resources.

308. Why the congestion occurs in network?
Congestion occurs because the switches in a network have a limited buffer size to store arrived packets.

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Cell error ratio (CER)

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For other bytes, use the bit-wise AND operator.

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A device used to connect two separate networks that use different communication protocols.

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In link state routing, a small packet containing routing information sent by a router to all other router by a packet called link state packet.

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For security, the transport layer may create a connection between the two end ports. A connection is a single logical path between the source and destination that is associated with all packets in a message. Creating a connection involves three steps:
- Connection establishment
- Data transfer
- Connection release
PART – C  (16MARKS)

317. With neat architecture, explain TCP in detail. (AU- NOV 2010)
318. Explain adaptive flow control in detail and its uses. (AU- NOV 2010)
319. With neat architecture, explain UDP in detail.
320. Discuss the different Queueing Discipline in detail.
321. Explain the Congestion Avoidance techniques in detail.
322. Explain TCP Congestion control techniques in detail.
323. Explain how QoS is provided through Integrated Services.
324. Explain how QoS is provided through Differentiated Services.
325. Perform a comparative study between the ISO OSI model and the TCP/IP reference model. (8)
326. Distinguish between point to point links and multi point links. Give relevant diagrams. (8)
327. List and discuss the states used in the TCP connection management finite state machine.
328. Discuss the various timers used by TCP to perform its various operations.
329. Present a tutorial on User Datagram Protocol (UDP).
330. Discuss the strategies TCP uses to avoid congestion.
331. Explain UDP & TCP.
332. Explain leaky bucket and token bucket algorithm.
333. Explain the duties of transport layer.

UNIT-V

PART – A  (1 MARK)

334. A computer communication technology that provides a way to interconnect multiple computers across short distance is
   a. LAN  b. MAN  c. WAN  d. Wireless network
335. Telnet is a service that runs
   a. Television on net   b. Remote program  c. Cable TV network  d. Telnet
336. A device that forwards data packet from one network to another is called a
   a. Bridge  b. Switch  c. Hub  d. Gateway
337. Which of the following is the fastest media of data transfer?
338. Tool that is used to transfer data/files among computers on the Internet
   a. FTP  b. Archie  c. TCP  d. Gopher
339. HTML is a
340. Secret-key encryption is also known as
341. The concept of electronic cash is to execute payment by
   a. Credit Card  b. ATM Card  c. Using computers over network  d. Cheque
342. SMTP is a
   a. Networking Protocol  b. Protocol used for transferring message between end user & Mail Server
   c. Protocol used for smart card message interchange  d. Encryption Standard
343. Digital Signature is
   a. Scanned Signature on Computer  b. Code number of the sender.
   c. Public Key Encryption  d. Software to recognize signature.
344. Telnet is a

345. The internet is

346. An e-business that allows consumer to name their own price for products and services is following which e-business model?

347. Kerberos is an encryption-based system that uses
   a. Secret key encryption b. Public key encryption c. Private key encryption d. Data key encryption

348. The method(s) of payment for online consumers are
   a. Electronic cash b. Credit/debit c. Electronic checks d. All of the above

349. DNS is
   a. The distributed hierarchical naming system b. The vertical naming system c. The horizontal naming system d. The client server system

350. A firewall is
   a. An established network performance reference point b. Software or hardware used to isolate a private network from a public network c. A virus that infects macros d. A predefined encryption key used to encrypt and decrypt data transmissions.

351. A router
   a. Screens incoming information. b. Distributes information between networks c. Clears all viruses from a computer system d. Is a work virus.

352. LDAP stands for

353. E-Commerce is not suitable for
   a. Sale/Purchase of expensive jewellery and antiques. b. Sale/Purchase of mobile phones. c. Sale/Purchase of branded clothes. d. Online job searching.

ANSWERS:

| 334 | 335 | 336 | 337 | 338 | 339 | 340 | 341 | 342 | 343 | 344 | 345 | 346 | 347 | 348 | 349 | 350 | 351 | 352 | 353 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| a   | b   | b   | d   | c   | b   | d   | c   | b   | d   | c   | a   | d   | a   | d   | c   | b   | b   | b   | d   |

PART – B  

354. What is the function of SMTP?

   The TCP/IP protocol supports electronic mail on the Internet is called Simple Mail Transfer (SMTP). It is a system for sending messages to other computer users based on e-mail addresses. SMTP provides mail exchange between users on the same or different computers.

355. What is the difference between a user agent (UA) and a mail transfer agent (MTA)?

   The UA prepares the message, creates the envelope, and puts the message in the envelope. The MTA transfers the mail across the Internet.

356. How does MIME enhance SMTP?

   MIME is a supplementary protocol that allows non-ASCII data to be sent through SMTP. MIME transforms non-ASCII data at the sender site to NVT ASCII data and delivers it to the client SMTP to be sent through the Internet. The server SMTP at the receiving side receives the NVT ASCII data and delivers it to MIME to be transformed back to the original data.
357. Why is an application such as POP needed for electronic messaging?

Workstations interact with the SMTP host, which receives the mail on behalf of every host in the organization, to retrieve messages by using a client-server protocol such as Post Office Protocol, version 3 (POP3). Although POP3 is used to download messages from the server, the SMTP client still needed on the desktop to forward messages from the workstation user to its SMTP mail server.

358. Give the format of HTTP request message?

```
Request Line

Headers

A Blank Line

Body
(present only in some messages)
```

359. What is the purpose of Domain Name System?

Domain Name System can map a name to an address and conversely an address to name.

360. Discuss the three main division of the domain name space.

Domain name space is divided into three different sections: generic domains, country domains & inverse domain.

Generic domain: Define registered hosts according to their generic behavior, uses generic suffixes.

Country domain: Uses two characters to identify a country as the last suffix.

Inverse domain: Finds the domain name given the IP address.

361. Discuss the TCP connections needed in FTP.

FTP establishes two connections between the hosts. One connection is used for data transfer, the other for control information. The control connection uses very simple rules of communication. The data connection needs more complex rules due to the variety of data types transferred.

362. Discuss the basic model of FTP.

The client has three components: the user interface, the client control process, and the client data transfer process. The server has two components: the server control process and the server data transfer process. The control connection is made between the control processes. The data connection is made between the data transfer processes.

363. Name four factors needed for a secure network?

Privacy: The sender and the receiver expect confidentiality.

Authentication: The receiver is sure of the sender’s identity and that an imposter has not sent the message.

Integrity: The data must arrive at the receiver exactly as it was sent.

Non-Reputation: The receiver must able to prove that a received message came from a specific sender.
364. How is a secret key different from public key?

In secret key, the same key is used by both parties. The sender uses this key and an encryption algorithm to encrypt data; the receiver uses the same key and the corresponding decryption algorithm to decrypt the data. In public key, there are two keys: a private key and a public key. The private key is kept by the receiver. The public key is announced to the public.

365. What is a digital signature?

Digital signature is a method to authenticate the sender of a message. It is similar to that of signing transactions documents when you do business with a bank. In network transactions, you can create an equivalent of an electronic or digital signature by the way you send data.

366. What are the advantages & disadvantages of public key encryption?

Advantages:

a) Remove the restriction of a shared secret key between two entities. Here each entity can create a pair of keys, keep the private one, and publicly distribute the other one.

b) The no. of keys needed is reduced tremendously. For one million users to communicate, only two million keys are needed.

Disadvantage:

If you use large numbers the method to be effective. Calculating the cipher text using the long keys takes a lot of time. So it is not recommended for large amounts of text.

367. What are the advantages & disadvantages of secret key encryption?

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Secret Key algorithms are efficient: it takes less time to encrypt a message. The reason is that the key is usually smaller. So it is used to encrypt or decrypt long messages.

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a) Each pair of users must have a secret key. If N people in world want to use this method, there needs to be N (N-1)/2 secret keys. For one million people to communicate, a half-billion secret keys are needed.

b) The distribution of the keys between two parties can be difficult.

368. Define permutation.

Permutation is transposition in bit level.

- **Straight permutation:** The no. of bits in the input and output are preserved.
- **Compressed permutation:** The no. of bits is reduced (some of the bits are dropped).
- **Expanded permutation:** The no. of bits is increased (some bits are repeated).

369. Define substitution & transposition encryption?

- **Substitution:** A character level encryption in which each character is replaced by another character in the set.
- **Transposition:** A Character level encryption in which the characters retain their plaintext but the position of the character changes.

370. Define CGI?

- CGI is a standard for communication between HTTP servers and executable programs. It is used in crating dynamic documents.

371. What are the requests messages support SNMP and explain it?

- **GET**
- **SET**

The former is used to retrieve a piece of state from some node and the latter is used to store a new piece of state in some node.
372. **Define PGP?**

Pretty Good Privacy is used to provide security for electronic mail. It provides authentication, confidentiality, data integrity, and non repudiation.

373. **Define SSH?**

Secure Shell is used to provide a remote login, and used to remotely execute commands and transfer files and also provide strong client/server authentication / message integrity.

374. **What is the purpose of Domain Name System?**

Domain Name System can map a name to an address and conversely an address to name.

375. **Discuss the three main division of the domain name space.**

Domain name space is divided into three different sections: generic domains, country domains & inverse domain.

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382. **Write down the three types of WWW documents.**

The documents in the WWW can be grouped into three broad categories: static, dynamic and active.

- **Static**: Fixed-content documents that are created and stored in a server.
- **Dynamic**: Created by web server whenever a browser requests the document.
- **Active**: A program to be run at the client side.
383. **What is the purpose of HTML?**

HTML is a computer language for specifying the contents and format of a web document. It allows additional text to include codes that define fonts, layouts, embedded graphics and hypertext links.

384. **Define CGI.**

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391. Define substitutional & transpositional encryption.
Substitutional: A character level encryption in which each character is replaced by another character in the set.
Transpositional: A character level encryption in which the characters retain their plaintext but the position of the character changes.

392. Give the format of HTTP response message?

393. Explain the role of a DNS on a computer network. (AU-NOV 2010)

394. Explain the SMTP and HTTP. Give their uses, state strengths and weaknesses (AU-NOV 2010)

395. Explain Email protocols in detail.

396. Discuss FTP in detail.

397. Discuss SNMP and Telnet in detail.

398. Write short notes on
   i. PGP
   ii. SSH

399. Explain how security is provided in interact operations in detail.

400. What is HTTP protocol used for? What is the default port number of HTTP protocol?

401. Discuss the features of HTTP and also discuss how HTTP works.

402. List and discuss the types of DNS records.

403. Explain WWW.

404. What are the duties of FTP protocol?

405. Explain the type of encryption/decryption method.

406. Explain about RSA algorithm

SUBJECT NAME: DIGITAL SIGNAL PROCESSING
SUBJECT CODE: CS2403

UNIT-I SIGNALS AND SYSTEMS

PART-A (1 MARK)

1. The unit step function is defined as \( u(t) = 1 \) when ___________________
   a) \( t \leq 0 \)    b) \( t \geq 0 \)   c) \( t = 1 \)    d) all the above

2. A real exponential signal is defined as \( x(t) = Ae^{at} \) if \( a \) is positive the signal \( x(t) \) is
   a) growing exponentially    b) decaying exponentially    c) zero    d) a dc signal
3. A signal \( x(n) \) is said to be causal if its value is zero for
   a) \( n=0 \)  b) \( n<0 \)  c) \( n>0 \)  d) \( n=1 \)

4. The Fourier transform of \( \delta(n) \) is __________
   a) 0  b) 2  c) 1  d) -1

5. DFT is defined only for sequence of __________ length.
   a) finite  b) infinite  c) both a and b  d) none

6. The circular convolution of the two sequences \( x(n)=\{1,2,2,1\} \) and \( y(n)=\{1,2,3,1\} \) is
   a) \( \{9,10,11,12\} \)  b) \( \{12,10,9,11\} \)  c) \( \{11,10,9,12\} \)  d) \( \{11,9,10,12\} \)

7. If the sequence \( x(n) \) is real and odd (or) imaginary and even then \( X(K) \) is
   a) purely imaginary  b) purely real  c) odd  d) both a and b

8. Sampling is performed only in
   a) frequency domain  b) time domain  c) z domain  d) both a and b

9. Fourier transform is used in __________ frequency spectrum.
   a) discrete  b) continuous  c) all the above  d) none

10. In overlap-save method the size of the input data block is
    a) \( N=M-1 \)  b) \( N=L \)  c) \( N=L-1 \)  d) \( N=L+M-1 \)

11. The FFT reduces the complex multiplications required to perform DFT from \( N^2 \) to
    a) \( N \log N \)  b) \( \frac{N^2}{2} \log N \)  c) \( N-1 \)  d) \( N+1 \)  d) none

12. The number of complex multiplications required for the direct evaluation of FFT algorithm when \( N=4 \)
    a) 12  b) 16  c) 8  d) 4

13. The transition ratio is given by
    a) \( \Omega_p/\Omega_s \)  b) \( \Omega_s/\Omega_p \)  c) \( \Omega_p \Omega_s \)  d) \( 1/\Omega_s \Omega_p \)

14. Given \( \alpha_p=1 \text{dB} ; \alpha_s=30 \text{dB} ; \Omega_p=200 \text{ rad/sec} ; \Omega_s=600 \text{ rad/sec} \) find the order of the filter
    a) 3  b) 5  c) 4  d) 2

15. In warping effect for small values of \( \theta \), \( \tan \theta = \)
    a) \( \theta \)  b) \( \theta + 90 \)  c) \( \theta - 90 \)  d) \( \theta + 180 \)

16. The system represented by the input-output relationship
    \[ y(t) = \int_{-\infty}^{\infty} x(\tau) d\tau, t > 0 \]
    (A) Linear and causal  (B) Linear but not causal  (C) Causal but not linear  (D) Neither linear nor causal

17. A Linear Time Invariant system with an impulse response \( h(t) \) produces output \( y(t) \) when input \( x(t) \) is applied. When the input \( x(t-\tau) \) is applied to a system with impulse response \( h(t-\tau) \), the output will be
    (A) \( y(\tau) \)  (B) \( y(2(\tau-t)) \)  (C) \( y(t-\tau) \)  (D) \( y(t-2\tau) \)

18. A cascade of three Linear Time Invariant systems is causal and unstable. From this, we conclude that
    (A) each system in the cascade is individually causal and unstable
    (B) at least on system is unstable and at least one system is causal
    (C) at least one system is causal and all systems are unstable
    (D) the majority are unstable and the majority are causal

19. The impulse response of a causal linear time-invariant system is given minimum of \( \alpha \) and \( \beta \) and similarly, max (\( \alpha \), \( \beta \)) denotes the maximum of \( \alpha \) and \( \beta \), and \( K \) is a constant, which one of the following statements is true about the output of the system?
    (A) It will be of the form \( K \text{sinc } (\gamma t) \) where \( \gamma = \text{min}(\alpha, \beta) \)
    (B) It will be of the form \( K \text{sinc } (\gamma t) \) where \( \gamma = \text{max}(\alpha, \beta) \)
    (C) It will be of the form \( K \text{sinc } (\alpha t) \)
    (D) It can not be a sinc type of signal
20. Let x(t) be a periodic signal with time period T. Let y(t) = x(t−t₀) + x(t+t₀) for some t₀. The Fourier Series coefficients of y(t) are denoted by b_k. If b_k = 0 for all odd k, then t₀ can be equal to
(A) T/8   (B) T/4   (C) T/2   (D) 2T

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PART-B  

21. Write the analysis and synthesis equation of DFT? (Nov/Dec 2008)

Analysis equation:  
\[ X(K) = \sum_{n=0}^{N-1} x(n) W^{kn} K = 0,1,\ldots,N-1 \]

Synthesis equation:  
\[ x(n) = \sum_{n=0}^{N-1} X(K) W^{-kn} n = 0,1,\ldots,N-1 \]

22. What is the need for FFT? (Nov/Dec 2008)

• Direct computation of DFT requires \(N^2\) complex multiplications and \(N(N-1)\) complex additions.
• FFT algorithm requires \(N/2 \log_2 N\) complex additions
• Thus the number of calculations required by FFT is much less hence it is used for calculation of DFT.

23. What is zero padding? What are its uses? (Nov/Dec 2009)

Zero padding means to add zeros at the end of the sequence. Because of zero padding length of the sequences increases in FFT algorithms. If actual length of the sequence is less than \(N\) then zeros are appended at the end.

24. How many multiplications and additions are required to compute \(N\) point DFT radix-2 FFT? (Nov/Dec 2009)

Complex multiplications: \(N/2 \log_2 N\)
Complex additions: \(N \log_2 N\)

25. List any two properties of DFT. (April/May 2008)

i) Circular Convolution
ii) Circular time shift of a sequence

26. Define the twiddle factor of FFT? (May/June 2009)

The twiddle factor is given as,
\[ W_N = e^{j2\pi/N} \]

27. Define the fourier transform of a discrete time signal. (Nov/Dec 2009)

Fourier transform of a discrete time signal is given as,
\[ X(K) = \sum_{n=-\infty}^{\infty} x(n) e^{-j2\pi n} \]
28. Give any two applications of DFT. (Nov/Dec 2010)
   i) The DFT is used for spectral analysis of signals using a digital computer
   ii) The DFT is used to perform filtering operations on signals using digital computer.

29. Compare the DIT and DIF radix-2 FFT (May/June 2012)
   • In DIT the time domain sequence is decimated
   • In DIF the frequency domain sequence is decimated
   • In DIT the input is bit reversed, the output will be in normal order and vice versa
   • In DIF the input is in normal order, the output will be in bit reversed order and vice versa
   • In DIT the phase factors are multiplied before add and subtract operations
   • In DIF the phase factors are multiplied after add and subtract operations

    The radix-2 FFT is an efficient algorithm for computing N-point DFT of an N-point sequence. In this the N-point sequence is decimated into 2-point sequence and the 2-point DFT for each decimated sequence is computed. From the results of 2-point sequence and the 4-point DFT are computed and so on until we get N-point DFT.

PART-C (16 MARKS)

31. For each impulse response listed below, determine if the corresponding system is (i) casual (ii)stable
   (1) h(n)=2^nu(-n) (2) h(n)=sin nπ/2 (3) h(n)=δ(n)+sinπn (4) h(n)=ρ^n u(n-1) [May/June-2009]

32. Explain in detail about analog to digital conversion with suitable block diagram and to reconstruct the analog signal. [May/June 2012]

33. (i) State and prove Sampling Theorem.(7)
   (ii) How do you recover continuous signal from its samples? (5) May/June-12
       Explain the process of reconstruction of the signal from its samples. Obtain the impulse response of an ideal reconstruction filter. (8) [May/June-2012]
   (iii) Discuss the various parameters involved in sampling and reconstruction. (4) [April/May10]

34. Check the properties of the following systems.
   (a) y(n)=a+b. x(n) (b) y(n)=2x(n)+n.x(n+1) [Nov/Dec 2010]

35. Discuss in detail the use of FFT algorithm in linear filtering. [Nov/Dec-2010]

36. Compute the DFT of the sequence (1, 2, 0, 0, 0, 2, 1, 1) using radix-2 DIF-FFT algorithm.[MAY-2007/09]

37 Verify and explain whether the following impulse responses describe causal, stable or LTI system. [May/June-2012]
   (i) h(n)=e^{0.6n} u(n)
   (ii) h(n)=e^{0}sin(n)u(n)
   (iii) h(n)=2{δ(n-2)+0.5 δ(n-4)}
   (iv) h(n)={cos(nπ/8)},-1<n<15
       {0,otherwise}

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UNIT II FREQUENCY TRANSFORMATIONS

38. The warping effect can be eliminated by
   a) linear phase  b) amplitude response  c) pre warping  d) none

39. The poles of Butterworth filter lie on an ellipse
   a) True  b) False  c) none

40. A causal and stable IIR filter cannot have linear phase
   a) True  b) False  c) none

41. FIR filters are
   a) recursive  b) non recursive  c) linear phase  d) both b & c

42. The FIR filter can be called a linear phase filter
   a) h(N-1-n)  b) h(1-N-n)  c) h(n-1-N)  d) h(-1-n-N)

43. The conversion of continuous time input signal into digital value produces an error called
   a) input quantization error  b) product quantization error  c) coefficient quantization error  d) a & b

44. Convert the decimal number 30.275 to binary form
   a) 0.0100011  b) 110.0100011  c) 11110.01000  d) 11100.1100001

45. Subtract 0.25 from 0.5
   a) 0.010  b) 0.110  c) 1.010  d) 1.110

46. Overflow occurs in ____________ arithmetic.
   a) fixed point  b) floating point  c) both a & b  d) none

47. The mantissa satisfies
   a) -1 ≤ M ≤ 1  b) 0.5 ≤ M ≤ 1  c) -0.5 ≤ M ≤ 0.5  d) -1 ≤ M ≤ 0.5

48. The mean value of an error signal is
   a) 1  b) 2  c) -1  d) 0

49. Saturation error occurs in
   a) DAC  b) ADC  c) both a & b  d) none

50. Limit cycle oscillations can be eliminated by using
   a) pre warping  b) signal scaling  c) warping  d) overflow

51. Express the fraction (-7/8) in sign magnitude
   a) 1.001  b) 1.000  c) 1.111  d) 0.111

52. Which realization is less sensitive to the process of quantization
   a) direct form  b) cascade form  c) direct form II  d) both b & c.

53. H(z) is a transfer function of a real system. When a signal x[n] = (1+j)^n is the input to such a
   system, the output is zero. Further, the Region of convergence (ROC) of (1−1/2z−1)H(z) is the
   entire Z-plane (except z=0). It can then be inferred that H(z) can have a minimum of
   (A) one pole and one zero  (B) one pole and two zeros
   (C) two poles and one zero  (D) two poles and two zeros

54. A signal is processed by a causal filter with transfer function G(s). For a distortion free
   output signal wave form, G(s) must
   (A) provides zero phase shift for all frequency
   (B) provides constant phase shift for all frequency
   (C) provides linear phase shift that is proportional to frequency
   (D) provides a phase shift that is inversely proportional to frequency

55. G(z) = az⁻¹ + βz⁻³ is a low pass digital filter with a phase characteristics same as that of the
   above question if
   (A) α = β  (B) α = -β  (C) α = β¹/³  (D) α = β⁻¹/³
56. If \( u(t), r(t) \) denote the unit step and unit ramp functions respectively and \( u(t) \ast r(t) \) their convolution, then the function \( u(t+1) \ast r(t-2) \) is given by
(A) \( \frac{1}{2}(t-1)u(t-1) \)  
(B) \( \frac{1}{2}(t-1)u(t-2) \)  
(C) \( \frac{1}{2}(t-1^2)u(t-1) \)  
(D) None of the above

57. The Fourier series for the function \( f(x) = \sin^2 x \) is
(A) \( \sin x + \sin 2x \)  
(B) \( 1 - \cos 2x \)  
(C) \( \sin 2x + \cos 2x \)  
(D) \( 0.5 - 0.5\cos 2x \)

ANSWERS:

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PART-B  (2 MARKS)

58. List the various forms of realizations of IIR systems. (Nov/Dec 2008)
- Direct form –I
- Direct form-II
- Cascade realization
- Parallel form realization
- Lattice realization

- LHS of S-plane is mapped inside the unit circle
- RHS of S-plane is mapped outside the unit circle
- Imaginary axis is mapped over the unit circle

60. Mention advantages of Direct form –II and cascade structure. (April/May-2009)
- Direct form II structures require less number of storage locations.
- Cascade structures are easy to implement, since second order sections are simply cascaded.

61. Mention the transformation to digitize an analog filter. (April/May-2012)
- Bilinear transformation
- Impulse invariant transformation

62. Why IIR filters do not have linear phase? (May-June 2010)
IIR filters do not have linear phase. These filters use feedback. The present output depends upon previous output also. Hence IIR filters do not have linear phase. However it is possible to design IIR filters with piecewise linear phase.

63. What are the desirable characteristics of windows? (Nov/Dec 2009)
- The length of the window should be as large as possible
- The width of the main lobe should be as small as possible
- The amplitudes of side lobe level should be very small

64. List the well known techniques for design of linear phase IIR filter (May/June 2012)
- FIR filter design using windows
- FIR filter design using frequency sampling

65. What are the disadvantages of FIR filters? (Nov-Dec 2010)
- FIR filters need higher order compared to IIR filter
- Processing time is more in FIR filter
- FIR filters need more memory
- FIR filters are all zero filters.
In IIR filter design using bilinear transformation the conversion of the specified digital
frequencies to analog frequencies is called prewarping.

The gibb’s oscillation in rectangular window are due to the sharp transitions from 1 to 0 at the edges of window sequence. These oscillation can be eliminated by replacing the sharp transition by gradual transition.

68. Explain in detail about properties of the z-transform with suitable examples. [May/June 2009]

69. For each of the following sequences determine the Z-transform and region of convergence, and sketch the pole zero diagram.
(i) \( x[n] = a^n u[n] + b^n u[n] + c^n u[n-1] \), \(|a| < |b| < |c|\) \( (9) \)
(ii) \( x[n] = 2^n a^n u[n] \) \( (7) \) \[Nov/Dec-2012\]

70. (i) State and prove convolution theorem in z-transform. (8)
(ii) Given \( x(n) = \delta(n) + 2 \delta(n-1) \) and \( y(n) = 3 \delta(n+1) + \delta(n) - \delta(n-1) \), find \( x(n) * y(n) \) and \( X(Z)Y(Z) \). \[Nov/Dec 2009\]

71. Find the z-transform of
(i) \( \cos \omega_0 n . u(n) = x_1(n) \) (ii) \( \sin \omega_0 n . u(n) = x_2(n) \) \[Nov/Dec 2009\]

72. Design and realize butterworth filter using bilinear transformation to meet the following requirements. \( 0.707 \leq |H_d(e^{j\omega})| \leq 1 \), \( 0 \leq |\omega| \leq \pi/2 \)
\( 0.2 \leq |H_d(e^{j\omega})| \leq 0.2 \), \( 3/4 \leq |\omega| \leq \pi \) \[Mya-2011\]

73. Explain the various design methods of IIR filters through analog filters. [Nov-2011]

74. Convert the analog filter with system function \( H_a(S) = \frac{S+0.1}{(S+0.1)^2+9} \) into a digital IIR filter using impulse invariance method \( T=0.1 \) sec [May-2011]

UNIT III IIR FILTER DESIGN

PART-A (1 MARK)

75. For positive number representation carry is
a) Zero  b) positive  c) negative  d) both b & c

76. For negative number representation carry is
a) Zero  b) positive  c) negative  d) one

77. Express the fraction (-3/8) in 1’s complement
a) 1.001  b) 1.100  c) 1.101  d) 0.101

78. When analog signal exceeds dynamic range it causes
a) quantization error  b) saturation error  c) both a & b  d) none

79. In fixed point representation the product of b bits will give_________ number.
a) \( b^2 \)  b) \( b^2 - 1 \)  c) \( 2^b \)  d) \( 2^b - 1 \)

80. The quantization step size for 2’s complement is
a) \( R/2^b \)  b) \( R/2^b - 1 \)  c) \( 2^b \)  d) \( 2^b - 1 \)

81. The fourier transform of auto correlation sequence is called
a) energy density spectrum  b) power density spectrum  c) both a & b  d) none
82. A stationary random process is said to be white noise if its power density spectrum is
a) zero b) one c) constant d) none

83. The quality factor for Bartlett
a) Q = 1.11NΔf b) 0.78NΔf c) 1.89NΔf d) 2.34NΔf

84. The quality factor for Welch method is
a) Q = 1.11NΔf b) 0.78NΔf c) 2.89NΔf d) 2.34NΔf

85. The quality factor for Blackman & Tukey is
a) Q = 1.11NΔf b) 0.78NΔf c) 2.89NΔf d) 2.34NΔf

86. The number of pipeline stages is referred as
a) pipelineing b) pipeline death c) logic unit d) PDSP

87. The factors that influence selection of DSP’s
a) architectural features b) execution speed c) type of arithmetic d) all the above.

88. Calculate the twiddle factors for the transform length 8
a) -j b) 1 c) j d) none

89. Complex multiplication for the N transform length FFT is
a) O(N logN) b) O(log N^2) c) 2N d) none

90. Let Y(s) be the Laplace transformation of the function y(t), then the final value of the function is
(A) \( \lim_{s \to 0} sY(s) \)  (B) \( \lim_{s \to \infty} Y(s) \)
(C) \( \lim_{s \to 0} sY(s) \)  (D) \( \lim_{s \to \infty} sY(s) \)

91. A stable system has input x(t) and output y(t) = e^{-2t}cos t u(t). The impulse response of the system is
(A) δ(t) – (e^{-2t}cos t + e^{-2t}sin t)u(t)  (B) δ(t) – (e^{-2t}cos t + e^{-2t}sin t)u(t-2)
(C) δ(t) – (e^{2t}cos t + e^{2t}sin t)u(t)  (D) δ(t) – (e^{2t}cos t + e^{2t}sin t)u(t+2)

92. The discrete-time signal x(n) = (-1)^n is periodic with fundamental period
(A) 6  (B) 4  (C) 2  (D) 0

93. The frequency of a continuous time signal x(t) changes on transformation from x(t) to x(αt), α > 0 by a factor
(A) α  (B) 1/α  (C) α^2  (D) √α

94. Two sequences x1(n) and x2(n) are related by x2(n) = x1(-n). In the z-domain, their ROC’s are
(A) the same.  (B) reciprocal of each other.
(C) negative of each other.  (D) complements of each other.

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PART-B  (2 MARKS)

95. What is the effect of quantization on pole locations? (Nov/Dec 2011)

Due to quantization the values of the coefficients change and hence pole locations also shift from their original positions. If the pole lies near the unit circle and make the system unstable.
96. Give the rounding errors for fixed and floating point arithmetic. (April/May 2011)
Whenever the number is rounded of to the nearest digital level rounding error is introduced. Fixed point number rounding error is introduced in the complete number. For floating point number rounding error is introduced only in mantissa since rounding operation is done in mantissa only.

97. What is truncation error? (April/May 2011)
When the quantization of digital number drops or truncates some directly to form new number truncation error is introduced.

98. What is the need of scaling in digital filters? (May/June 2012)
When filters are implemented in fixed point arithmetic the overflow can take place even if inputs are scaled. Hence the output is undesired of oscillatory. Hence internal scaling is used in digital filters.

Quantization step size is the minimum value by which the nearest amplitude level differ.

100. What are the two m-types of quantization employed in digital system? (Nov/Dec 2011)
Truncation and rounding are the two types of quantization employed in digital system.

101. How will you avoid limit cycle oscillations due to overflow in addition? (May/June 2006) (May/June 2012)
The adder should perform saturation arithmetic. When the overflow occurs output of the adder is saturated to + 1. This type of operation avoids the limit cycle oscillation.

102. What is rounding? (May/June 2011)
Rounding is the process of reducing the step size of a binary number to finite word size of b-bit such that the rounded b-bit number is closest to the original unquantized number.

103. What are the different formats of fixed point representation? (Nov/Dec 2010)
i) Sign magnitude format
ii) One’s complement format
iii) Two’s complement format

104. Compare fixed point and floating point arithmetic. (Nov/Dec 2011)
- In fixed point the position of binary point is fixed
- In floating point the position of binary point is variable
- The resolution is uniform throughout the range in the case of fixed point
- The resolution is variable in the case of floating point.

PART-C (16 MARKS)

105. Determine the 8-point DFT of the sequence x(n)={1,1,1,1,1,1,0,0} [May/June 2009]
106. Explain in detail about radix-2 DIT—FFT algorithm. [May/June 2009]
107. (i) Compute the DFT of the Four-point sequence x[n]=(0,1,2,3) (6)
(ii) By means of DFT and IDFT, perform the circular convolution of the following two sequences x1[n]= (2,1,2,1) and x2[n]=(1,2,3,4) (10) [Nov/Dec-2010]
108. From the first principle develop the 8-point radix-2 DIT FFT algorithm and compute the 8-point DFT of the sequence x[n]=(1,1,1,1,1,1,1,1) by using DIT FFT algorithm.[Nov-10]
109. (i) Determine the 8-point DFT of the sequence x(n)= {0,0,1,1,1,0,0,0}.(8)
(ii) Find the circular convolution of x1(n) = {1, 2, 3, 4} and x2(n) = {4, 3, 2, 1} (8) [Nov/Dec-2011/12]
UNIT IV  FIR FILTER DESIGN

PART-A  (1 MARK)

110. The Fourier transform of the exponential signal $e^{j\omega t}$ is
(A) a constant.  (B) a rectangular gate.  (C) an impulse.  (D) a series of impulses.

111. The auto-correlation function of a rectangular pulse of duration T is
(A) a rectangular pulse of duration T.  (B) a rectangular pulse of duration 2T.
(C) a triangular pulse of duration T.  (D) a triangular pulse of duration 2T.

112. The FT of a rectangular pulse existing between $t = -T/2$ to $t = T/2$ is a
(A) sinc squared function.  (B) sinc function.
(C) sinc squared function.  (D) sinc function.

113. The system characterized by the equation $y(t) = ax(t) + b$ is
(A) linear for any value of b.  (B) linear if $b > 0$.  (C) linear if $b < 0$.  (D) non-linear.

114. The continuous time system described by $y(t) = x(t^2)$ is
(A) causal, linear and time varying.  (B) causal, non-linear and time varying.
(C) non causal, non-linear and time-invariant.  (D) non causal, linear and time-invariant.

115. If $G(f)$ represents the Fourier Transform of a signal $g(t)$ which is real and odd symmetric in time, then $G(f)$ is
(A) complex.  (B) imaginary.  (C) real.  (D) real and non-negative.

116. $x(n) = a^n, |a|<1$ is
(A) an energy signal.  (B) a power signal.
(C) neither an energy nor a power signal.  (D) an energy as well as a power signal.

117. If a periodic function $f(t)$ of period $T$ satisfies $f(t) = -f(t+T/2)$, then in its Fourier series expansion,
(A) the constant term will be zero.  (B) there will be no cosine terms.
(C) there will be no sine terms.  (D) there will be no even harmonics.

118. A band pass signal extends from 1 KHz to 2 KHz. The minimum sampling frequency needed to retain all information in the sampled signal is
(A) 1 KHz.  (B) 2 KHz.  (C) 3 KHz.  (D) 4 KHz.

119. The region of convergence of the z-transform of the signal $2^n u(n) - 3^n u(-n-1)$
(A) is $|z| > 1$  (B) is $|z| < 1$.  (C) is $2 < |z| < 3$.  (D) does not exist.

120. Given a unit step function $u(t)$, its time-derivative is:
(A) a unit impulse.  (B) another step function.
(C) a unit ramp function.  (D) a sine function.

121. The impulse response of a system described by the differential equation $d^2y/dt^2 + y(t) = x(t)$ will be
(A) a constant  (B) an impulse function
(C) a sinusoid.  (D) an exponentially decaying function.

122. The order of a linear constant-coefficient differential equation representing a system refers to the number of
(A) active devices.  (B) elements including sources.
(C) passive devices.  (D) none of those.

123. z-transform converts convolution of time-signals to
(A) addition.  (B) subtraction.  (C) multiplication.  (D) division.

124. Region of convergence of a causal LTI system
(A) is the entire s-plane  (B) is the right-half of s-plane.
(C) is the left-half of s-plane.  (D) does not exist.

ANSWERS:

<p>| | | | | | | | | | | | | | | |</p>
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</tbody>
</table>
PART-B

125. Define the bias of an estimator. (April/May 2011)

The bias of an estimator is defined as the difference between true value of the parameter and the expected value of the estimator.

126. What is an ergodic process? (April/May 2012)

A stationary random process is said to be ergodic with probability 1 if all the statistical averages can be determined from a single realization of a process.

127. When a stationary random process is white? (Nov/Dec 2010)

A stationary random process is said to be white if its power density spectrum is constant.

128. When the power density spectrum of a random process is an even function? (Nov/Dec 2010)

If the random process is real then the power density spectrum of a random process is an even function.

129. What is meant by power spectral density? (Nov/Dec 2010)

The power spectral density of a process is a measure of how the average power of the process is distributed with respect to frequency.

130. What is meant by periodogram? (May/June 2009)(May/June 2011)

It is a nonparametric method of power spectrum estimation. It is defined as the Fourier transform of an auto correlation function $\gamma_{xx}(l)$, given by

$$I_N(\omega) = \sum_{l=-(N-1)}^{N-1} \gamma_{xx}(l) e^{j\omega l}$$

131. Define cross power spectral density. (May/June 2012)

Let $X(t)$ and $Y(t)$ be two real and jointly wide sense stationary random processes. Their cross power spectral densities are defined as

$$S_{XY}(\Omega) = \int_{-\infty}^{\infty} R_{XY}(t) e^{j\Omega t} dt.$$  

132. What are the advantages of nonparametric method of power spectral estimation? (May/June 2010)

i) It is relatively simple
ii) It is easy to compute using FFT algorithm.

133. What are the disadvantages of nonparametric method of power spectral estimation? (May/June 2006)(May/June 2011)

i) Require long data records
ii) Suffer from spectral leakage effects due to windowing
iii) Poor resolution

134. What are the different methods of nonparametric power spectrum estimation? (May/June 2006)(May/June 2011)

i) Periodogram
ii) Blackman-Tukey
iii) Welch method

PART-C

135. Design an ideal Hilbert transform having frequency response $H(\omega) = j\begin{cases} \Omega, & -\pi \leq \omega < 0 \\ -j, & 0 \leq \omega \leq \pi \end{cases}$

Using (i) Rectangular window (ii) Blackmann window. For $N=11$ plot the frequency response in both cases. [MAY-2009]
136. Explain in detail about IIR filter design by the bilinear transformation. [May/June-2009/12]

137. Design the high pass FIR filter of length 7 with cut-off frequency of 2 rad/sec using Hamming window. Plot its magnitude and phase responses.
   [Nov/Dec-2010]

138. Obtain the Direct form I , direct form II, cascade and parallel form realization for the system
   \[ y(n)= -0.1y(n-1)+0.2y(n-2)+3x(n)+3.6x(n-1)+0.6x(n-2). \] [Nov/Dec-2009]

UNIT V  APPLICATIONS

PART-A    (1 Mark)

139. The DFT of a signal \( x(n) \) of length \( N \) is \( X(k) \). When \( X(k) \) is given and \( x(n) \) is computed from it, the length of \( x(n) \)
   (A) is increased to infinity (B) remains \( N \) (C) becomes \( 2N - 1 \) (D) becomes \( N^2 \)

140. The system having input \( x(n) \) related to output \( y(n) \) as \( y(n) = \log_{10}|x(n)| \) is:
   (A) nonlinear, causal, stable. (B) linear, noncausal, stable.
   (C) nonlinear, causal, not stable (D) linear, noncausal, not stable.

141. To obtain \( x(4 - 2n) \) from the given signal \( x(n) \), the following precedence (or priority) rule is used for operations on the independent variable \( n \):
   (A) Time scaling \( \rightarrow \) Time shifting \( \rightarrow \) Reflection. (B) Reflection \( \rightarrow \) Time scaling \( \rightarrow \) Time shifting.
   (C) Time scaling \( \rightarrow \) Reflection \( \rightarrow \) Time shifting. (D) Time shifting \( \rightarrow \) Time scaling \( \rightarrow \) Reflection.

142. Zero-order hold used in practical reconstruction of continuous-time signals is mathematically represented as a weighted-sum of rectangular pulses shifted by:
   (A) Any multiples of the sampling interval. (B) Integer multiples of the sampling interval.
   (C) One sampling interval. (D) 1 second intervals.

143. When two honest coins are simultaneously tossed, the probability of two heads on any given trial is:
   (A) 1 (B) 3/4 (C) 1/2 (D) 1/4

144. A continuous-time periodic signal \( x(t) \), having a period \( T \), is convolved with itself. The resulting signal is
   (A) not periodic (B) periodic having a period \( T \)
   (C) periodic having a period \( 2T \) (D) periodic having a period \( T/2 \)

145. If the Fourier series coefficients of a signal are periodic then the signal must be
   (A) continuous-time, periodic (B) discrete-time, periodic
   (C) continuous-time, non-periodic (D) discrete-time, non-periodic

146. The region of convergence of a causal finite duration discrete-time signal is
   (A) the entire \( z \)-plane except \( z = 0 \) (B) the entire \( z \)-plane except \( z = \infty \)
   (C) the entire \( z \)-plane (D) a strip in \( z \)-plane enclosing \( jo \)-axis

147. The probability cumulative distribution function must be monotone and
   (A) increasing (B) decreasing (C) non-increasing (D) non-decreasing

148. Convolution is used to find:
   (A) The impulse response of an LTI System (B) Frequency response of a System
   (C) The time response of a LTI system (D) The phase response of a LTI system

149. The Fourier Transform of a rectangular pulse is
   (A) Another rectangular pulse (B) Triangular pulse (C) Sinc function (D) Impulse.

150. The property of Fourier Transform which states that the compression in time domain is equivalent to expansion in the frequency domain is
   (A) Duality. (B) Scaling. (C) Time Scaling. (D) Frequency Shifting.
151. The function which has its Fourier transform, Laplace transform, and Z transform unity is
   (A) Gaussian (B) impulse (C) Sinc (D) pulse

152. The autocorrelation of a rectangular pulse is
   (A) another rectangle pulse (B) Square pulse (C) Triangular pulse (D) Sinc pulse

153. If the Fourier series coefficients of a signal are periodic then the signal must be
   (A) continuous-time, periodic (B) discrete-time, periodic
   (C) continuous-time, non periodic (D) discrete-time, non periodic

154. A transmission is said to be ____________ if the response of the system is exact replica of
    the input signal.
   (A) LTI (B) Distorted (C) Distortionless (D) Causal

155. Two sequences $x_1(n)$ and $x_2(n)$ are related by $x_2(n) = x_1(-n)$. In the Z-domain, their ROCs
    are
   (A) same (B) reciprocal of each other (C) negative of each other (D) complement of each other

156. The autocorrelation of a sinusoid is
   (A) Sinc pulse (B) another sinusoid (C) Rectangular pulse (D) Triangular pulse

157. Which of the following is true for the system represented by $y(n) = x(-n)$
   (A) Linear (B) Time invariant (C) Causal (D) Non Linear

158. Discrete time system is stable if the poles are
   (A) within unit circle (B) outside unit circle (C) on the unit circle (D) None

Answers:

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PART-B (2 MARKS)

159. What are the classifications of digital signal processors? (May/June2010)
   The digital signal processors are classified as
   i) General purpose digital signal processors
   ii) Special purpose digital signal processors

160. What are the advantages of VLIW architecture?(May/June2010)
   i) Increased performance
   ii) Better compiler targets
   iii) Potentially easier to program
   iv) Potentially scalable
   v) Can add more execution units; allow more instructions to be packed into the VLIW
      instruction.

161. What is pipelining?(may/June2010)
   Pipelining is a processor means breaking down its instruction in to a series of discrete
   pipeline stages which can be completed in sequence by specialized hardware.

162. What are the different buses of TMS320C5x?(May/June2010)
   i) Program bus ii) Program address bus
   iii) Data read bus iv) Data read address bus
163. What are the different stages in pipelining? (April/May 2011)
   i) The fetch phase
   ii) The decode phase
   iii) Memory read phase
   iv) The execute phase

164. List the various registers used with ARAU. (April/May 2012)
   i) Eight auxiliary registers (AR0-AR7)
   ii) Auxiliary register point (ARP)
   iii) Unsigned 16 bit ALU

165. What are the logical instructions of c5x? (Nov/Dec 2011)
   AND, ANDB, OR, ORB, XOR, XORB

166. What is the function of parallel logic unit?
   The parallel logic unit is a second logic unit that execute logic operations on data without affecting the contents of accumulator.

167. What are the shift instructions?
   ROR, ROL, ROLB, RORB, ASAR

168. What are the disadvantages of VLIW architecture?
   i) New kind of programmer/compiler complexity
   ii) Program must keep track of instruction scheduling
   iii) Increased memory use
   iv) High power consumption

PART-C (16 Marks)

169. With a suitable diagram describe the functions of multiplier/adder unit of TMS 320 C54X.
   [May-2007, May/June 2010/12]

170. Explain in detail about quantization in floating point realization of IIR digital filters.
   [May/June-2009/12]

171. Explain Harvard architecture. [Nov-2005][May/June 2012]

172. Explain in detail about dedicated MAC unit. [Dec-2004][May/June 2011]

SUBJECT NAME: INFORMATION THEORY AND CODING
SUBJECT CODE: IT2302

UNIT-I INFORMATION THEORY

PART-A (1 MARK)

1. Which of the following type does Screw compressor belongs to?
   a) Positive displacement compressor b) Dynamic compressors
   c) Both a & b d) None of the above

2. The compressor capacity of a reciprocating compressor is directly proportional to __
   a) Speed b) Pressure c) Volume d) All

3. Vertical type reciprocating compressors are used in the capacity range of
   a) 50 – 150 cfm b) 200 – 500 cfm c) Above 1000 cfm d) 10 – 50 cfm
4. The specific power consumption of non lubricated compressor compared to lubricated type is ____
   a) Lesser b) Same c) Higher d) None

5. The discharge temperature of two stage compressor compared to single stage one is ____
   a) Lesser b) Same c) Higher d) None

6. The compression ratios for axial flow compressors are ____.
   a) Lesser b) Higher c) moderate d) None

7. The volumetric efficiency of the compressor ______ with the increase in altitude of place
   a) increases b) decreases c) does not change d) None

8. The most important feature of spiral model is
   (a) requirement analysis. (b) risk management.
   (c) quality management. (d) configuration management.

9. The worst type of coupling is
   (a) Data coupling. (b) control coupling. (c) stamp coupling. (d) content coupling.

10. SRD stands for
    a) Software requirements definition       b) Structured requirements definition
    c) Software requirements diagram          d) Structured requirements diagram

11. Pseudocode can replace
    a) flowcharts b) structure charts c) decision tables d) cause-effect graphs

12. If a node having two children is deleted from a binary tree, it is replaced by its
    a) inorder predecessor b) Inorder successor c) Preorder predecessor d) None of the above

13. The searching technique that takes O (1) time to find a data is
    a) Linear Search b) Binary Search c) Hashing d) Tree Search

14. The number of interchanges required to sort 5, 1, 6, 2 4 in ascending order using Bubble Sort is
    a) 6 b) 5 c) 7 d) 8

15. IEEE 830-1993 is a IEEE recommended standard for
    a) Software requirement specification. b) Software design. c) Testing. d) Both (a) and (b)

ANSWER :

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| a | a | a | c | a | b | b | b | d | b | a | b | c | b | a |

PART-B

    Prefix coding is variable length coding algorithm. It assigns binary digits to the messages as per their probabilities of occurrence. Prefix of the codeword means any sequence which is initial part of the codeword. In prefix code, no codeword is the prefix of any other codeword.

17. State the channel coding theorem for a discrete memoryless channel.(Nov/Dec-2003, April/May-2005)
    Given a source of ‘M’ equally likely messages, with M>>1, which is generating information at a rate R. Given a channel of capacity C. Then if, R ≤ C there exists a coding technique such that the output of the source may be transmitted over the channel with a probability of error in the received message which may be made arbitrarily small.

18. Define a discrete memoryless channel.(AU-APR/MAY-2004)
    For the discrete memoryless channels, input and output, both are discrete random variables. The current output depends only upon current input for such channel.
   
   The channel capacity of the white bandlimited Gaussian channel is, \( C = B \log_2(1+S/N) \) bits/sec. Here, \( B \) is the channel bandwidth.

20. **Give two properties of entropy.**
   
   • \( H(\mathcal{A}) = 0 \) if and only if \( p_k = 1 \) and the remaining probabilities in the set is equal to 0. The lower bound on entropy corresponds to no uncertainty.
   
   • \( H(\mathcal{A}) = \log_2 K \) if and only if \( p_k = 1/K \) then all the probabilities in the set is equiprobable. The upper bound on entropy corresponds to maximum uncertainty.

21. **What is data compaction?**
   
   Data compaction is used to remove redundant information so that the decoder reconstructs the original data with no loss of information.

22. **What is decision tree? Where it is used?** *(April/May-2008)*
   
   The decision tree is a tree that has an initial state and terminal states corresponding to source symbols \( s_0, s_1, s_2, \ldots s_{k-1} \). Once each terminal state emits its symbol, the decoder is reset to its initial state. Decision tree is used for decoding operation of prefix codes.

23. **What is instantaneous code?** *(April/May-2010, Nov/Dec-2009)*
   
   If a codeword is not a prefix of any other code word then it is said to be instantaneous code. (e.g) \[ 0 \ 10 \ 110 \ 1110 \]

24. **What is uniquely decipherable code?**
   
   If a codeword is not a combination of any other code word then it is said to be uniquely decipherable code. (e.g) \[ 0 \ 11 \ 101 \ 1001 \]

25. **What are the two important points while considering a code word?**
   
   • The code words produced by the source encoder are in binary form.
   
   • The source code is uniquely decodable.

26. **Define information.** *(NOV2012)*
   
   Average information is the ratio of the total information to the number of messages.

27. **State and explain Shannon’s theorem on channel capacity.**

28. **State and explain Shannon-Hartley theorem.**

29. **A voice grade telephone channel has a bandwidth of 3400 Hz. If the signal to noise ratio (SNR) on the channel is 30 dB, determine the capacity of the channel. If the above channel is to be used to transmit 4.8 kbps of data determine the minimum SNR required on the channel.** *(AU NOV/DEC-2003)*

30. **A discrete memoryless source has a alphabet of five symbols whose probabilities of occurrence are as described here:**

<table>
<thead>
<tr>
<th>Symbols</th>
<th>X1</th>
<th>X2</th>
<th>X3</th>
<th>X4</th>
<th>X5</th>
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<tr>
<td>Probability</td>
<td>0.2</td>
<td>0.2</td>
<td>0.1</td>
<td>0.1</td>
<td>0.4</td>
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   Compute the Huffman code for this source. Also calculate the efficiency of the source encoder. *(AU NOV/DEC-2003)*

31. **Find capacity of a Binary (symmetric) channel in bits/sec, when probability of error is 0.1 and the symbol rate is 1000 symbol/sec.** *(AU- NOV/DEC-2004)*

32. **Apply Huffman coding procedure to following message ensample and determine average length of enclosed message also. Determine the coding efficiency. Use coding alphabet D=4. There are 10 symbols.**

   **X=[x1 x2 x3,....x10]**
   
   **P(x)=[0.18,0.17,0.16,0.15,0.1,0.08,0.05,0.05,0.04,0.02]** *(AU- NOV/DEC-2004)*
33. Encode the following source

<table>
<thead>
<tr>
<th>X</th>
<th>X1</th>
<th>X2</th>
<th>X3</th>
<th>X4</th>
<th>X5</th>
<th>X6</th>
<th>X7</th>
<th>X8</th>
</tr>
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<tr>
<td>P(X)</td>
<td>1/2</td>
<td>1/4</td>
<td>1/16</td>
<td>1/16</td>
<td>1/32</td>
<td>1/32</td>
<td>1/32</td>
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</tr>
</tbody>
</table>

Using

ii) Huffman coding

iii) Shannon Fano coding

(AU-NOV 2012)

34. State Channel Capacity theorem and explain in detail. (AU-NOV 2012)

35. Determine the channel capacity for the following channel matrix

\[
\begin{pmatrix}
0.8 & 0.1 & 0.1 \\
0.1 & 0.8 & 0.1 \\
0.1 & 0.1 & 0.8
\end{pmatrix}
\]

(i) How will you calculate channel capacity? (2)

(ii) Write channel coding theorem and channel capacity theorem (5)

(iii) Calculate the entropy for the given sample data AAABBBCCD (3)

(iv) Prove Shannon information capacity theorem (6) (AU-NOV 2012)

UNIT II SOURCE CODING: TEXT, AUDIO AND SPEECH

PART-A (1 MARK)

36. An AM demodulator can be implemented with a linear multiplier followed by a ______ filter.

a.low-pass b.high-pass c.band-pass d.band-stop

37. The intermediate frequency in a standard AM receiver is

a.455 Hz. b.455 kHz. c.4.55 MHz. d.none of the above

38. In AM, the carrier is changed by a modulating signal. What parameter of the carrier is changed?

a.amplitude b.frequency c.pulse width d.phase

39. For a four-quadrant linear multiplier, what is the output voltage, given input voltages of

\[ V_x = +2\,V \text{ and } V_y = -10\,V \]

a.+2 V b.+1 V c.-2 V d.-1 V

40. The output spectrum of a ______ modulator includes upper-side and lower-side frequencies and the carrier frequency.

a.balanced db.standard amplitude c.none of the above

41. Amplitude modulation is a ______ process.

a.multiplication b.division c.sum/difference d.[NIL]

42. What does VCO stand for?

A. Visually-Controlled Organization B. Voltage-Controlled Oscillator C. Voltage-Centered Oscilloscope

43. A phase-locked loop (PLL) is a feedback circuit consisting of a

a. phase detector. b. low-pass filter. c. VCO. d. all of the above
44. If a 1 MHz carrier is amplitude modulated with a 5 kHz audio signal, the upper-side frequency is _______ kHz.
   a. 1005 b. 1000 c. 995 d. none of the above

45. A certain fiber-optic cable has the following characteristics: n1 = 1.82 and n2 = 1.73. What is the value of θc?
   a. 71.90° b. 0.95° c. 18.1° d. 1.81°

46. An AM demodulator can be implemented with a linear multiplier followed by a ________ filter.
   a. low-pass b. high-pass c. band-pass d. band-stop

47. The intermediate frequency in a standard AM receiver is
   a. 455 Hz. b. 455 kHz. c. 4.55 MHz. d. none of the above

48. Light may be propagated along a fiber-optic cable in which of the following modes?
   a. multimode step index b. single-mode step index
   c. multimode graded index d. all of the above

49. The two basic types of signals are analog and:
   a. digilog b. Digital c. vetilog d. sine wave

50. Which of the following characterizes an analog quantity?
   a. Discrete levels represent changes in a quantity.
   b. Its values follow a logarithmic response curve.
   c. It can be described with a finite number of steps.
   d. It has a continuous set of values over a given range.

51. ASCII stands for:
   a. American Serial Communication Interface
   b. Additive Signal Coupling Interface
   c. American Standard Code for Information Interchange
   d. none of the above

52. Which type of signal is represented by discrete values?
   a. noisy signal b. nonlinear c. analog d. digital

53. A data conversion system may be used to interface a digital computer system to:
   a. an analog output device b. a digital output device
   c. an analog input device d. a digital printer

ANSWER:

| 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| a  | b  | a  | c  | b  | a  | b  | d  | a  | a  | a  | b  | d  | b  | d  | c  | d  | a  |

PART-B (2 MARKS)

54. Explain subband coding for speech signal. (Nov/dec-2003, April/May-2004)
   The speech signal is divided into number of nonoverlapping frequency bands.
   These frequency bands are called subbands of small range covering specific frequency.
   Each subband is encoded separately with ADPCM or ADM.
   Subband coding provides efficient noise reduction and improves overall sound quality.

55. What are the advantages of coding speech at low bit rates. (AU-APR/MAY-2004)
   Due to low bit rate coding, the speech can be securely transmitted over radio channels of low capacity.
   The PCM quality speech of 64 KB/s can be coded as low as 2 KB/s with low bit rate.
56. **Define static and dynamic coding?**

After finding the code words these code words are substituted in a particular type of text is known as static coding. If the code words may vary from one transfer to another then it is said to be dynamic coding.

57. **What is Dolby AC-1? (Nov/Dec-2009)**

Dolby AC-1 is used for audio recording. It is MPEG audio coding standard. It used psychoacoustic model at the encoder and has fixed bit allocations to each subband.

58. **What is perceptual coding? (AU-NOV 2012)**

In perceptual coding only perceptual frames of the sound are stored. This gives high degree of compression. Human ear is not sensitive to all frequencies equally. Similarly masking of weaker signal takes place when louder signal is present near by. These parameters are used in perceptual coding.

59. **Why LPC is not suitable to encode music signal? (AU-NOV 2012)**

Sound obtained by LPC is very synthetic. Hence it is suitable mainly for speech. since music has high bandwidth, the naturalness of sound is further deteriorated. therefore LPC is not used for music compression.

PART-C (16 MARKS)

60. **Discuss in briefly the following audio coders:**

   i) MPEG audio coders
   ii) Dolby audio coders (AU-NOV 2012)

61. **Elucidate the terms frequency masking and temporal masking with diagrams wherever necessary.** (AU-NOV 2012)

62. **Explain the principles of perceptual coding** (AU-NOV 2011)

63. **With a schematic diagram of an LPC encoder and decoder, identify the perception parameters and associated vocal tract excitation parameters that are used. Give explanations wherever necessary.** (AU-DEC 2004)

64. **Explain the LPV model of analysis and synthesis of speech signal. state the advantages of coding speech signal at low bit rate.** (MAY 2009)

65. **Explain with an example how static arithmetic coding is advantageous over static Huffman encoding** (AU-DEC 2004)

66. **Discuss in brief the principles of compression** (AU-DEC 2005)

67. **Explain arithmetic coding with suitable example.** (AU-MAY 2012)

68. **Compare arithmetic coding algorithm with suitable example.** (AU-MAY 2004)

UNIT III SOURCE CODING: IMAGE AND VIDEO

PART-A (1 MARK)

69. **Converting data into signals by transforming and encoding the information to produce electromagnetic signals is the functionality of a _______.**

   a. Source b. transmitter c. receiver d. destination

70. **What must a sender do before a receiver’s sliding windows buffer can expand?**

   a. Send an acknowledgment b. Receive an acknowledgment
c. Either a or b d. Neither a nor b

71. **Controlled access line discipline is used with which type of circuit?**

   a. Point-to-point  b. **Multipoint**  c. Either a or b  d. Neither a nor b

72. **Which of the following is the simplest error-detection method?**

   a. Parity b. Longitudinal redundancy checking c. Checksum checking
d. Cyclic redundancy checking
73. Which type of error detection uses binary division?
   a. Parity b. Longitudinal redundancy checking c. Checksum checking  
   d. Cyclic redundancy checking

74. Which of the following is also called forward error correction?
   a. Simplex b. Retransmission c. Detection-error coding  
   d. Error-correction coding

75. When a network interface has a failure in its circuitry, it sends a continuous stream of frames causing the Ethernet LAN to enter a Collapse state. This condition is known as
   a. Scattering b. blocking c. Jabbering d. Refreshing

76. In an object-oriented model, when different classes have operations with the same name but different implementation, they are having the property of ________.
   a. Inheritance b. association c. polymorphism d. aggregation

77. _____ is a technique which transforms an analogue telephone circuit into a digital signal, and involves three consecutive processes: sampling, quantization and encoding.
   a. Frequency Modulation (FM) b. Pulse Code Modulation (PCM)  
   c. Amplitude Modulation (AM) d. Phase Modulation (PM)

78. The frame alignment word is a sequence of bits that allows the start of each STM-1 frame to be clearly identified within SDH network. It is contained within
   a. Regenerator section overhead b. Multiplex section overhead  
   c. Synchronous section overhead d. Sequence section overhead

79. _____ is one of the Telecommunication management network (TMN) functional blocks that will convert TMN information into a format that can be easily understood by the user.
   a. Operations system function block b. Workstation function block 
   c. Reference function block d. Network element function block

80. In Telecommunication management Network (TMN) system, the role of the manager is to issue commands and requests to the agent. These commands and requests are known as ____________.
   a. Notifications b. feedbacks c. operations d. acknowledgements

81. The sequence of the binary digits representing the outcomes of parity checks in Hamming codes is known as ____________.
   a. look-up entry b. Hamming distance c. radix d. syndrome

82. Rather than sending the absolute value of each sample, it is possible to achieve a smaller transmission bit-rate by sending the difference between consecutive samples. This is known as ____________.
   a. delta modulation b. delta-sigma modulation c. adaptive delta modulation 
   d. differential PCM

83. The figure below shows an example of a modulation system used in digital communication. What is that modulation system?
**ANSWERS:**

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**PART-B**

84. **What is Hamming distance in error control coding? (AU NOV/DECEMBER-2003)**

   The hamming distance between the two code vectors is equal to the number of digits in which they differ. For example, let the two codewords be, X = (1 0 1) and Y = (1 1 0). These two codewords differ in second and third bits. Therefore the hamming distance between X and Y is two.

85. **Why cyclic codes are extremely well suited for error detection? (AU NOV/DECEMBER-2003)**

   Cyclic codes are extremely well suited for error detection because of the following reasons:
   i) They are easy to encode.
   ii) They have well defined mathematical structure. Therefore efficient decoding schemes are available.

86. **What is syndrome? (AU APRIL/MAY-2004)**

   Syndrome gives an indication of errors present in received vector ‘Y’. If YHT = 0, then there are no errors in ‘Y’ and it is a valid codevector. The non zero value of YHT is called ‘syndrome’. It’s non zero value indicates that ‘Y’ is not a valid code vector and it contains errors.

87. **Define dual code. (AU APRIL/MAY-2004)**

   Let there be (n,k) block code. It satisfies HGT = 0. Then the (n,n-k) i.e. (n,q) block code is called dual code. For every (n,k) block code, there exists a dual code of size (n,q).

88. **Write the syndrome properties of linear block codes. (AU NOV/DECEMBER-2004)**

   • Syndrome is obtained by S = YHT.
   • If Y = X, then S = 0 i.e. no error in output
   • If Y ≠ X, then S ≠ 0 i.e. there is an error in output
   • Syndrome depends upon the error pattern only, i.e. S = EHT

89. **What is Hamming code? (AU APRIL/MAY-2005)**

   This is a family of (n, k) linear block code. Block length: n = 2m – 1, Number of message bits: k = 2m – m-1, number of parity bits: n – k = m, Where m ≥ 3 and m should be positive integer

90. **What is error detection?**

   The decoder accepts the received sequence and checks whether it matches a valid message sequence. If not, the decoder discards the sequence and notifies the transmitter (over the reverse channel from the receiver to the transmitter) that errors have occurred and the received message must be retransmitted. This method of error control is called error detection.

91. **Define linear block code?**

   If each of the 2k code words can be expressed as a linear combination of ‘k’ linearly independent code vectors then the code is called linear block code.

92. **What is convolutional code?**

   A convolutional code in which parity bits are continuously interleaved by information (or) message bits.

93. **Define constraint length?**

   The constraint length (K) of a convolutional code is defined as the number of shifts a single message bit to enter the shift register and finally comes out of the encoder output. K = M + 1

94. **State the main application of Graphics Interchange Format (GIF)? (AU NOV/DECEMBER-2003)**

   The Graphics Interchange Format (GIF) is used mainly for compressing and transmitting images over internet.

95. **What do you understand by “GIF Interlaced node”? ( Nov/DECEMBER-2010)**

   The image data can be stored and transferred over the network in an interlaced mode.
96. How arithmetic coding is advantageous over Huffman coding for text compression? (April/May-2010)
- Shannon’s rate can be achieved always irrespective or probabilities of characters in the message.
- Arithmetic coding encodes messages of short lengths rather than characters.

97. Define TIFF? (AU-NOV 2012)
Tagged image file format. Color images can be represented by means of 48 bits. Each 16-bits corresponds to R, G and B. TIFF is used for transferring both images and digitized documents. Code numbers 2, 3, 4, 5 were used.

98. What is significance of D-frames in video coding? (April/May-2012)
- The D-frames are inserted at regular intervals in the encoded sequence of frames. These frames are highly compressed and they are ignored during decoding ‘p’ and ‘B’ frames.
- The D-frame consists of only DC coefficients and hence they generate low resolution picture.
- The low resolution pictures generated by D-frames are useful in fast forward and rewind applications.

PART-C (16 MARKS)

96. Draw the JPEG coder schematic diagram and explain. (AU-MAY 2012)
97. Investigate on the block preparation and quantization phase of JPEG compression process with diagrams wherever necessary. (May 2005)
98. Elucidate on the GIF and TIFF image compression formats. (MAY 2005)
99. Explain the encoding procedure for I, P and B frames in video compression techniques. State intended application of the following video coding standard. MPEG-1, MPEG-2, MPEG-3 and MPEG-4. (MAY 2011)
100. Explain the encoding procedure of I, P and B frames in video encoding with suitable diagrams. (DEC 2011)
101. Explain the motion estimation and motion compensation procedures of P and B frames encoding process. (MAY 2012)
102. Write a short note on the macro block format of H.261 compression standard. (AU-MAY 2012)

UNIT IV ERROR CONTROL CODING: BLOCK CODES

PART-A (1 MARK)
103. One of the compression techniques in communication uses the fact that in most pictures, there is considerable correlation between neighboring areas that is a high degree of redundancy in the data to compress. This type of compression is known as ____________.
   a. temporal compression b. dynamic compression c. spatial compression d. random compression

104. Reversible or lossless coding is a type of coding for which the exact data can be recovered after decoding. This type of coding is used by ________________.
   a. PCM encoding b. Huffman encoding c. Run-length encoding
   b. Both b and c

105. The error represented by the difference between the original and quantized signals set a fundamental limitation to the performance of PCM systems known as ___.
   a. dynamic range b. quantization noise c. detection-error d. correction-error

106. Which of the following type does Screw compressor belongs to?
   a) Positive displacement compressor b) Dynamic compressors c) Both a & b
   d) None of the above
107. The compressor capacity of a reciprocating compressor is directly proportional to __
a) Speed b) Pressure c) Volume d) All

108. Vertical type reciprocating compressors are used in the capacity range of ____
a) 50 – 150 cfm b) 200 – 500 cfm c) Above 1000 cfm d) 10 – 50 cfm

109. The specific power consumption of non lubricated compressor compared to lubricated
type is ____
a) Lesser b) Same c) Higher d) None

110. The discharge temperature of two stage compressor compared to single stage one is ___
a) Lesser b) Same c) Higher d) None

111. The compression ratios for axial flow compressors are ____.
a) Lesser b) Higher c) moderate d) None

112. The volumetric efficiency of the compressor ____ with the increase in altitude of place
a) increases b) decreases c) does not change d) None

113. The ratio of isothermal power to actual measured input power of a compressor is known as:
a) Isothermal efficiency b) Volumetric Efficiency c) Barometric efficiency d) None

114. The basic function of air dryer in a compressor is:
a. prevent dust from entering compressor
b. storage and smoothening pulsating air output
c. reduce the temperature of the air before it enters the next state to increase efficiency
d. to remove remaining traces of moisture after after-cooler

115. For every 4°C raise in air inlet temperature of an air compressor, the power consumption
will increases by ____
a) 2% b) 1% c) 3% d) 4%

116. The percentage increase in power consumption of a compressor with suction side air filter
and with the pressure drop across the filter of 200 mmWc is ____
a) 1.0% b) 3% c) 2.4% d) 1.6%

117. Which of the statement is “True” for centrifugal compressors?
a) The compressor should not be operated at full load
b) The compressor should be operated at shut off pressure
c) The compressor should not be operated with inlet-guide vane control

ANSWERS:

103 104 105 106 107 108 109 110 111 112 113 114 115 116 117  
c  d  b  a  a  a  c  a  b  b  a  d  b  d  a

PART-B (2 MARKS)

118. Explain Run-length-encoding.(AU NOV/DEC-2003)
The runlength encoding is simplest lossless encoding techniques. It is mainly used to
compress text or digitized documents. Binary data strings are better compressed by runlength
encoding. Consider the binary data string, 1 1 1 1 1 1 0 0 0 0 0 0 0 0 1 1 1 1 0 0 0 0 … If we
apply runlength coding to above data string, we get, 7,1;6,0;5,1;3,0…. Thus there are 7 binary
1’s followed by 6 binary 0’s ,followed by 5 binary 1’s and so on.

119. Why differential encoding is carried out only for DC coefficient in JPEG?(AU-
APR/MAY-2004)
• The DC coefficient represents average colour/luminance/chrominance in the
  corresponding block. Therefore it is the largest coefficient in the block.
• Very small physical area is covered by each block. Hence the DC coefficients do not vary
  much from one block to next block.
• The DC coefficient vary slowly. Hence differential encoding is best suitable compression for DC coefficients. It encodes the difference between each pair of values rather than their absolute values.
• Due to different encoding only difference is encoded. Hence number of bits required are less.

120. **What are “Make-up Codes” and Termination codes in digitization of documents?**

   Make-up codes and termination codes gives codewords for contiguous white and block pels along the scanned line.

   **Termination codes**: These codes give codewords for block and white run lengths from 0 to 63 in steps of 1 pel
   **Make-up codes**: These codes give codewords for black and white run lengths that are multiples of 64 pels.

121. **Define spatial frequency?**

   The rate of change in magnitude while traversing the matrix is known as spatial frequency.

122. **What is a horizontal and vertical frequency component?**

   If we scan the matrix in horizontal direction then it is said to be horizontal frequency components. If we scan the matrix in vertical direction then it is said to be vertical frequency components.

123. **List the properties of generator polynomial of cyclic codes.**

   i) Generator polynomials is a factor of \( x^n \) and \( (P^n + 1) \)
   ii) Code polynomial, message polynomial and generator polynomial are related by \( X(p) = M(p) G(p) \)
   iii) Generator polynomial is of degree \( q \)

124. **Why cyclic codes are extremely well suited for error detection?**

   Cyclic codes are extremely well suited for error detection because of following reasons:
   i) They are easy to decode.
   ii) They have well defined mathematical structure therefore efficient decoding schemes are available.

125. **What is Syndrome?**

   Syndrome gives an indication of errors present in received vector \( Y \). If \( YH' = 0 \), then there are no errors in \( Y \) and it is valid code vector the non zero value of \( YH' \) is called syndrome. Its non zero value indicates that \( Y \) is not a valid code vector and it contains errors.

126. **Explain the JPEG decoder with a diagram?**

127. **Explain the linear block codes.**

128. **Explain the single parity codes.**

129. **Explain the cyclic codes.**

130. **Calculate the systematic generator matrix to the polynomial \( g(x) = 1 + x + x^3 \). Also draw through encoder diagram.**

131. **The generator matrix for a (6,3) block code is given below. Find all code words of this code.**

\[
G = \begin{bmatrix}
1 & 0 & 0 & : & 0 & 1 & 1 \\
0 & 1 & 0 & : & 1 & 0 & 1 \\
0 & 1 & 1 & : & 1 & 1 & 0
\end{bmatrix}
\]
132. The parity check matrix of a particular (7,4) linear block code is given by

\[
[H] = \begin{bmatrix}
1 & 1 & 1 & 0 & 1 & 0 & 0 \\
1 & 1 & 0 & 1 & 0 & 1 & 0 \\
1 & 0 & 1 & 1 & 0 & 0 & 1 \\
\end{bmatrix}
\]

i) Find the generator matrix \((G)\)
ii) List all the code vocoders
iii) What is the minimum distance between code vectors?
iv) How many errors can be detected? How many errors can be corrected?

133. The parity check matrix of a (7,4).Hamming code is given as follows

\[
[H] = \begin{bmatrix}
1 & 1 & 1 & 0 & 1 & 0 & 0 \\
0 & 1 & 1 & 1 & 0 & 1 & 0 \\
1 & 1 & 0 & 1 & 0 & 0 & 1 \\
\end{bmatrix}
\]

Calculate the syndrome vector for single bit errors.

134. For a linear block code, prove with examples that:
   i) The syndrome depends only on error pattern and not transmitted codeword..
   ii) All error patterns that differ by a codeword have the same syndrome.

UNIT V  ERROR CONTROL CODING: CONVOLUTIONAL CODES

PART-A  (1 MARK)

135. Isochronous Transmission Model provides
   a. Communication without any timely restriction;
   b. Communication with upper bound on end to end for each packet of a data stream
   c. Communication with upper bound on end to end delay and minimal jitter delay for each packet of a data stream

136. Audio sample values 0,0.25,0.36,0.50,0.75,0.65,0.50,0.75,0.2,-0.4,-0.6,-0.45,-0.23,0 require how many bits for encoding the values:
   a. 3 bits  b. 4 bits  c. 5 bits

137. Noiseless 6KHz channel cannot transmit a signal of four discrete levels at a rate exceeding:
   a. 24000 bits/sec  b. 12000 bits/sec  c. 6000 bits/sec

138. Color encoding uses during the transmission
   a. Two luminance signals and chrominance signals
   b. Red, Green and Blue signals
   c. One luminance signals and Two chrominance signals

139. To avoid flicker effect, we need to
   a. Increase the pixel resolution
   b. Increase the refresh cycles/sec
   c. Increase the memory in the display refresh buffer

140. HDTV differs from NTSC video signal because of
   a. Different number of lines only
   b. Different frame rate and aspect ratio only
   c. Different number of lines, frame rate and aspect ratio.
141. MPEG-2 compression belongs to
   a. Entropy coding scheme b. Hybrid coding scheme c. Source coding scheme

142. What operation produces a pulse-modulated signal?
   a. converting the message signal to a digital code
   b. passing the message signal through a high-pass filter
   c. sampling the amplitude of the message signal
   d. sampling the message signal's frequency

143. What are PAM, PWM, and PPM signals?
   a. pulse-modulated signals b. 4-bit digital codes c. PLL-modulated signals
d. 2-bit digital codes

144. What circuit demodulates a pulse-modulated signal?
   a. sampler b. low-pass filter c. comparator d. sample/hold

145. How are PAM and PCM signals usually multiplexed?
   a. JK multiplexed (JKM) b. SCR multiplexed (SCRM)
c. integrated digitally multiplexed (IDM) d. time-division multiplexed (TDM)

146. What circuits compose the receiver section of the PTM circuit block?
   a. SAMPLE/HOLD, RAMP GENERATOR, ADDER, COMPARATOR, and PULSE-LENGTH
   b. LIMITER and PREFILTER

147. What is the frequency of the 5 Vpk-pk M1 message signal?
   a. 1 kHz b. 2 kHz c. 5 kHz

148. In the PAM circuit block, what circuit is the receiver?
   a. SAMPLER b. FILTER

149. What PTM circuit converts the message signal into a staircase PAM signal?
   a. ADDER b. SAMPLE/HOLD c. COMPARATOR

ANSWERS:

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PART-B (2 MARKS)

150. What is meant by linear code? (MAY 2011)
    A code is linear if modulo-2 sum of any two codevectors produces another code vector. This means any code vector can be expressed as linear combination of other code vectors.

151. What are the error detection and correction capabilities of hamming codes?
    The minimum distance of hamming code is 3. Hence it can be used to detect double errors or correct single errors. Hamming codes are basically linear block codes with $d_{min} = 3$.

152. What is hamming distance?
    The hamming distance between the two code vectors is equal to the number of elements in which they differ. For example, let the two code words be,
    
    \[ X = (101) \text{ and } Y = (110) \]
    
    These two code words differ in second and third bits. Therefore the hamming distance between X and Y is two.

153. Define code efficiency. (AU-NOV 2012)
    The code efficiency is the ratio of message bits in a block to the transmitted bits for that block by the encoder.

154. What is meant by systematic and nonsystematic codes? (AU-MAY 2011)
    In a systematic block code, message bits appear first and then check bits. In the non-systematic code, message and check bits cannot be identified in the code vector.
155. **What is the difference between block codes and convolutional codes?**

Block codes take \( k \) number of messages bit simultaneously and form \( n \)-bit code vector. This code vector is also called block. Convolutional code takes one message bit at a time and generates two or more encoded bits. Thus convolutional codes generate a string of encoded bits for input message string.

156. **Define constraint length in convolutional codes.** (AU-NOV 2012)

Constraint length is the number of shifts over which the single message bit can influence the encoder output. It is expressed in terms of message bits.

---

**PART-C**

(16 MARKS)

157. **Comparison between linear block codes and convolutional codes.** (MAY 2011)

158. **Construct a convolutional encoder for the following specifications:** rate efficiency = 0.5, constraint length = 4. The connections from the shift registers to modulo 2 adder are described by the following equations:

\[
G_1(x) = 1 + x \\
G_2(x) = x
\]

Determine the output codeword for the input message \([1110]\).

159. **A convolutional encoder is defined by the following generator polynomials:**

\[
G_0(x) = 1 + x + x^2 + x^3 + x^4 \\
G_1(x) = 1 + x + x^3 + x^4 \\
G_2(x) = 1 + x^2 + x^4
\]

i) What is the constraint length of this code?

ii) How many states are in the trellis diagram of this code?

iii) What is the code rate of this code?

160. **A convolutional encoder has single shift registers with **\( n \)two stages three modulo 2 adders and an output multiplexer. The following generator sequences are combined by the multiplexer to produce the encoder output:** \( g_1 = (1,0,1); \ g_2 = (1,1,0); \ g_3 = (1,1,1) \)

i) Draw the block diagram of encoder.

ii) For the message sequence \((10011)\), determine encoded sequence.

If above hardware is enhanced by increasing number of stages in shift registers and number of mod – 2 adders respectively, what is the effect on

1. Generated output sequence.
2. Periodicity of the codetree

161. **A rate 1/3 convolution encoder has generating vectors as \( g_1 = (100), \ g_2 = (111) \) and \( g_3 = (101) \)**

i) Sketch the encoder configuration.

ii) Draw the codetree, state diagram and trellis diagram.

iii) If input message sequence is \(10110\), determine the output sequence of the encoder.