

मौलाना आज़ाद राष्ट्रीय प्रौद्योगिकी संस्थान भोपाल
MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY BHOPAL

जब तक आपको यह प्रश्न पत्र खोलने को ना कहा जाये तब तक न खोले
DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO

तकनीकी अधिकारी पद के लिए प्रश्न पत्र
QUESTION PAPER FOR THE POST OF TECHNICAL OFFICER
समय: 2 घंटा अधिकतम अंक: 100
TIME ALLOWED: 2 HOURS **MAXIMUM MARKS: 100**

अनुदेश (INSTRUCTIONS)

1. प्रश्न पत्र केवल कंप्यूटर स्क्रीन पर प्रदर्शित किया जाएगा।
The Question Paper will be displayed only on the Computer Screen.
2. 100 अंकों के 100 बहुविकल्पीय प्रश्न होंगे।
There shall be 100 Multiple Choice Based Questions of 100 marks.
3. प्रत्येक बहुविकल्पीय प्रश्न में चार प्रतिक्रियाएँ (विकल्प) शामिल हैं। आप उस उत्तर का चयन करेंगे जिसे आप उत्तर पुस्तिका (ओ एम आर) पर अंकित करना चाहते हैं। किसी भी स्थिति में, प्रत्येक प्रश्न के लिए केवल एक उत्तर चुनें।
Each Multiple Choice Based Questions Question comprises four responses (options). You will select the response which you want to mark on the Answer Sheet (OMR). In any case, choose ONLY ONE response for each question.
4. आपको अपने सभी बहुविकल्पीय प्रश्न के उत्तरों को उपलब्ध कराई गई उत्तर पुस्तिका (ओ एम आर) पर ही अंकित करना होगा।
You must mark all your responses for Multiple Choice Based Questions only on the separate Answer Sheet (OMR) provided.
5. सभी बहुविकल्पीय प्रश्नों के अंक समान हैं।
All Multiple Choice Based Questions carry equal marks.
6. इससे पहले कि आप उत्तर पुस्तिका (ओ एम आर) में विभिन्न प्रश्नों के उत्तर के लिए आगे बढ़ें, आपको उत्तर पुस्तिका (ओ एम आर) में विवरण भरने होंगे।
Before you proceed to answer the various questions in the answer sheet (OMR), you must fill in the details in the answer sheet (OMR).
7. उत्तर पुस्तिका में अपने सभी उत्तर भरने के बाद और परीक्षा समाप्त होने पर, आपको उत्तर पुस्तिका (ओएमआर) परीक्षक को सौंपनी होगी।
After you have completed filling in all your responses on the Answer Sheet and on conclusion of the examination, you must handover the Answer Sheet (OMR) to the invigilator.
8. गलत उत्तर के लिए कोई नकारात्मक अंकन नहीं है।
There is no negative marking for wrong answer.

जब तक आपको यह प्रश्न पत्र खोलने को ना कहा जाये तब तक न खोले
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TECHNICAL OFFICER

Q1: Out of 100 pens sold on Thursday, 30% are blue ink pen. Out of remaining 30% are red ink pen and remaining are black in pen. Find total number of blue and black ink pen sold on Thursday?

(A) 82

(B) 49

(C) 79

(D) 65

Q 2: In a box there are 12 blue ball, X red balls & 30 green balls. Probability of choosing one red ball from the given box is $\frac{1}{3}$. Then find the sum of red and blue balls in the box?

(A) 20

(B) 52

(C) 25

(D) 33

Q 3: Two types of ornaments are prepared by using gold and copper in two different proportions. In first ornaments, 6 gram gold is mixed with 4 gram copper and in second ornament 1 gram gold is mixed with 1 gram copper. If total quantity of gold and copper is 18 gram and 14 gram respectively then how many ornaments are prepared of second type?

(A) 6

(B) 4

(C) 7

(D) 10

Q 4: Length of train A is 800 meters and length of train B is 'x' meters more than train A. If speed of both train A & B is equal and they cross a pole in 32 sec and 40 secs respectively, then in what time train 'B' will cross 400 m long platform.

(A) 56 sec

(B) 35 sec

(C) 62 sec

(D) 71 sec

Reasoning

Read the following information carefully to answer the questions 5 and 6 given below.

Fourteen persons i.e. A, B, C, D, E, F, G, M, N, O, P, Q, R and S are sitting in two parallel rows such that A, B, C, D, E, G and F sits in row 1 faces towards south direction and M, N, O, P, Q, R and S sits in the row 2 such that all are facing north direction. Person sitting in the row 1 faces the person sitting in row 2. A sit third to the right of B. Either B or A sits at the end of the row. N sits third to the right of O. Neither N nor O Faces A and B. The one who faces C sits third to the right of M. None of the immediate neighbour B Faces O. C sits third to the left of F. O does not face F. One of the immediate neighbour of F Faces Q, who does not sit at the end of the row. D is not the immediate neighbour of C. G sits on the left of E but not on the immediate left. P does not face G and C. S

does not face C. R and S are immediate neighbours. E does not sit at the end of the row. D does not face P.

Q 5. Who among the following faces P?

- (A) D
- (B) A
- (C) F
- (D) G

Q 6. How many persons sits to the right of B?

- (A) Two
- (B) More than Three
- (C) Three
- (D) One

Q 7. There are nine members i.e., H, R, D, W, K, T, F, X and A live in a family. F is mother of R who is the only son of X. H is sister-in-law of A who is mother of both K and T. H is married to D who is parent of W. K is only grandson of X. Neither W nor X has any sibling. W is the niece of R. How is F related to T?

- (A) Mother
- (B) Aunt
- (C) Daughter-in-law
- (D) Grandmother

Q 8. More than 10 persons were sitting in a circular row facing the centre. B is 3rd to the left of C. Two person are sitting between D and B. A sits immediate right of E. One person is sitting between C and E. Less than two person are sitting between D and A. A does not sit second to the right of B. How many persons are sitting in between D and C?

- (A) 4
- (B) 6
- (C) 7
- (D) 8

Q 9. Which of the following words has the meaning which is SIMILAR to the meaning 'discordant'?

- (A) Ugly
- (B) Concur
- (C) Accord
- (D) Clashing

Q10. Select the phrase/connector from the given three options which can be used to form a single sentence from the two sentences given below, implying the same meaning as expressed in the statement sentences.

RBI is concerned about the risk of investing in mutual funds. RBI is likely to ask banks to reduce their investments in mutual funds.

(1) At the risk of investing

(2) To reduce investments

(3) Concern for the risk

(A) Only (1)

(B) Only (2)

(C) Only (3)

(D) Only (1) and (3)

Q11. In this question, out of four alternatives, choose the one which is opposite in the meaning of the given word.

Fulmination

(A) obloquy

(B) denunciation

(C) compliment

(D) diatribe

Q12. Colours bounced around in her head. They mixed and threaded themselves together. Even colours that had no business being together. They were all one, yet distinctly separate at the same time. Her mind was forming _____ vision on her head.

(A) delusional

(B) transfusion

(C) kaleidoscopic

(D) emmetropic

Q 13. Swapnil Kusale recently won a bronze medal in which sports event at Paris Olympics 2024?

(A) Shooting

(B) Boxing

(C) Wrestling

(D) Badminton

Q14. Recently, who achieved India's first rowing quota for Paris Olympics?

(A) Balraj Panwar

(B) Sawarn Singh

(C) Arjun Lal

(D) Jaswinder Singh

Q15. Who administers the oath of office to the President of India?

- (A) The Prime Minister of India
- (B) The Chief Justice of India
- (C) The Vice President of India
- (D) The Speaker of the Lok Sabha

Q16. Which Indian has won the 2023 Ramon Magsaysay award?

- (A) Ravi Kannan
- (B) Gautam Adani
- (C) Ghazal Alagh
- (D) Kailash Vidyarthi

Q17. Which of the following memory allocation schemes does not suffer from external fragmentation?

- (A) Segmentation
- (B) Paging
- (C) Variable partitioning
- (D) Contiguous allocation

Q18. In MS Word, which feature allows you to create a consistent layout for documents that share similar formatting and structure?

- (A) Mail Merge
- (B) Template
- (C) Macro
- (D) Table of Contents

Q19. What is the primary purpose of the INDIRECT function in Excel?

- (A) To convert text into uppercase
- (B) To return the address of a cell
- (C) To return the value of a cell specified by a text string
- (D) To find the sum of a range of cells

Q 20. What is the primary advantage of heuristic-based antivirus detection over signature-based detection?

- (A) Faster scanning
- (B) Detection of previously unknown malware
- (C) Lower resource usage
- (D) Real-time scanning

Q 21. What will be the output of the following C code?

```
#include <stdio.h>

void func(int *p, int n) {
    for (int i = 0; i < n; ++i) {
        *(p + i) += i;
    }
}

int main() {
    int arr[] = {1, 2, 3, 4, 5};
    int n = sizeof(arr) / sizeof(arr[0]);
    func(arr, n);
    for (int i = 0; i < n; ++i) {
        printf("%d ", arr[i]);
    }
    return 0;
}
```

- (A) 1 2 3 4 5
- (B) 2 4 6 8 10
- (C) 1 3 5 7 9
- (D) 1 2 3 4 5 6

Q 22. What will be the output of the following C code?

```
#include <stdio.h>

#define MAX(a, b) ((a) > (b) ? (a) : (b))

int main() {
    int x = 5;
    int y = 10;
    int z = MAX(x++, y++);
    printf("%d %d %d\n", x, y, z);
    return 0;
}
```

- (A) 6 11 5
- (B) 6 11 10
- (C) 5 10 11
- (D) 6 12 11

Q 23. What will be the output of the following C code?

```
#include <stdio.h>

void func(int *a, int *b) {
    *a = *a + *b;
    *b = *a - *b;
    *a = *a - *b;
}

int main() {
    int x = 10, y = 20;
    func(&x, &y);
    printf("%d %d\n", x, y);
    return 0;
}
```

(A) 10 20

(B) 20 10

(C) 30 -10

(D) -10 30

Q 24. What will be the output of the following C code?

```
#include <stdio.h>

void change(int *p) {
    *p = 20;
    p = NULL;
}

int main() {
    int a = 10;
    int *ptr = &a;
    change(ptr);
    printf("%d\n", *ptr);
    return 0;
}
```

(A) NULL

(B) 10

(C) 20

(D) Segmentation fault

Q 25. What will be the output of the following C code?

```
#include <stdio.h>

#define MAX 10

void func() {
    #undef MAX
    #define MAX 20
    printf("%d ", MAX);
}

int main() {
    printf("%d ", MAX);
    func();
    printf("%d\n", MAX);
    return 0;
}
```

- (A) 10 20 10
- (B) 10 20 20
- (C) 20 10 20
- (D) 20 20 20

Q 26. What will be the output of the following Java code?

```
public class Test {
    public static void main(String[] args) {
        String str = "Hello";
        String str2 = new String("Hello");
        if (str == str2) {
            System.out.println("str == str2");
        } else {
            System.out.println("str != str2");
        }
        if (str.equals(str2)) {
            System.out.println("str equals str2");
        } else {
            System.out.println("str not equals str2");
        }
    }
}
```

}

A) str == str2

str equals str2

B) str != str2

str not equals str2

C) str == str2

str not equals str2

D) str != str2

str equals str2

Q 27. Consider the following Java interface and class:

```
interface Animal {
```

```
    default void sound() {
```

```
        System.out.println("Some sound");
```

```
    }
```

```
}
```

```
interface Dog extends Animal {
```

```
    default void sound() {
```

```
        System.out.println("Bark");
```

```
    }
```

```
}
```

```
class MyDog implements Dog {
```

```
}
```

```
public class Main {
```

```
    public static void main(String[] args) {
```

```
        MyDog dog = new MyDog();
```

```
        dog.sound();
```

```
    }
```

```
}
```

(A) Some sound

(B) Bark

(C) Compilation error

(D) Runtime error

Q 28. What will be the output of the following Java code?

```
import java.util.*;

public class Main {

    public static void main(String[] args) {

        List<Integer> list = Arrays.asList(10, 20, 30, 40);

        list.removeIf(e -> e % 20 == 0);

        System.out.println(list);

    }

}
```

(A) [10, 20, 30]

(B) [10, 30]

(C) [20, 40]

(D) Unsupported Operation Exception

Q 29. What will be the output of the following Java code?

```
public class Main {

    public static void main(String[] args) {

        try {

            int data = 50 / 0;

        } catch (ArithmeticException e) {

            System.out.println("Exception caught: " + e);

        } finally {

            System.out.println("Finally block executed");

        }

        System.out.println("Rest of the code");

    }

}
```

(A) Exception caught: java.lang.ArithmeticException: / by zero

(B) Finally block executed

(C) Exception caught: java.lang.ArithmeticException: / by zero

Finally block executed

Rest of the code

(D) Finally block executed

Rest of the code

Q 30. What will be the output of the following Java code?

```
public class Main {  
    public static void main(String[] args) {  
        try {  
            methodA();  
        } catch (Exception e) {  
            System.out.println("Caught in main");  
        }  
    }  
    public static void methodA() throws Exception {  
        try {  
            throw new Exception("Exception in methodA");  
        } catch (Exception e) {  
            System.out.println("Caught in methodA");  
            throw e;  
        } finally {  
            System.out.println("Finally in methodA");  
        }  
    }  
}
```

A) Caught in methodA

Finally in methodA

Caught in main

B) Caught in methodA

Finally in methodA

C) Finally in methodA

Caught in methodA

Caught in main

D) Finally in methodA

Caught in main

Q 31. Given the infix expression $a + b * (c / d) + (e * f)$, what is its equivalent postfix notation?

(A) $a b c d / * e f * + +$

(B) $a b c d / * + e f * +$

(C) $a b c d / * e f * + \backslash$

(D) $a b c d / e f * * + +$

Q 32. In a multi-level linked list where each node has a next pointer and a down pointer to another linked list, what is the worst-case time complexity for finding a specific element if the height of the list is 'h' and the average width is 'w'?

(A) $O(h \cdot w)$

(B) $O(h + w)$

(C) $O(h \cdot \log w)$

(D) $O(h \cdot \log h)$

Q 33. In a queue with a maximum size of 50 elements, if there are 30 elements enqueued and the queue operates in a circular manner with the index starting from 0, what is the index of the rear element if the front index is at position 10 and the rear is positioned 15 elements from the front?

(A) 24

(B) 25

(C) 26

(D) 27

Q 34. A binary search tree has 100 nodes. What is the minimum possible height of the tree (considering the height of a tree with a single node is 0)?

(A) 6

(B) 7

(C) 8

(D) 9

Q 35. In a binary search tree, the number of nodes in the left subtree of the root is m, and the number of nodes in the right subtree is n. What is the maximum height of the tree?

(A) $\max(m, n)$

(B) $m + n$

(C) $\log_2(m + n)$

(D) $1 + \max(m, n)$

Q 36. Given a graph G with 12 vertices and 21 edges, the graph is guaranteed to be connected if:

- (A) The minimum degree of any vertex is at least 1.
- (B) The graph contains a Hamiltonian cycle.
- (C) The graph contains a Eulerian circuit.
- (D) The minimum degree of any vertex is at least 2.

Q 37. Consider two processors P1 and P2 executing the same instruction set. Assume that under identical conditions, for the same input, a program running on P2 takes 30% less time but incurs 25% more CPI (clock cycles per instruction) as compared to the program running on P1. If the clock frequency of P1 is 1GHz, then the clock frequency of P2 (in GHz) is _____.

- (A) 1.25 GHz
- (B) 1.43 GHz
- (C) 1.79 GHz
- (D) 2.0 GHz

Q 38. In a deadlock detection algorithm, what is the time complexity to check for the presence of a cycle in the resource allocation graph, where V is the number of vertices and E is the number of edges?

- (A) $O(V)$
- (B) $O(V + E)$
- (C) $O(V^2)$
- (D) $O(VE)$

Q 39. A system uses a two-level page table where the first-level page table contains 1024 entries and each second-level page table also contains 1024 entries. If the page size is 4 KB, what is the size of the virtual address space?

- (A) 4 GB
- (B) 16 GB
- (C) 1 GB
- (D) 64 GB

Q 40. Which of the following algorithms is generally considered to have the worst page fault rate?

- (A) Least Recently Used (LRU)
- (B) Optimal Page Replacement
- (C) First-In-First-Out (FIFO)
- (D) Clock Page Replacement

Q 41. In a Unix-like file system, what is the primary role of the superblock?

- (A) To store file data
- (B) To manage file access permissions
- (C) To keep information about the file system structure and metadata
- (D) To handle file allocation tables

Q 42. In a system where processes use message passing for IPC, what is the primary difference between synchronous and asynchronous message passing?

- (A) Synchronous message passing requires processes to be in the same network, while asynchronous does not.
- (B) Synchronous message passing blocks the sender until the message is received, while asynchronous does not.
- (C) Asynchronous message passing blocks the sender until the message is received, while synchronous does not.
- (D) There is no difference between synchronous and asynchronous message passing.

Q 43. In a file system with an inode-based directory structure, what information is typically stored in an inode?

- (A) File name and file data
- (B) File name and directory path
- (C) File permissions, ownership, and location of file data
- (D) File size and number of subdirectories

Q 44. In a file system that uses a file allocation table (FAT) directory structure, how is the directory entry for a file typically identified?

- (A) By a file name and its corresponding inode number
- (B) By a file name and its file allocation table entry
- (C) By a file path and its disk block address
- (D) By a file name and its directory path

Q 45. Which of the following file system types is not typically supported in UNIX?

- (A) ext4
- (B) XFS
- (C) NTFS
- (D) ZFS

Q 46. If a file system supports 512-byte blocks and a file is 600 bytes in size, how many blocks are required to store the file, and what will be the total amount of slack space?

- (A) 1 block, 112 bytes of slack space
- (B) 2 blocks, 424 bytes of slack space
- (C) 2 blocks, 312 bytes of slack space
- (D) 1 block, 88 bytes of slack space

Q 47. In a memory system with a 2-to-4 address decoder, what is the maximum number of addressable memory units if each unit is 1 KB?

- (A) 4 KB
- (B) 8 KB
- (C) 16 KB
- (D) 32 KB

Q 48. In the context of interrupts, what is the main difference between maskable and non-maskable interrupts?

(A) Maskable interrupts can be disabled by the processor, while non-maskable interrupts cannot be disabled.

(B) Maskable interrupts are always higher priority than non-maskable interrupts.

(C) Non-maskable interrupts are generated by software, while maskable interrupts are hardware-generated.

(D) Maskable interrupts are used for system initialization, while non-maskable interrupts are used for error handling.

Q 49. In which DMA mode does the DMA controller transfer data in a burst, and then return control to the CPU until the next transfer?

(A) Block Mode

(B) Cycle Stealing Mode

(C) Burst Mode

(D) Demand Mode

Q 50. In which category of memory devices does EEPROM (Electrically Erasable Programmable Read-Only Memory) fall?

(A) Volatile Memory

(B) Non-Volatile Memory

(C) Dynamic Memory

(D) Static Memory

Q 51. Given the following tables:

```
CREATE TABLE Employees (
```

```
    EmpID INT PRIMARY KEY,
```

```
    Name VARCHAR(50),
```

```
    DeptID INT
```

```
);
```

```
CREATE TABLE Departments (
```

```
    DeptID INT PRIMARY KEY,
```

```
    DeptName VARCHAR(50)
```

```
);
```

What will be the result of the following query?

```
SELECT e.Name, d.DeptName
```

```
FROM Employees e
```

```
LEFT JOIN Departments d ON e.DeptID = d.DeptID
```

WHERE d.DeptName IS NOT NULL;

- (A) Lists all employees and their department names, including those without a department.
- (B) Lists only employees who have a department and their corresponding department names.
- (C) Lists all department names and their employees, including those with no employees.
- (D) Lists all department names and their employees, including departments with no employees.

Q 52. Given the following table:

```
CREATE TABLE Sales (  
    SaleID INT,  
    SaleDate DATE,  
    Amount DECIMAL(10, 2)  
);
```

What will be the result of the following query?

```
SELECT SaleDate, COUNT(*) AS TotalSales, SUM(Amount) AS TotalAmount  
FROM Sales  
GROUP BY SaleDate  
HAVING SUM(Amount) > (  
    SELECT AVG(SUM(Amount))  
    FROM Sales  
    GROUP BY SaleDate  
);
```

- (A) Lists each date where the total sales amount is greater than the average amount of all dates.
- (B) Lists each date where the number of sales is greater than the average number of sales across all dates.
- (C) Lists the dates where the average sale amount is greater than the total sales amount for that date.
- (D) Lists each date where the total sales amount is less than the average amount of all dates.

Q 53. Given two relations, A and B, where A has attributes (A1, A2) and B has attributes (B1, B2), which relational algebra operation will yield a relation that includes tuples where A1 = B1 and A2 = B2?

- A) $A \cup B$
- B) $A - B$
- C) $A \bowtie B$
- D) $A \times B$

Q 54. Given an E-R diagram with an entity 'Employee' and a relationship 'WorksFor' connecting 'Employee' to 'Department'. The 'WorksFor' relationship has attributes 'StartDate' and 'EndDate'. Which of the following statements correctly represents the E-R model for this scenario?

- A) 'WorksFor' is a weak entity, and 'StartDate' and 'EndDate' are attributes of 'Employee'.
- B) 'WorksFor' is a multivalued attribute of Employee.
- C) 'Employee' is a weak entity, and 'WorksFor' has 'StartDate' and 'EndDate' as attributes.
- D) 'WorksFor' is a binary relationship with 'StartDate' and 'EndDate' as attributes of the relationship.

Q 55. A FAT (file allocation table) based file system is being used and the total overhead of each entry in the FAT is 4 bytes in size. Given a 100×10^8 bytes disk on which the file system is stored and data block size is 10^3 bytes, the maximum size of a file that can be stored on this disk in units of 10^8 bytes is _____.

- (A) 99.55 to 99.65
- (B) 100.5 to 101.4
- (C) 95 to 98.5
- (D) 89.1 to 91.2

Q 56. In a B-tree of order 5, if there are 200 keys in the tree and each node is filled to its maximum capacity, how many nodes are required to store these keys?

- (A) 40
- (B) 25
- (C) 60
- (D) 50

Q 57. What is the primary purpose of a "hotfix" in system maintenance?

- (A) To upgrade the system to a new version
- (B) To address a specific issue or bug that needs immediate attention
- (C) To perform regular system backups
- (D) To install new software applications

Q 58. Which of the following bootloaders is commonly used for managing dual-boot configurations on Linux systems?

- (A) GRUB
- (B) NTLDR
- (C) LILO
- (D) MBR

Q 59. Why is it important to reserve space for a swap partition in a Linux installation?

- (A) To store user documents and files
- (B) To provide virtual memory and support hibernation
- (C) To improve network performance
- (D) To store system logs and temporary files

Q 60. What is the role of the GPG key in package management?

- (A) To encrypt the package contents for secure transmission
- (B) To uninstall packages securely
- (C) To compress the package files for efficient storage
- (D) To verify the authenticity and integrity of packages

Q 61. In an HTTP request, which status code would be relevant if an email server responds with an error indicating that the user's mailbox is full, and the action cannot be completed?

- (A) 404 Not Found
- (B) 421 Service Not Available
- (C) 500 Internal Server Error
- (D) 550 Requested Action Not Taken

Q 62. In a Class B IP network, what is the maximum number of hosts that can be accommodated in a subnet with a subnet mask of 255.255.252.0?

- (A) 510
- (B) 1022
- (C) 2046
- (D) 4094

Q 63. Encryption, and compression are some of the duties of thein the OSI model

- (A) Presentation layer
- (B) Data link layer
- (C) Application layer
- (D) Network layer

Q64. Which of the following specifies WLAN security standards?

- A) IEEE 80.2.11
- B) IEEE 802.11 g
- C) IEEE 802.11 b
- D) IEEE 802.11 i

Q 65. Which of the following is true about the differences between TCP and UDP in terms of their layer-specific functionalities?

- (A) TCP provides error recovery and flow control, while UDP does not guarantee delivery or order.
- (B) UDP provides error recovery and flow control, while TCP does not guarantee delivery or order.
- (C) TCP and UDP both guarantee data integrity and delivery order but use different methods for encryption.
- (D) TCP operates at the Network Layer, while UDP operates at the Transport Layer.

Q 66. The computation of the shortest path in OSPF is usually done by _____

- (A) Bellman-ford algorithm
- (B) Routing information protocol
- (C) Dijkstra's algorithm
- (D) Distance vector routing

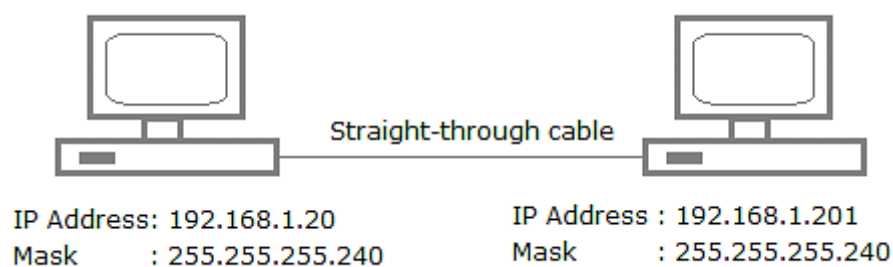
Q 67. In Wi Fi, Access Point has following layer of 4 layers of TCO/IP protocol stack(Layer 1: Link Layer (Physical Layer + Data Link Layer), Layer 2: Network Layer, Layer 3: Transport Layer, Layer 4: Application?

- (A) All 4 Layers
- (B) Layer 1 to Layer 3
- (C) Layer 1
- (D) Layer 1 to Layer 2

Q 68. You need to configure a server that is on the subnet 192.168.19.24/29. The router has the first available host address. Which of the following should you assign to the server?

- (A) 192.168.19.0 255.255.255.0
- (B) 192.168.19.33 255.255.255.240
- (C) 192.168.19.26 255.255.255.248
- (D) 192.168.19.31 255.255.255.248

Q 69. A network administrator is connecting hosts A and B directly through their Ethernet interfaces, as shown in the figure. Ping attempts between the hosts are unsuccessful. What can be done to provide connectivity between the hosts?



1. A crossover cable should be used in place of the straight-through cable.
2. A rollover cable should be used in place of the straight-through cable.

- 3. The subnet masks should be set to 255.255.255.192.
- 4. A default gateway needs to be set on each host.
- 5. The subnet masks should be set to 255.255.255.0.

- (A) 1 only
- (B) 2 only
- (C) 3 and 4 only
- (D) 1 and 5 only

Q 70. Generally, which network topology is being used in an Institute?

- (A) Star
- (B) Ring
- (C) Bus
- (D) Peer to Peer

Q 71. In RSA encryption, if the public key $e=7$ and $n=33$, what is the ciphertext when encrypting the plaintext message $M=4$?

- (A) 16
- (B) 21
- (C) 31
- (D) 29

Q 72. When a Certificate Authority (CA) signs a digital certificate, what cryptographic operation is performed?

- (A) The CA encrypts the certificate with the user's public key.
- (B) The CA hashes the certificate and encrypts the hash with its private key.
- (C) The CA decrypts the certificate with its public key.
- (D) The CA encrypts the certificate with the user's private key.

Q 73. In the context of firewalls, what does the term "demilitarized zone (DMZ)" refer to?

- A) A secured internal network isolated from the internet
- B) A network segment with the highest level of security
- C) A network segment that is used exclusively for internal communication
- D) A subnet that is accessible from both the internal network and the internet

Q 74. What is the purpose of a "nonce" in authentication protocols?

- (A) To serve as a random value used to ensure that old communications cannot be reused
- (B) To store the user's password securely
- (C) To authenticate the user's identity through biometric data
- (D) To manage and distribute digital certificates

Q 75. In a certificate revocation list (CRL), what information is typically included?

- (A) Information about certificates that have been revoked before their expiration date
- (B) The encryption algorithm used by the certificate
- (C) The list of all active certificates issued by a CA
- (D) The hash of the certificate and its validity period

Q 76. In a multi-threaded server, what is the primary advantage of using thread pools instead of creating a new thread for each client request?

- (A) Thread pools reduce memory usage by reusing existing threads.
- (B) Thread pools simplify the client-server architecture.
- (C) Thread pools improve the speed of network communication.
- (D) Thread pools eliminate the need for synchronization mechanisms.

Q 77. What is the main difference between Layer 2 and Layer 3 switches in terms of packet forwarding?

- (A) Layer 2 switches use IP addresses to forward packets, while Layer 3 switches use MAC addresses.
- (B) Layer 3 switches use IP addresses to forward packets, while Layer 2 switches use MAC addresses.
- (C) Both Layer 2 and Layer 3 switches use IP addresses for forwarding.
- (D) Both Layer 2 and Layer 3 switches use MAC addresses for forwarding.

Q 78. In a 3-tier network architecture, which layer is responsible for aggregating data from multiple access layer switches and routing it to the core layer?

- (A) Core Layer
- (B) Edge Layer
- (C) Access Layer
- (D) Distribution Layer

Q 79. In a 2-tier network topology, which component typically connects end devices to the network and provides access to the rest of the network?

- (A) Core Switch
- (B) Distribution Switch
- (C) Access Switch
- (D) Edge Router

Q 80. In a SOHO environment, which type of cloud service model would most likely be used for hosting a website and handling email services?

- (A) Software as a Service (SaaS)
- (B) Platform as a Service (PaaS)
- (C) Infrastructure as a Service (IaaS)
- (D) Database as a Service (DBaaS)

Q 81. Which cabling standard is designed to support network speeds of up to 10 Gbps over short distances and is commonly used in data centers?

- (A) Cat 5e
- (B) Cat 6
- (C) Cat 6a
- (D) Cat 7

Q 82. In fiber optics, what does the term "modal dispersion" refer to?

- (A) The scattering of light due to impurities in the fiber
- (B) The delay spread caused by different light paths in a multimode fiber
- (C) The absorption of light by the fiber core
- (D) The loss of signal strength over long distances

Q 83. Which PoE standard introduces support for 4-pair power delivery, allowing for higher power levels?

- (A) IEEE 802.3af
- (B) IEEE 802.3at
- (C) IEEE 802.3bt
- (D) IEEE 802.3az

Q 84. Which Ethernet standard primarily utilizes point-to-point links and is designed for high-speed communication in data centers and enterprise networks?

- (A) 10BASE-T
- (B) 100BASE-TX
- (C) 1000BASE-SX
- (D) 10GBASE-LR

Q 85. Which of the following principles is most crucial for ensuring that a website is accessible to users with disabilities?

- (A) Responsive Design
- (B) Semantic HTML
- (C) Cross-Browser Compatibility
- (D) Aesthetic Design

Q 86. In the context of database connectivity, what is the primary purpose of an Object-Relational Mapping (ORM) tool?

- (A) To map database tables to application objects and simplify database interactions
- (B) To directly connect to a database and execute SQL queries
- (C) To perform database backup and recovery operations
- (D) To optimize database performance and indexing

Q 87. In HTML5, which attribute is used to specify that a form should not be submitted if it contains invalid input?

- (A) required
- (B) novalidate
- (C) validate
- (D) formnovalidate

Q 88. Which CSS property is used to control the spacing between lines of text?

- (A) line-height
- (B) letter-spacing
- (C) word-spacing
- (D) text-indent

Q 89. What will be the output of the following JavaScript code snippet?

```
console.log(0.1 + 0.2 === 0.3);
```

- (A) true
- (B) undefined
- (C) false
- (D) NaN

Q 90. What is the role of ViewState in ASP.NET?

- (A) To store data between postbacks
- (B) To handle session management
- (C) To provide client-side data validation
- (D) To manage application-level configuration

Q 91. In a Management Information System, what is typically the role of a Data Warehouse?

- (A) To provide real-time transactional data to end-users
- (B) To handle operational tasks and daily business processes
- (C) To execute routine database queries and transactions
- (D) To store and manage large volumes of historical data for analysis and reporting

Q 92. What is a major challenge of implementing an MIS in a large organization?

- (A) Reducing data redundancy and inconsistency
- (B) Ensuring that all employees receive training on how to use the system
- (C) Integrating the MIS with existing legacy systems and processes
- (D) Increasing the speed of data entry and retrieval

Q 93. Consider a software program that is artificially seeded with 200 faults. While testing this program, 300 faults are detected, out of which 125 faults are from those artificially seeded faults. Assuming that both real and seeded faults are of the same nature and have the same distribution, what is the estimated number of undetected real faults?

- (A) 50
- (B) 75
- (C) 100
- (D) 105

Q 94. In the context of process change management, which tool is used to analyse the driving and restraining forces that affect a change initiative?

- (A) SWOT Analysis
- (B) Force Field Analysis
- (C) PEST Analysis
- (D) RACI Matrix

Q 95. Consider a software project with the following information domain characteristics:

Number of external inputs (I) = 40

Number of external outputs (O) = 80

Number of external inquiries (E) = 23

Number of files (F) = 08

Number of external interfaces (N) = 02

The complexity weighting factors for I, O, E, F, and N are 4, 5, 4, 10, and 7, respectively. If the value adjustment factors sum up to 36, what is the computed value of the function point metric?

- (A) 746
- (B) 752
- (C) 760
- (D) 762

Q 96. What is the main difference between a formal design review and an informal design review?

- (A) Formal reviews are typically unstructured, while informal reviews follow a strict agenda.
- (B) Formal reviews involve detailed documentation and follow a structured process, whereas informal reviews are more flexible and less documented.
- (C) Formal reviews are conducted by junior developers, while informal reviews are done by senior developers.
- (D) Formal reviews focus on code quality, while informal reviews focus on design quality.

Q 97. Which section of the Software Design Document (SDD) typically includes detailed descriptions of data structures and their relationships?

- (A) Design Constraints
- (B) Data Design
- (C) Interface Design
- (D) Architectural Design

Q 98. Which design pattern is characterized by providing a surrogate or placeholder for another object to control access to it?

- (A) Proxy
- (B) Adapter
- (C) Composite
- (D) Flyweight

Q 99. What is the term used for a technique that involves customizing ERP software to fit specific business needs and processes?

- (A) Configuration
- (B) Integration
- (C) Personalization
- (D) Customization

Q 100. Which ERP system benefit is most directly associated with streamlining operational efficiency?

- (A) Enhanced customer relationship management
- (B) Automated and standardized business processes
- (C) Increased employee training requirements
- (D) Improved hardware performance