

Sr. No. ..... 418

# ENTRANCE TEST-2024

## SCHOOL OF APPLIED SCIENCES & TECHNOLOGY

### COMPUTER SCIENCES

Total Questions : 60

Question Booklet Series **B**

Time Allowed : 70 Minutes

Roll No. :

#### Instructions for Candidates :

1. Write your Entrance Test Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.
2. OMR Answer Sheet has an Original Copy and a Candidate's Copy glued beneath it at the top. While making entries in the Original Copy, candidate should ensure that the two copies are aligned properly so that the entries made in the Original Copy against each item are exactly copied in the Candidate's Copy.
3. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.
4. Choose the correct / most appropriate response for each question among the options A, B, C and D and darken the circle of the appropriate response completely. The incomplete darkened circle is not correctly read by the OMR Scanner and no complaint to this effect shall be entertained.
5. Use only blue/black ball point pen to darken the circle of correct/most appropriate response. In no case gel/ink pen or pencil should be used.
6. Do not darken more than one circle of options for any question. A question with more than one darkened response shall be considered wrong.
7. There will be '**Negative Marking**' for wrong answers. Each wrong answer will lead to the deduction of 0.25 marks from the total score of the candidate.
8. Only those candidates who would obtain positive score in Entrance Test Examination shall be eligible for admission.
9. Do not make any stray mark on the OMR sheet.
10. Calculators and mobiles shall not be permitted inside the examination hall.
11. Rough work, if any, should be done on the blank sheets provided with the question booklet.
12. OMR Answer Sheet must be handled carefully and it should not be folded or mutilated in which case it will not be evaluated.
13. Ensure that your OMR Answer Sheet has been signed by the Invigilator and the candidate himself/herself.
14. At the end of the examination, hand over the OMR Answer Sheet to the invigilator who will first tear off the original OMR sheet in presence of the Candidate and hand over the Candidate's Copy to the candidate.

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SEAL

1. There are 8 letters in the word COMPUTER. How many permutations can these letters have ?
- (A) 8,080  
(B) 9,080  
(C) 10,080  
(D) 11,080
2. The value of  $\log_2(2048)$  is :
- (A) 10  
(B) 11  
(C) 12  
(D) 13
3. Rectangular coordinate system is also termed as :
- (A) Polar coordinate system  
(B) Spherical coordinate system  
(C) Cartesian coordinate system  
(D) None of the above
4. Identify which one of the options is not the standard equation of a parabola :
- (A)  $y^2 = 4ax$   
(B)  $y^2 = -4ax^2$   
(C)  $x^2 = 4ay$   
(D)  $x^2 = -4ay$
5. Differential equation is given by  $\frac{dy}{dx} + 6x = \cos x$  identify its order :
- (A) 0  
(B) 0.5  
(C) 1  
(D) 1.5
6. Compute the value of
- $$\log \left( \frac{\tan \sqrt{\cos 45 + \sqrt{\sin 90}}}{\sin 90} \right)$$
- (A) -1  
(B) -0.9  
(C) 1  
(D) 0.9
7. Standard Deviation (SD) is given by  $\sqrt{\frac{\sum |x - \mu|^2}{N}}$ . Use the given formula to identify the meaning of  $\mu$ .
- (A) Value in the data set  
(B) Mean of the data set  
(C) Number of data points  
(D) None of the above
8. Batsman scored 60, 70, 80, 90 and 40 runs in different one day matches. Compute the approximate standard deviation.
- (A) 16.59  
(B) 16.69  
(C) 17.69  
(D) 17.19
9. When a pair of dice is rolled, the probability of obtaining an even prime number on each die can be calculated :
- (A) 0  
(B) 1/3  
(C) 1/12  
(D) 1/36

10. What is the probability of having a 1 or a 5 at the unit's place of a digit, that is chosen randomly and squared :
- (A)  $3/10$   
 (B)  $7/10$   
 (C)  $1/10$   
 (D) None of the above
11. Given the dimensions of matrix A are  $4 \times 3$ , the dimensions of matrix B are  $4 \times 5$ , and the dimensions of matrix C are  $7 \times 3$ , then what are the dimensions of  $(A^T B)^T C^T$  ?
- (A)  $4 \times 5$   
 (B)  $5 \times 4$   
 (C)  $5 \times 7$   
 (D)  $3 \times 7$
12. Let  $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 1 & 1 \\ 1 & 3 & 2 \end{bmatrix}$  be a square matrix of size  $3 \times 3$ . Find the Determinant :
- (A) 16  
 (B) 18  
 (C) 20  
 (D) 22
13. If the independent variables are more than one, then the differential equation is termed as :
- (A) ode  
 (B) pde  
 (C) Both (A) and (B)  
 (D) Neither (A) nor (B)
14. For local maxima and minima,  $f'(x)$  is equal to :
- (A)  $1/2$   
 (B) 0  
 (C) 1  
 (D) None of the above
15. What component replaced vacuum tubes in the second generation of computers ?
- (A) Resistor  
 (B) Transistor  
 (C) Integrated Chip (IC)  
 (D) Micro-processor
16. During which generation of computers was the microprocessor introduced ?
- (A) Second  
 (B) Third  
 (C) Fourth  
 (D) Fifth
17. What kind of technology enables simultaneous use of a computer by several users ?
- (A) Batch system  
 (B) Multi-processor system  
 (C) Multi-user system  
 (D) Real Time system

18. How many bits are there in a nibble ?
- (A) Two
  - (B) Four
  - (C) Eight
  - (D) Thirty-two
19. What is the largest decimal number that can be represented with 8 bits ?
- (A) 127
  - (B) 128
  - (C) 255
  - (D) 256
20. Which of the following terms is used to represent memory of the size  $2^{80}$  bytes ?
- (A) Exabyte
  - (B) Zettabyte
  - (C) Yottabyte
  - (D) Petabyte
21. Where is the first instructor of the operating system's bootstrap loader program stored ?
- (A) HDD
  - (B) SSD
  - (C) RAM
  - (D) BIOS
22. A register specifically designated to store the address of the location from or to which data is to be transferred is termed as :
- (A) Program Counter
  - (B) Instruction Register
  - (C) Memory Address Register
  - (D) Memory Data Register
23. What is the output of the following program fragment ?
- ```
#include <stdio.h>

int main()
{
    int x = 5;
    int y = 3;
    int z = ++x + y--;
    printf("The value of z is %d\n", z);
    return 0;
}
```
- (A) 7
  - (B) 8
  - (C) 9
  - (D) 10

24. What is the output of the following program fragment ?

```
#include <stdio.h>
int main()
{
    int x = 5;
    int y = 3;
    int z = (x == y) && (x > y);
    printf("The value of z is %d\n", z);
    return 0;
}
```

- (A) The value of z is 0  
 (B) The value of z is 1  
 (C) The value of z is true  
 (D) The value of z is false
25. What is the output of the following program fragment ?

```
#include <stdio.h>
int main()
{
    int x = 5;
    int y = 3;
    int z = (++x * y--) + (x--/++y);
    printf("The value of z is %d\n", z);
    return 0;
}
```

- (A) 18  
 (B) 20  
 (C) 22  
 (D) 24

26. What is the output of the following program fragment ?

```
#include <stdio.h>
int main()
{
    int arr[] = {1, 2, 3, 4, 5};
    int *ptr = arr + 2;
    printf("%d", *ptr);
    printf("%d", ptr[1]);
    printf("%d\n", *(ptr - 1));
    return 0;
}
```

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

27. The Schema in a database is sometimes also called as :

- (A) Intension  
 (B) Extension  
 (C) Snapshot  
 (D) Occurrence

28. Which of the following statements is TRUE ?

- (A) Every relation in BCNF is also in 3NF  
 (B) Every relation in 3NF is also in BCNF  
 (C) No relation can be in both BCNF and 3NF  
 (D) None of the above

29. Among the options listed, which one is NOT classified as a type of Database Management System ?

- (A) Hierarchical  
 (B) Network  
 (C) Relational  
 (D) Sequential

30. Match the following :

**List-I**

**List-II**

- |                             |                                                                                                                                                                                                                    |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I. Casual end users         | a. Include engineers, scientists, business analysts, and others who thoroughly familiarize themselves with facilities of the DBMS in order to implement their own applications to meet their complex requirements. |
| II. Naïve users             | b. Constantly querying and updating the database, using standard types of queries and updates called canned transactions.                                                                                          |
| III. Standalone users       | c. Maintain personal databases by using readymade program packages that provide easy to use menu based or graphics based interfaces.                                                                               |
| IV. Sophisticated end users | d. Occasionally access the database, but they may need different information each time.                                                                                                                            |

- (A) I-a, II-b, III-c, IV-d  
(B) I-d, II-c, III-b, IV-a  
(C) I-d, II-b, III-c, IV-a  
(D) I-a, II-b, III-c, IV-d

31. Starting with an empty stack, the following operations are performed : push(A), push(B), push(C), pop, push(D), push(E), pop, pop, pop. What will be the value at the top of the stack ?

- (A) A  
(B) B  
(C) C  
(D) D

32. Which of the following approach is used by recursive algorithms ?

- (A) Top Down approach  
(B) Bottom Up approach  
(C) Hierarchical approach  
(D) Heuristic approach

33. Choose the appropriate option representing the time complexity for inserting an element at the front of a LinkedList when the head pointer is given :

- (A)  $O(1)$   
(B)  $O(n)$   
(C)  $O(\log n)$   
(D)  $O(n^2)$

34. Evaluate the following postfix expression :  $4\ 6\ 2\ +\ 8\ /\ *$
- (A) 2  
(B) 8  
(C) 4  
(D) 6
35. If the FIFO page replacement algorithm is used with a total of  $m = 4$  frames, what number of page faults would occur given the following page trace :
- 4, 3, 2, 1, 4, 3, 5, 4, 3, 2, 1, 5 ?
- (A) 8  
(B) 9  
(C) 10  
(D) 12
36. A process that has finished its execution but its parent process has not yet executed the `wait()` system call is known as :
- (A) Orphan  
(B) Daemon  
(C) Zombie  
(D) None of the above
37. Which of the following scheduling algorithms does not allow pre-emption ?
- (A) Round Robin  
(B) Priority Scheduling  
(C) Shortest Job First  
(D) First come first serve
38. Which statements below accurately describe characteristics of scheduling algorithms ?
1. Pre-emptive scheduling can result in race conditions
  2. Round robin is better than FCFS in terms of response time
  3. FCFS may face the convoy effect
- (A) 1 only  
(B) 1 and 2 only  
(C) 2 and 3 only  
(D) 1, 2 and 3
39. What is the term used to describe the condition when a `pop()` operation is performed on an empty queue ?
- (A) Pop error  
(B) Push error  
(C) Overflow  
(D) Underflow
40. The worst case time complexity of merge sort is :
- (A)  $O(n)$   
(B)  $O(n \log n)$   
(C)  $O(n^2)$   
(D)  $O(\log n)$

41. What is the term used to describe the number of iterations required for a subproblem to reach the base condition ?
- (A) Count  
(B) Recursion depth  
(C) Both (A) and (B)  
(D) None of the above
42. Which sorting algorithm offers the best time complexity in the worst-case scenario among the following options ?
- (A) Bubble Sort  
(B) Selection Sort  
(C) Merge Sort  
(D) Quick Sort
43. What is the regular expression representing the set of all strings that start with "ab" and end with "aa," given the alphabet  $\Sigma = \{a, b\}$  ?
- (A)  $aba^*b^*aa$   
(B)  $ab(ab)^*aa$   
(C)  $ab(a+b)^*aa$   
(D) None of the above
44. What is the minimum number of states required in a DFA to accept the language defined by the given regular expression :  $(a+b)^*(a+b)(a+b)^*$
- (A) 1  
(B) 2  
(C) 3  
(D) 4
45. Match the following :
- |                               |                                    |
|-------------------------------|------------------------------------|
| a. Context Sensitive language | i. Deterministic finite automation |
| b. Regular grammar            | ii. Recursive enumerable           |
| c. Context free grammar       | iii. Recursive language            |
| d. Unrestricted grammar       | iv. Pushdown automation            |
- Codes :
- |     |     |    |    |     |
|-----|-----|----|----|-----|
|     | a   | b  | c  | d   |
| (A) | ii  | i  | iv | iii |
| (B) | iii | iv | i  | ii  |
| (C) | iii | i  | iv | ii  |
| (D) | ii  | iv | i  | iii |
46. The language recognized by a Pushdown Automaton with a limited stack capacity of 20 items can be characterized as :
- (A) Regular  
(B) Context free  
(C) Context Sensitive  
(D) Recursive

47. Which of the following switching methods involves dividing the message into small packets ?
- (A) Message Switching
  - (B) Virtual Switching
  - (C) Packet Switching
  - (D) None of the above
48. In Classful addressing, the default subnet mask for a class C network is :
- (A) 255.255.255.0
  - (B) 192.255.255.0
  - (C) 255.0.0.0
  - (D) 192.0.0.0
49. The length of a MAC address is :
- (A) 48 bits
  - (B) 40 bits
  - (C) 32 bits
  - (D) 16 bits
50. In an asymmetric key cryptography system, the private key is :
- (A) Sender
  - (B) Receiver
  - (C) Both Sender and Receiver
  - (D) None of the above
51. Choose the correct meaning for the idiom/phrase highlighted in this sentence. "to spill the beans" :
- (A) To reveal a secret unintentionally
  - (B) To be extremely cautious
  - (C) To start an argument
  - (D) To make a decision hastily
52. Choose the most appropriate word to fill in the blank. After the unexpected power outage, the presentation had to be \_\_\_\_\_.
- (A) Initiated
  - (B) Continued
  - (C) Improvised
  - (D) Rescheduled
53. What is the synonym of word AMBIGUOUS ?
- (A) Clear
  - (B) Definite
  - (C) Confusing
  - (D) Precise
54. Choose the most appropriate word to fill in the blank. She always endeavours to \_\_\_\_\_ the latest trends in fashion.
- (A) keep up with
  - (B) keep down
  - (C) keep on
  - (D) keep off

55. Choose one option from below that will correctly fill in the blank given in the series :  
 M2 \_\_\_\_\_ K8 J16 I32  
 (A) N4  
 (B) N6  
 (C) L6  
 (D) L4
56. In a certain code, COMPUTERS is written as BMOUPETSR. What will be the fifth letter of the coded word for SCIENCE ?  
 (A) N  
 (B) I  
 (C) C  
 (D) E
57. Out of the following four words, three share a common characteristic, while one is distinct. Identify the odd one out.  
 (A) Pentagon  
 (B) Hexagon  
 (C) Heptagon  
 (D) Hendecagon
58. Two days before yesterday was Monday, what will be the day after tomorrow ?  
 (A) Sunday  
 (B) Tuesday  
 (C) Friday  
 (D) Saturday
59. Determine the 30th term of the arithmetic progression : 10, 7, 4, \_\_\_\_\_.  
 (A) 87  
 (B) 77  
 (C) -87  
 (D) -77
60. If the total of  $n$  terms in a geometric progression 5, 10, 20 equals 1275, what is the value of  $n$  ?  
 (A) 9  
 (B) 8  
 (C) 7  
 (D) 6