Question Booklet No. : 680393

ENTRANCE TEST-2026

SCHOOL OF APPLIED SCIENCES & TECHNOLOGY

5-Year Integrated Masters Programme in Data Science & Artificial Intelligence (DS & AI)

Total Questions : 60
Time Allowed : 70 Minutes

Question Booklet Series **A**

Entrance Test Roll No. : | | | | | | |

Important Instructions for Candidates :

1. Candidates shall compulsorily use only **blue/ black ball point pen.** In no case gel/ink pen or pencil should be used.
2. Compulsorily write your **entrance test roll number** in the space provided at the top of this page of the question booklet.
3. Fill up the necessary information in the spaces provided on OMR Answer Sheet including **Question Booklet Number** and **Question Booklet Series.**
4. 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.
5. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.
6. **Choose only one correct/most appropriate response** for each question among the options A, B, C and D and darken the circle of the appropriate response completely. Incompletely darkened circle is not correctly read by the OMR scanner and no complaint to this effect shall be entertained.
7. **Do not darken more than one circle of option for any question. A question with more than one darkened response shall be considered wrong.**
8. **There will be negative marking for wrong answers. Each wrong answer will lead to deduction of 0.25 marks per wrong answer from the score.**
9. Only those candidates who obtain positive score in Entrance Test shall be eligible for admission.
10. Do not make any stray mark on the OMR sheet as this may lead to errors while scanning.
11. OMR answer sheet must be handled carefully and it should not be folded or mutilated, as in such case it will not be properly evaluated by the scanning machine.
12. Use of Electronic gadgets like calculator, mobile, smart watch, blue tooth etc. is strictly prohibited.
13. Rough work, if any, should be done on the blank sheets provided with the question booklet.
14. Ensure that the OMR Sheet is signed by the Examinee as well as by the invigilator.
15. At the end of the examination, fold the OMR Sheet along the crease on the top and tear off the top strip to separate the Original OMR Sheet from the Duplicate Copy.
16. Compulsorily hand over the **Original OMR Answer Sheet** to the invigilator.
17. Candidate's can retain duplicate copy of the OMR, Question Booklet and Admit Card.
18. If any of the information in the Response Sheet/Question Paper has been found missing or not mentioned as stated above, the candidate is solely responsible for that lapse.
19. Any deficiency on the OMR shall be the responsibility of the candidate himself/herself.

SEAL

DIRECTIONS **for questions 1 - 3**: In each of the questions below are given three statements, followed by conclusions: I, II, III, IV. You have to take the given statements to be true even if they seem to be at variance from commonly known facts. Read the conclusions and then decide which of the given conclusions logically follows from the given statements disregarding commonly known facts.

1. Statements: Some Cats are Rats. All bats are tables. All Rats are Bats.

   Conclusion:

   I. Some Cats are bats

   II. All bats are rats

   III. All tables are cats

   IV. All bats are cats

   (A) Only I & II follow

   (B) Only II follows

   (C) Only I & IV follow

   (D) None of these

2. Statements: All Carrots are birds. Some telephones are Carrots. All bedsheets are telephone.

   Conclusion:

   I. All bedsheet are birds

   II. Some bedsheet are birds

   III. Some birds are telephone

   IV. All telephone are birds

   (A) Only I follows

   (B) Only II follows

   (C) Only I and III follow

   (D) Only III follows

3. Statements: Most CPUs are keyboards. No keyboard is a Mouse. All Mouses are CPU.

   Conclusion:

   I. Some keyboards are CPU

   II. All CPU's are Mouse

   III. No Mouse is a keyboard

   IV. Some Mouse are keyboard

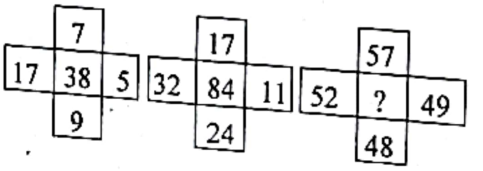
   (A) Only I follows

   (B) Only II and III follow

   (C) Only I and III follow

   (D) Only II follows

4. Find the missing term :



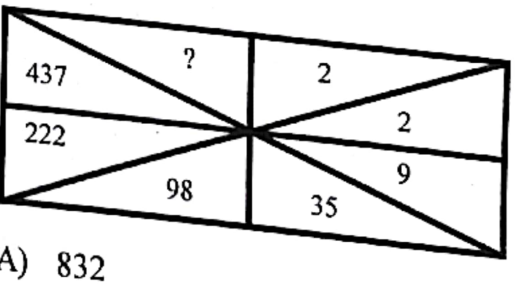
   (A) 70

   (B) 206

   (C) 106

   (D) 100

5. Find the missing term :



   (A) 832

   (B) 777

   (C) 245

   (D) 779

6. I bought a car with a peculiar 5-digit numbered license plate. When the number is turned upside down and read in reverse, it still forms a valid number. Interestingly, this new number is greater than the original by 58212. All digits in the number are different. What is the original number?
   (A) 10968
   (B) 10689
   (C) 16890
   (D) 19068

7. A popular newspaper that sells a large number of copies is called:
   (A) Daily
   (B) Broadsheet
   (C) Red-top
   (D) Magazine

8. Which of the following statements correctly describes the words "*flammable*" and "*inflammable*"?
   (A) Flammable means catches fire easily, while inflammable means does not burn
   (B) Flammable and inflammable have the same meaning: catches fire easily
   (C) Inflammable means explosive, while flammable means safe
   (D) Flammable is incorrect usage, while inflammable is correct

9. Anything that can be saved is:
   (A) Tangible
   (B) Gullible
   (C) Perceptible
   (D) Salvageable

10. What does the phrase "*chock-a-block*" mean?
   (A) Completely empty
   (B) Partially filled
   (C) Completely full or overcrowded
   (D) Neatly arranged

11. A person who knows many languages:
   (A) Linguist
   (B) Polyglot
   (C) Scholar
   (D) Grammarian

12. Identify the misspelt word:
   (A) Millennium
   (B) Independent
   (C) Seperate
   (D) Temperature

13. Let A and B are the two sets; $A = \{1,2,3,4\}$, $B = \{2,4,6\}$. Find $A \cap B$.
   (A) $\{1,2\}$
   (B) $\{2,4\}$
   (C) $\{4,6\}$
   (D) $\{1,3\}$

14. Let A and B are the two sets; let n(X) represent the cardinality of a set X; If n(A)=20, n(B)=15, and $n(A \cap B) = 5$, then $n(A \cup B) = ?$
   (A) 25
   (B) 30
   (C) 35
   (D) 40

15. A relation R on set A is reflexive if:
   (A) $(a,b) \in R \Rightarrow (b,a) \in R$
   (B) $(a,a) \in R$ for all $a \in A$
   (C) $(a,b), (b,c) \in R \Rightarrow (a,c) \in R$
   (D) None

16. If $f(x)=2x+3$, find its inverse i.e $f^{-1}(x)$.
   (A) $(x-3)/2$
   (B) $(x+3)/2$
   (C) $2x-3$
   (D) $x/2+3$

17. Find the domain of $f(x)=1/(x-2)$; $\mathbb{R}$ math (all real numbers)
   (A) $\mathbb{R}$
   (B) $\mathbb{R} - \{2\}$
   (C) $\mathbb{R} - \{0\}$
   (D) $\mathbb{R} - \{-2\}$

18. A function has an inverse if it is:
(A) Continuous
(B) Differentiable
(C) One-one and onto (bijective)
(D) Polynomial

19. What is the derivative of the function $(x)=3x^2+7\text{Sin}(4x)$?
(A) $6x+7\text{Cos}(4x)$
(B) $6x^2+7\text{Sin}(4x)$
(C) $6x^2+28\text{Cos}(4x)$
(D) $6x+28\text{Cos}(4x)$

20. What is the derivative of the function $f(x)=\ln 3x$?
(A) $\frac{1}{x}$
(B) $\frac{3}{x}$
(C) $\frac{1}{3x}$
(D) $\frac{1}{3x^2}$

21. Which function is discontinuous at $x=0$?
(A) x^2
(B) $|x|$
(C) $1/x$
(D) e^x

22. What is the mathematical expression for the definition of continuity of a function defined on (a, b) ?
(A) $\lim_{x\to c} f(x)=f(c)\ \forall\ c\in a$
(B) $\lim_{x\to c} f(x)=f(c)\ \forall\ c\in(a,b)$
(C) $\lim_{x\to c} f(x)=f(c)\ \forall\ c\in b$
(D) $\lim_{x\to a} f(x)=f(c)\ \forall\ c\in(a,b)$

23. What is a monotonically increasing function?
(A) $x_1>x_2\Rightarrow f(x_1)\le f(x_2)\forall\ x_1,x_2\in(a,b)$
(B) $x_1<x_2\Rightarrow f(x_1)\le f(x_2)\forall\ x_1,x_2\in(a,b)$
(C) $x_1<x_2\Rightarrow f(x_1)=f(x_2)\forall\ x_1,x_2\in(a,b)$
(D) $x_1=x_2\Rightarrow f(x_1)\le f(x_2)\forall\ x_1,x_2\in(a,b)$

24. A formula for the tangent to a curve is $y=x^3$ at (1, 1):
(A) $x-10y+50=0$
(B) $3x-y-2=0$
(C) $x-3y-4=0$
(D) $x+2y-7=0$

25. What would be the probability of an event 'G' if H denotes its complement, according to the axioms of probability?
(A) $P(G)=1/P(H)$
(B) $P(G)=1-P(H)$
(C) $P(G)=1+P(H)$
(D) $P(G)=P(H)$

26. A table with all possible value of a random variable and its corresponding probabilities is called :
(A) Probability Mass Function
(B) Probability Density Function
(C) Cumulative distribution function
(D) Probability Distribution

27. The expected value of a discrete random variable 'x' is given by:
(A) P(x)
(B) $\sum P(x)$
(C) $\sum xP(x)$
(D) 1

28. For a continuous random variable X,
(A) $P(X=a)>0$
(B) $P(X=a)=0$
(C) $P(X=a)=1$
(D) $P(X=a)<0$

29. The variance of a random variable is always :
(A) Negative
(B) Zero
(C) Non-negative
(D) Imaginary

30. If $P(A) = 0.8$, $P(B) = 0.5$ and $P(B|A) = 0.4$, what is the value of $P(A \cap B)$?

(A) 0.32

(B) 0.25

(C) 0.1

(D) 0.5

31. Find the determinant of A below

$$A = \begin{bmatrix} c^2 & cb & ca \\ ab & a^2 & -ac \\ ab & bc & -b^2 \end{bmatrix}$$

(A) $abc(a^3 + b^3 + c^3 + abc)$

(B) $abc(a^3 + b^3 + c^3 - abc)$

(C) $(a^3 + b^3 + c^3 + abc)$

(D) $(a^3 - b^3 + c^3 - abc)$

32. If the 5th term of an Arithmetic Progression is 20 and the 10th term is 40, the common difference is:

(A) 2

(B) 4

(C) 5

(D) 6

33. If the sum of infinite Geometric Progression is 12 and first term is 3, then common ratio is:

(A) 1/2

(B) 3/4

(C) 2/3

(D) 1/4

34. The sum 1+2+3+...+n equals:

(A) n(n+1)/2

(B) n(n)

(C) n(n–1)/2

(D) n(n+1)

35. A matrix is singular if:

(A) Determinant = 1

(B) Determinant = 0

(C) Trace = 0

(D) Rank = n

36. The determinant of identity matrix is:

(A) 0

(B) 1

(C) n

(D) –1

37. Which network topology provides the highest fault tolerance?

(A) Bus

(B) Star

(C) Ring

(D) Mesh

38. In which network topology does the central device failure bring down the entire network?

(A) Bus

(B) Star

(C) Mesh

(D) Hybrid

39. What is the total number of IPv4 addresses? (x^y means x to the power of y)

(A) 2^16

(B) 2^32

(C) 2^64

(D) 2^128

40. Which statement about IPv6 is correct?

(A) It uses 32-bit addresses

(B) It eliminates the need for sub-netting

(C) It uses 128-bit addresses

(D) It is incompatible with routing

41. Which class of IP address has the default subnet mask 255.0.0.0?
(A) Class A
(B) Class B
(C) Class C
(D) Class D

42. Which IP address is used for loopback testing?
(A) 192.168.0.1
(B) 127.0.0.1
(C) 255.255.255.255
(D) 0.0.0.0

43. Consider the following statement and select the correct option: "*A switch statement without a default label is syntactically invalid in C/C++*"
(A) True
(B) False
(C) Valid only in C, not in C++
(D) Valid only if all enum values are covered

44. Which of the following statements about arrays in C is correct?
(A) C supports only rectangular multidimensional arrays stored in column-major order
(B) C allows jagged arrays natively like Java
(C) Multidimensional arrays are stored in row-major order
(D) Only 1D arrays are stored contiguously

45. Which of the following is valid regarding destructors in C++?
(A) A class can overload destructors with different parameters
(B) A class can have both virtual and non-virtual destructors simultaneously
(C) A destructor can be declared but not defined
(D) A class can have only one destructor, optionally declared virtual

46. Which of the following is true about multiple inheritance in C++?
(A) It is limited to two base classes due to ambiguity issues
(B) It is unlimited but may introduce ambiguity (e.g., diamond problem)
(C) It is disallowed unless virtual inheritance is used
(D) It is supported only for abstract base classes

47. Why should base class destructors often be declared virtual?
(A) To allow destructor overloading
(B) To ensure proper destruction of derived class objects via base pointers
(C) To improve performance
(D) To allow multiple inheritance

48. Which condition creates an infinite loop?
(A) for(i=0; i<10; i++)
(B) while(0)
(C) while(1)
(D) for(i=1; i>10; i++)

49. Why is a base case necessary in recursion?
(A) Improve speed
(B) Prevent infinite recursion
(C) Reduce memory
(D) Increase complexity

50. Consider an array A[20][20]. A 2D array can be represented as an array of pointers to 1D arrays. What is the memory layout?
(A) Row-major
(B) Column-major
(C) Depends on compiler
(D) Random

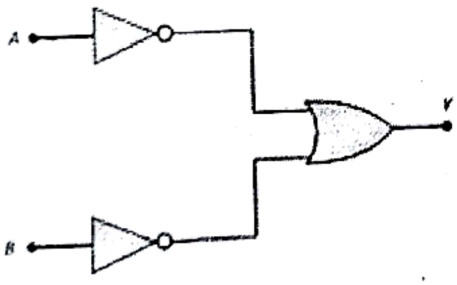
51. A stack is used to pass parameters to procedures in a procedure call. If an error occurs within a procedure and it needs to be unrolled, how many times does the stack need to be popped?
(A) Once
(B) Twice
(C) Thrice
(D) Depends on depth

52. In a singly linked list, insertion at the end requires time to the order of :
(A) O(1)
(B) O(n)
(C) O(log n)
(D) O(n*n)

53. Circular linked list allows:
(A) Easy traversal from last to first
(B) Faster deletion
(C) Both (A) & (B)
(D) None

54. Doubly linked list allows traversal in:
(A) One direction
(B) Two directions
(C) Random directions
(D) None

55. Which logic gate is represented by the following combination of logic gates?



(A) OR
(B) NAND
(C) AND
(D) NOR

56. The output of a NAND gate is 0 :
(A) If both inputs are 0
(B) If one input is 0 and the other input is 1
(C) If both inputs are 1
(D) If both inputs are 1 or one of the inputs is 1 and the other one is 0

57. Which of the following represents the identity law in Boolean Algebra?
(A) A+1=1
(B) A·0=0
(C) A+0=A
(D) A+A=A

58. Which expression is always equal to 1 in Boolean Algebra?
(A) A+A
(B) A·A
(C) A'+A'
(D) A'·A'

59. Which of the following is correctin Boolean Algebra?
(A) A+A=2A
(B) A·A=A
(C) A+A=0
(D) A·A=0

60. Simplify: $(A+B)'$ as per Boolean Algebra :
(A) A'+ B'
(B) A' B'
(C) AB
(D) A+B