Question Booklet No. 1263

ENTRANCE TEST-2025

SCHOOL OF APPLIED SCIENCES & TECHNOLOGY

5-YEAR INTEGRATED MASTERS PROGRAMME IN DATA SCIENCE & ARTIFICIAL INTELLIGENCE

Question Booklet Series **C**

Total Questions : 60
Time Allowed : 70 Minutes

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 **roll number** in the space provided at the top of this page.
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 machine.
12. **No Electronic gadgets including calculators, mobiles, smart watches, blue tooth etc. shall be permitted inside the examination hall.**
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. Hand over the Original OMR answer sheet to the invigilator and retain the candidate's copy of OMR, Question Booklet and Admit Card for your reference.
17. 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.
18. Any deficiency on the OMR shall be the responsibility of the candidate himself/herself.

SEAL

1. The minimum value of $f(x) = x^2 + 4x + 7$ occurs at:
   (A) $x = 2$
   (B) $x = -2$
   (C) $x = -4$
   (D) $x = 0$

2. The solution of $dy/dx = 3x^2$, given that $y = 2$ when $x = 1$, is :
   (A) $y = x^3 + 1$
   (B) $y = x^3 + 2$
   (C) $y = x^3 + 3$
   (D) $y = x^2 + 2$

3. The limit $(x \to 0)\ (\sin(3x)/2x)$ equals:
   (A) 1/2
   (B) 3/2
   (C) 2/3
   (D) 3

4. If $\int_0^2 (2x^3)dx = k$, then k equals:
   (A) 4
   (B) 8
   (C) 16
   (D) 32

5. The mean of 6 numbers is 12. If one number is removed, the mean becomes 10. Find the number that was removed.
   (A) 22
   (B) 12
   (C) 15
   (D) 10

6. Two dice are rolled together. What is the probability that the sum is 7 ?
   (A) 1/6
   (B) 5/36
   (C) 7/36
   (D) 1/12

7. The variance of 5 observations 2, 4, 6, 8, 10 is:
   (A) 8
   (B) 6
   (C) 5
   (D) 10

8. A multiple-choice question has 4 options, only one of which is correct. What is the expected number of correct answers in 10 independent guesses ?
   (A) 10
   (B) 5
   (C) 2.5
   (D) 7.5

9. The cumulative frequency just greater than or equal to n/2 gives:
   (A) Mean
   (B) Mode
   (C) Median
   (D) Range

10. Two Independent events A and B are independent. If P (A) = 0.4 and P (B) = 0.5, then P (A and B) = ?
   (A) 0.2
   (B) 0.9
   (C) 0.5
   (D) 0.3

11. The roots of $x^2 - 7x + 12 = 0$ are :
   (A) 3 and 4
   (B) 6 and 2
   (C) 3 and 6
   (D) 4 and 3

12. The algebraic expression $8a + 6b - 9c$ is a
   (A) Monomial
   (B) Binomial
   (C) Trinomial
   (D) None of the above

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13. Identify the like terms from the following options.
    (A) 3xy, 7yx
    (B) ab, 6b
    (C) –7, 7z
    (D) $6z^2$, $12y^2$
14. If the roots of $ax^2 + bx + c = 0$ are reciprocal to each other, then:
    (A) $b = 0$
    (B) $a = c$
    (C) $a + c = 0$
    (D) $b = c$
15. Complete 2,3,5,7,_____
    (A) 8
    (B) 9
    (C) 10
    (D) 11
16. What is the first term of Fibonacci sequence ?
    (A) 0
    (B) 1
    (C) 2
    (D) 3
17. The IP address 121.12.12.225 belongs to class
    (A) Class A
    (B) Class B
    (C) Class C
    (D) Class D
18. Which protocol is used to send email messages ?
    (A) HTTP
    (B) FTP
    (C) SMTP
    (D) SNMP
19. Which protocol is used for secure file transfer ?
    (A) FTP
    (B) SFTP
    (C) HTTP
    (D) Telnet
20. Which topology allows for the most redundancy ?
    (A) Star
    (B) Ring
    (C) Mesh
    (D) Bus
21. Which topology does the Internet resemble ?
    (A) Ring
    (B) Bus
    (C) Star
    (D) Mesh
22. The port number of HTTP is :
    (A) 80
    (B) 243
    (C) 40
    (D) 20
23. Which of the following is a valid variable name in most programming languages ?
    (A) 2variable
    (B) variable_name
    (C) @variable
    (D) variable-name
24. What is an algorithm ?
    (A) A programming language
    (B) A step-by-step procedure to solve a problem
    (C) A data type
    (D) A computer program

25. Which loop is guaranteed to execute at least once, even if the condition is false ?

(A) for loop

(B) while loop

(C) do-while loop

(D) foreach loop

26. What is the output of the following C++ code ?

```
int factorial (int n) {
  if (n == 0)
     return 1;
else
      return n * factorial (n - 1);
}
int main () {
cout<< factorial (3) <<endl;
  return 0;
}
```

(A) 3

(B) 6

(C) 9

(D) 1

27. Which of the following is an example of polymorphism in OOP ?

(A) Using a class to represent a real-world object

(B) Using a method with the same name but different parameters

(C) Creating a class that can inherit properties from another class

(D) Grouping data and methods together in one unit

28. Which of the following is true about an object in OOP ?

(A) An object is a template or blueprint for creating instances

(B) An object cannot store data

(C) An object is an instance of a class

(D) An object is a function within a class

29. Which of the following is a linear data structure ?

(A) Tree

(B) Graph

(C) Stack

(D) Heap

30. Which of the following data structures is used in the implementation of recursion ?

(A) Queue

(B) Stack

(C) Tree

(D) Linked List

31. Which operation is used to access an element of a list at a specific index ?

(A) list[index]

(B) list(index)

(C) list->index

(D) list[index] = value

32. In C++, how do you declare a string ?

(A) string str = "Hello"

(B) String str = "Hello"

(C) str = "Hello"

(D) char str[ ] = "Hello"

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33. Which of the following correctly describes the condition for a queue to be empty (array implementation)?

(A) front == rear + 1

(B) rear == –1

(C) front == rear

(D) rear == size

34. In a singly linked list, each node contains:

(A) Only data

(B) Data and one pointer

(C) Data and two pointers

(D) Only a pointer

35. What is the result of A + 1 in Boolean algebra?

(A) A

(B) 0

(C) 1

(D) A'

36. What is A + A' equal to?

(A) 0

(B) A

(C) A'

(D) 1

37. According to De Morgan's first law, (A·B)' is equal to:

(A) A' + B'

(B) A' · B'

(C) A + B

(D) A + B'

38. The output of a 2-input XOR gate is 1 when:

(A) Both inputs are 1

(B) Both inputs are 0

(C) Inputs are different

(D) Inputs are the same

39. A circuit that has two inputs and the output is HIGH only when both inputs are HIGH is called:

(A) OR gate

(B) NAND gate

(C) NOR gate

(D) AND gate

40. How many different input combinations are possible for a 4-input circuit?

(A) 4

(B) 8

(C) 16

(D) 32

41. Architect: Building : : Choreographer :

(A) Dance

(B) Song

(C) Stage

(D) Performer

42. A man said, "The boy playing is the son of the only son of my wife." Who is playing?

(A) His son

(B) His daughter

(C) His grandson

(D) His granddaughter

43. A person walks 7 km north, turns west and walks 4 km, then south 4 km. How far is he from the starting point?

(A) 2 km

(B) 3 km

(C) 8 km

(D) 5 km

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44. Six persons are sitting in a row. B is to the right of A but left of C. D is right of C. E is right of D and left of G. F is to the left of A. Who is in the middle ?
(A) A
(B) B
(C) C
(D) D

45. If DEVICE is coded as EFWJDF, then CHARGE is coded as ?
(A) ADEFG
(B) BORST
(C) DESTV
(D) DIBSHF

46. 3, 7, 15, 31, 63, ____.
(A) 28
(B) 13
(C) 18
(D) 127

47. Vocabulary : Choose the word which is most similar in meaning to "Esoteric".
(A) Common
(B) Mysterious
(C) Secret
(D) Simple

48. Identify the error in the sentence :
"Neither of the candidates have submitted their proposals."
(A) Neither of the candidates
(B) have submitted
(C) their proposals
(D) No error

49. Choose the correct synonym for "Benevolent".
(A) Cruel
(B) Kind
(C) Proud
(D) Shy

50. The scientist's theory was so ___ that few could grasp its implications.
(A) Lucid
(B) Abstruse
(C) Verbose
(D) Mundane

51. Choose the correct antonym for "Trivial".
(A) Important
(B) Minor
(C) Insignificant
(D) Petty

52. Choose the meaning of "To bury the hatchet".
(A) To fight
(B) To make peace
(C) To plan secretly
(D) To dig a hole

53. A set A has 6 elements, and a set B has 3 elements. How many onto functions exist from A to B ?
(A) 729
(B) 648
(C) 540
(D) 120

54. If a relation R on a set A satisfies $R = \{(a, b): a + b$ is divisible by $2\}$, then R is :
(A) Reflexive and Symmetric only
(B) Symmetric and Transitive only
(C) Reflexive, Symmetric, and Transitive
(D) None of these

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55. Let $U = \{1,2,3,4,5\}$, $A = \{2,3\}$, and $B = \{3,4\}$. Then $(A \cup B)'$ is :

(A) $\{1,5\}$

(B) $\{2,4\}$

(C) $\{1,2,5\}$

(D) $\{5\}$

56. If $f(x) = 1/(x-2)$ and $g(x) = (x+2)/x$, then $(g \circ f)(x)$ equals :

(A) $2x-3$

(B) $3/(x-2)$

(C) $(2x)/(x-3)$

(D) $(x+3)/(x-2)$

57. If the universal set is $U = \{1,2,3,...,10\}$ and $A = \{1,3,5,7,9\}$, then $A' \cap \{2,4,6,8,10\}$ is:

(A) $\{2,4,6,8,10\}$

(B) $\{\}$

(C) $\{1,3,5,7,9\}$

(D) $\{2,4,6\}$

58. Let $f: R \to R$ be defined as $f(x) = 3x + 7$. Then the range of $f(x)$ is:

(A) $(0, \infty)$

(B) R

(C) $[7, \infty)$

(D) None of these

59. If $\lim (x \to 2) [(x^3 - 8)/(x-2)] = k$, then k equals:

(A) 6

(B) 12

(C) Infinity

(D) N.D.

60. If $f(x) = x^2 \sin(1/x)$ for $x \neq 0$ and $f(0) = 0$, then $f(x)$ is :

(A) Not continuous at $x = 0$

(B) Continuous but not differentiable at $x = 0$

(C) Continuous and differentiable at $x = 0$

(D) Neither continuous nor differentiable