Code No.	V – 2345

Entrance Examination for Admission to the P.G. Courses in the Teaching Departments, 2025

CSS

DATA SCIENCE

For office use only

General Instructions

1. The Question Paper is having 100 Objective Questions, each carrying one mark.
2. The answers are to be (✓) 'tick marked' **only** in the "**Response Sheet**" provided.
3. **Negative marking** : **0.25 marks** will be deducted for each wrong answer .

Time : 2 Hours **Max. Marks : 100**

To be filled in by the Candidate									
Register Number	in Figures								
	in words								

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Choose appropriate answer from the options in the questions.

(100 × 1 = 100 marks)

1. The $(n-1)^{rh}$ term of an arithmetic progression 7, 12, 17, 22.... is given by

   A. $(5n+2)$

   B. $(5n+3)$

   C. $(5n-5)$

   D. $(5n-3)$

---

2. Find the sum of 12 terms of an Arithmetic Progression whose n^{th} term is given by $a_n = 3n + 4$.

   A. 265 B. 272

   C. 282 D. 292

3. If first term of a Geometric Progression is 20 and common ratio is 4. Find the 5^{th} term.

   A. 10240 B. 40960

   C. 5120 D. 2560

4. In a Geometric Progression, the 5^{th} term is 27 and 8^{th} term is 729. Find its 11^{th} term.

   A. 729 B. 2187

   C. 19683 D. 6561

5. The arithmetic mean of 40 numbers was found to be 38. It was then discovered that the number 56 had been misinterpreted as 36. Determine the correct mean of the numbers given.

A. 39.2 B. 37.6

C. 37.5 D. 38.5

6. Worker A takes 8 hours to do a job. Worker B takes 10 hours to do a job. How long should it take both A and B, working together to do same job

A. 40/9 B. 4/9

C. 22/9 D. 31/9

7. If one geometric mean *G* and two arithmetic mean *A*1, *A*2 are inserted between two numbers, then $(2A1-A2)(2A2-A1)$ is equal to

A. 2G B. G^2

C. G D. None of the mentioned

8. The sum of the place values of 3 in the number 503535 is

A. 3030 B. 6

C. 3300 D. 60

9. A quadratic polynomial, whose zeroes are –3 and 4, is

A. x^2-x-12 B. x^2+x+12

C. x^2-x+12 D. $2x^2+2x-24$

10. If $x+y+z=9$ and both *y* and *z* are positive integers greater than zero, then the maximum Value *x* can take is

A. 7 B. 3

C. 8 D. Data insufficient

11. Which of the following is not the property of transpose of a matrix?

A. $(A')'=A$ B. $(A+B)'=A'+B'$

C. $(kA)'=KA'$ D. $(AB)'=(BA)'$

12. Sum of two different prime number is a _____

A. Prime number B. Either Prime or Composite

C. Composite number D. None of the mentioned

13. On dividing a number by 357, we get 39 as the remainder. On dividing the same number by 17, what will be the remainder?

A. 2 B. 3

C. 4 D. 5

14. If GCD of two number is 8 and LCM is 144, then what is the second number if first number is 72?

A. 24 B. 16

C. 3 D. 2

15. Let $\log 105 = z$ then what should be the value of $\log 10(1/50)$?

A. $-\left(z^2+2\right)$ B. $-(z+1)$

C. $(z+1)-1$ D. $(z+1)/(z-1)$

16. $\log 360$ is equal to

A. $2\log 2+3\log 3$ B. $3\log 2+2\log 3$

C. $3\log 2+2\log 3+\log 5$ D. $3\log 2+2\log 3-\log 5$

17. Which of the following statements is not correct

A. $\log_{10} 10 = 1$

B. $\log_{10} 1 = 0$

C. $\log(1+2+3) = \log(1)+\log(2)+\log(3)$

D. $\log(2+3) = \log(2\times 3)$

18. What will be nature of the $f(x) = 10-9x+6x^2-x^3$ for $x > 3$?

A. Increases

B. Decreases

C. Cannot be determined for $x > 3$

D. A constant function

19. A particle is moving in a straight line and its distance s cm from a fixed point in the line after t seconds is given by $s = 12t - 15t^2 + 4t^3$. What is the velocity of the particle after 3 seconds?

A. 30 cm/sec
B. 20 cm/sec
C. 10 cm/sec
D. 40 cm/sec

20. If $f(x) = x^3 - \left(1/x^3\right)$, then $f(x) + f(1/x)$ is equal to

A. 0
B. $2/x^3$
C. $2x^3$
D. 1

21. The lines $x + 2y = 5$ and $3x + 6y = 15$ are:

A. Intersecting
B. Parallel and distinct
C. Coincident
D. Perpendicular

22. If $\log_a X = 3$ and $\log_a Y = 5$, then $\log_a(XY)$ is

A. 3
B. 15
C. 5
D. 8

23. A function $f : A \to B$ is subjective if:

A. Every element of A has a unique image in B
B. Every element of B has at least one pre-image in A
C. Every element of A has more than one image in B
D. None of these

24. The function $f(x) = 3x + 2$ is:

A. Subjective but not injective
B. Injective but not subjective
C. Injective and subjective
D. Neither injective nor subjective

25. A crosses a 600 m long street in 5 minutes. What is his speed in km/hour?

A. 3.6
B. 7.2
C. 8.4
D. 10

26. In a clock that has 24 hours, what time will it be 250 hours after 18:00?

A. 4:00
B. 20:00
C. 12:00
D. 6:00

27. Two gears are rotating on a machine. The first gear makes 72 rotations per minute, and the second gear makes 108 rotations per minute. After how many minutes will both gears be at the same position again?

A. 3
B. 6
C. 8
D. 12

28. A particle moves along a straight line such that its velocity at time *t* seconds is given by: $v(t) = 3t^2 + 2t + 1$ (in meters per second. What is the total distance travelled by the particle from *t* = 0 to *t* = 4 seconds

A. 64 meters
B. 96 meters
C. 120 meters
D. 84 meters

29. If the system of equations

$x + y + z = 6,\ x + 2y + 3z = 14,\ x + 4y + 9z = 30$

is written in matrix form $AX = B$, then what is the value of $\det(A)$?

A. 2
B. 1
C. 0
D. 4

30. Find the area of triangle with vertices $A(1,2), B(4,6), D(5,3)$ using determinants.

A. 5 sq units
B. 9.5 sq units
C. 8.7 sq units
D. 6.5 sq units

31. The value of the determinant does not change if:

A. A multiple of one row is added to another row
B. A row is multiplied by a scalar
C. Two rows are interchanged
D. All elements of a row are made zero

32. If a function is differentiable at a point, then it must be:

A. Discontinuous at that point

B. Periodic at that point

C. Continuous at that point

D. Increasing at that point

33. The function $f(x) = x^3 - 3x$ has:

A. A local maximum at $x = 1$

B. A local minimum at $x = 0$

C. Local maxima at $x = -1$ and minima at $x = 1$

D. No local extrema at any point

34. The dot product of two vectors is zero when:

A. Vectors are parallel

B. Vectors are perpendicular

C. Vectors have same magnitude

D. Vectors lie in the same plane

35. The shortest distance between two skew lines lies along:

A. Their angle bisector

B. The plane containing both lines

C. The x-axis

D. A line perpendicular to both

36. In Linear Programming, the feasible region is always:

A. A straight line

B. A convex polygon

C. A circle

D. A single point

37. Which of the following numbers is divisible by 4?

A. 223523352
B. 22346457354
C. 22458767745351
D. 2457457359

38. The area of a triangle with sides $a = 6,\ b = 8,$ and $c = 10$ is:

A. 36
B. 30
C. 24
D. 48

39. Which of the following is the correct definition of a bijection?

A. A function that is continuous and one-to-one
B. A function that is either injective or subjective
C. A function that has a domain and co-domain of the same set
D. A function that is both injective and surjective

40. If the sum of the first n terms of an arithmetic progression is $S = 3n^2 + 2n$, then the 5^{th} term is:

A. 77
B. 68
C. 29
D. 55

41. A Bag contains 10 black and 20 white balls. One ball is drawn at random. What is the probability that ball is white

A. 1
B. 1/3
C. 2/3
D. 4/3

42. From a pack of 52 cards, two cards are drawn together, what is the probability that both the cards are kings?

A. 2/121
B. 2/221
C. 1/13
D. 1/221

43. In a class, 30% of students are girls, 70% of the girls like math, while only 20% of the boys like math. If a student is randomly chosen and they like math, what is the probability that the student is a girl?

A. 0.21
B. 0.60
C. 0.50
D. 0.30

44. A fair coin is flipped twice. What is the probability of getting heads on the first flip and tails on the second?

A. 1/2
B. 1/4
C. 3/4
D. 1/3

45. In a game show, a contestant is asked to choose one of three doors. Behind one door is a car, and behind the other two are goats. After the contestant makes their choice, the host, who knows what's behind each door, opens one of the other two doors, revealing a goat. The contestant is then given the option to switch their choice to the other unopened door.

What should the contestant do to maximize their chances of winning the car?

A. Stay with their original choice.
B. It doesn't matter, the probability is the same.
C. Switch to the other door.
D. Switch only if the host opens the door with the goat closest to the contestant.

46. A deck of 52 cards contains 4 suits: hearts, diamonds, clubs, and spades. Each suit has 13 cards, including the Ace, numbered cards (2 through 10), and face cards (Jack, Queen, King).

If a card is drawn at random, what is the probability that it is a King, given that it is a face card (Jack, Queen, or King)?

A. 1/4
B. 1/13
C. 3/13
D. 1/3

47. A fair coin is flipped until the first heads appears. What is the probability that the first heads occurs on an odd-numbered flip (1^{st}, 3^{rd}, 5^{th}, etc.)?

A. 1/2
B. 1/3
C. 2/3
D. 1/4

48. In a factory, 95% of the products pass quality control, and 5% fail. A quality control inspector incorrectly marks 2% of the passing products as failures (False Positive Rate) and incorrectly marks 10% of the failing products as passing (False Negative Rate). If a product is marked as a failure, what is the probability that it actually failed?

A. 0.50 B. 0.02

C. 0.98 D. 0.70

49. A box contains 5 red balls and 3 blue balls. Two balls are drawn at random without replacement. What is the probability that both balls drawn are red?

A. 5/28 B. 5/14

C. 1/7 D. 3/28

50. A box contains 10 balls: 6 red and 4 green. If 3 balls are drawn at random without replacement, what is the probability that at least one of them is green?

A. 5/6 B. 3/10

C. 9/20 D. 1/6

51. What is the basic idea behind the Pigeonhole Principle?

A. Every pigeon can have a unique hole

B. Pigeons and holes must be equal in number

C. If more pigeons than holes exist, at least one hole has more than one pigeon

D. No pigeon can share a hole

52. If 100 balls are placed into 9 boxes, what's the minimum number of balls in the fullest box?

A. 11 B. 12

C. 13 D. 14

53. From a group of 8 men and 6 women, how many ways can a committee of 5 be formed such that at least 3 women are included?

A. 336 B. 816

C. 792 D. 686

54. A word is formed by rearranging the letters of the word "BALLOON". How many distinct words can be formed?

A. 1260 B. 630

C. 420 D. 2520

55. How many numbers between 1000 and 9999 have all distinct digits?

A. 4536 B. 5040

C. 6480 D. 9000

56. If 2 dice are rolled, how many total outcomes are there?

A. 6 B. 36

C. 18 D. 12

57. In a club of 100 members, 70 play Tennis, 60 play Badminton, and 40 play both How many play at least one game?

A. 110 B. 100

C. 90 D. 70

58. How many 4-digit numbers can be formed using the digits 1, 2, 3, 4, 5, 6 without repetition such that the number is even?

A. 94 B. 82

C. 210 D. 180

59. In how many ways can 6 friends sit around a circular table if two specific friends must sit together?

A. 120 B. 260

C. 60 D. 48

60. In a meeting of 6 people, each person shakes hands with everyone else except their best friend. Assuming everyone has exactly one best friend (and best-friendship is manually, how many handshakes occur in total?

A. 15 B. 9

C. 12 D. 6

61. Simplify the following Boolean expression:

$A.(A+B)+A'.B$

Which of the following is the correct simplified expression?

A. A B. B

C. $A+B$ D. $A'.B$

62. Which of the following Boolean expressions has the same truth table as the expression: $A \oplus B$

A. $A.B'+A'.B$ B. $(A+B).(A'+B')$

C. $A.B+A'+B'$ D. $A+B$

63. Which of the following statements about Karnaugh Maps (K-map) is NOT true?

A. K-maps are only used for Boolean functions with 3 or fewer variables

B. A K-Map is used to simplify Boolean expressions visually by grouping adjacent 1s or 0s

C. K-map groups must always consist of 1, 2, 4, 8, or 16 cells (powers of 2).

D. Each cell in a K-map represents a minterm of the Boolean function

64. A person starts at point A. He walks 10 meters towards the north, then turns right and walks 15 meters. He then turns right again and walks 10 meters. Finally, he turns left and walks 5 meters. How far is he from point A and in which direction?

A. 5 meters East B. 5 meters West

C. 15 meters East D. 20 meters East

65. What comes next in the series: 2, 6, 12, 20, 30,……?

A. 36
B. 40
C. 42
D. 48

66. A logic system triggers an alarm if either door sensor (D) is active or both window sensors (W1 and W2) are active. What is the correct simplified Boolean expression?

A. $D + W1 + W2$
B. $D + W1W2$
C. $D(W1 + W2)$
D. $DW1W2$

67. Given the logic gates: (A AND B), (A' AND C) and (B AND C), all feeding into an OR gate, what is the simplified Boolean expression?

A. $ABC + A'C$
B. $AB + A'C + BC$
C. $AB + AC + BC$
D. $A + C$

68. Which logic gate can be used to implement any Boolean function (universal gate)?

A. AND
B. XOR
C. OR
D. NAND

69. In Gray coding, the adjacent code values differ by _____.

A. 0 bit
B. 3 bits
C. 10 bits
D. single bit

70. A security system triggers an alarm if a motion sensor is activated (M) and either a door sensor (D) is triggered or the system is in armed mode (A). Which of the following Boolean expressions correctly represents the condition for the alarm to trigger?

A. $M.(D + A)$
B. $M + (D.A)$
C. $M + D + A$
D. $M.D.A$

71. In Java, which of the following is true regarding garbage collection?

A. You can explicitly delete objects

B. Objects are destroyed immediately after use

C. The JVM automatically collects unused objects

D. Java does not support memory management

72. What will be the following code output?

$i = 0$

While $i < 3$:

{print i
$i = i + 1$

A. 0 1 2 3

B. 0 1 2

C. 1 2 3

D. 0 1 2 3 4

73. What is the value of x after this code?

$x = 10$
$x = (x < 5)\,?\, x + 1 : x - 1$

A. 5

B. 11

C. 10

D. 9

74. What will the loop print?

for $i = 1$ to 4;
{*if* $i = 3$:
{continue}
print i}

A. 1 2 3 4

B. 1 3 4

C. 1 2 4

D. 2 3 4

75. What is the value of *b*?

$a = 3$
$b = ++a$
print b

A. 3
B. 4
C. 5
D. Error (depends on language)

76. What will be printed by the code below?

for *j* in range(2):

{for j in range(2):

print $(i + j)$}

A. 0 1 2 1
B. 0 1 2 3
C. 0 1 1 2
D. 0 1 0 2

77. Which of the following series will be printed by the given pseudocode?

Integer a, b, c

Set b = 4, c = 5

for (each a from 2 to 4)

print c

b = b – 1

c = c + b

end for

A. 1 3 6
B. 5 8 10
C. 8 9 10
D. 3 6 9

78. What will be the output?

```
x = 3
y = 4
if x > 2:
  {if y > 5:
   print(“Hello”)
else:
   print(“World”))
```

A. World
B. Hello
C. Nothing
D. Error

79. What is the purpose of this pseudocode?

```
a ← 5
b ← 10
temp ← a
a ← b
b ← temp
```

A. Swap a and b
B. Add a and b
C. Sort a and b
D. Multiply a and b

80. How many times will the loop execute?

```
i ← 1
while i ← 100 do
i ← i * 2
```

A. 7
B. 6
C. 5
D. 8

81. Which data structure is used in Breadth-First Search (BFS) traversal of a graph?

A. Stack
B. Hash Map
C. Priority Queue
D. Queue

82. Which machine learning algorithm is based on the idea of calculating distances between data points?

A. Decision Tree
B. K-Nearest Neighbors
C. Logistic Regression
D. Naive Bayes

83. What is the main idea behind the Apriori algorithm?

A. Associating items in a dataset
B. Clustering data
C. Predicting numerical values
D. Reducing data dimensionality

84. What is the purpose of a return statement in a function?

A. To print values
B. To exit the program
C. To define variables
D. To return a value to the caller

85. What happens if a return statement is not used in a Python function?

A. Error is thrown
B. Function returns None
C. Function returns 0
D. Function returns garbage value

86. A function that calls itself is termed as

A. Looping function
B. Repetitive function
C. Recursive function
D. Callback function

87. What will be printed?

```
int  a = 3, b;
b = ++a;
printf("%d %d", a, b);
```

A. 4 4
B. 3 4
C. 3 3
D. 4 3

88. What will be the output?

```
int a = 1;
switch(a) {
    case 1: printf("Hi");
    default: printf("Bye");
}
```

A. Hi
B. Bye
C. Error
D. Hi Bye

89. What will be the output of the following code?

```
int a = 2;
switch (a) {
    case 1:
        a += 2;
    case 2:
        a +=3
    case 3:
        a +=4;
}
printf("%d", a);
```

A. 2
B. 9
C. 5
D. 14

90. What is the final output of this recursive function?

```
int compute (int x) {
    if (x <= 0) return 0;
    return x + compute(x – 2);
}
int main() {
    printf("%d", compute(5));
}
```

A. 15
B. 12
C. 6
D. 9

91. What will the following program print?

```
void update(int* a, int b. {
*a = * a + b
b = * a + b ;
}
int main() {
    int x = 5, y = 3
    update(&x, y);
    printf("%d %d", x, y);
}
```

A. 8 16
B. 8 3
C. 13 3
D. 53

92. What will be printed?

```
void func(int x) {
    static int count = 0 ;
    count += x ;
    printf("%d ", count);
}
int main() {
    func(1); func(2); func(3);
}
```

A. 136
B. 123
C. 135
D. 134

93. Which of these sorting algorithms has the best average-case time complexity?

A. Bubble Sort
B. Insertion Sort
C. Quick Sort
D. Selection Sort

94. What is an invariant in algorithm design?

A. A variable that stores final results
B. A constant value used for optimization
C. A comment used for debugging
D. A condition that remains true throughout execution

95. In a queue, how are elements processed?

A. Last In First Out (LIFO)

B. Random order

C. First In First Out (FIFO)

D. Most recently accessed first

96. What in a base case in recursion?

A. A function that never returns

B. The maximum depth of recursion

C. The cave where recursion stops

D. The condition where iteration begins

97. Which of the following binary numbers represents –23 in 8-bit 2's complement format?

A. 11100101

B. 10010101

C. 11011101

D. 11101001

98. What is the decimal equivalent of the binary function 101.101?

A. 5.253

B. 5.625

B. 5.545

D. 5.756

99. If a computer uses 16-bit addressing, what is the maximum memory (in bytes) it can address?

A. 64 KB

B. 32 KB

C. 16 KB

D. 128 KB

100. Which type of error is detected during compilation?

A. Runtime error

B. Syntax error

C. Logical error

D. Semantic error

RESPONSE SHEET

1	A	B	C	D	E	26	A	B	C	D	E	51	A	B	C	D	E	76	A	B	C	D	E
2	A	B	C	D	E	27	A	B	C	D	E	52	A	B	C	D	E	77	A	B	C	D	E
3	A	B	C	D	E	28	A	B	C	D	E	53	A	B	C	D	E	78	A	B	C	D	E
4	A	B	C	D	E	29	A	B	C	D	E	54	A	B	C	D	E	79	A	B	C	D	E
5	A	B	C	D	E	30	A	B	C	D	E	55	A	B	C	D	E	80	A	B	C	D	E
6	A	B	C	D	E	31	A	B	C	D	E	56	A	B	C	D	E	81	A	B	C	D	E
7	A	B	C	D	E	32	A	B	C	D	E	57	A	B	C	D	E	82	A	B	C	D	E
8	A	B	C	D	E	33	A	B	C	D	E	58	A	B	C	D	E	83	A	B	C	D	E
9	A	B	C	D	E	34	A	B	C	D	E	59	A	B	C	D	E	84	A	B	C	D	E
10	A	B	C	D	E	35	A	B	C	D	E	60	A	B	C	D	E	85	A	B	C	D	E
11	A	B	C	D	E	36	A	B	C	D	E	61	A	B	C	D	E	86	A	B	C	D	E
12	A	B	C	D	E	37	A	B	C	D	E	62	A	B	C	D	E	87	A	B	C	D	E
13	A	B	C	D	E	38	A	B	C	D	E	63	A	B	C	D	E	88	A	B	C	D	E
14	A	B	C	D	E	39	A	B	C	D	E	64	A	B	C	D	E	89	A	B	C	D	E
15	A	B	C	D	E	40	A	B	C	D	E	65	A	B	C	D	E	90	A	B	C	D	E
16	A	B	C	D	E	41	A	B	C	D	E	66	A	B	C	D	E	91	A	B	C	D	E
17	A	B	C	D	E	42	A	B	C	D	E	67	A	B	C	D	E	92	A	B	C	D	E
18	A	B	C	D	E	43	A	B	C	D	E	68	A	B	C	D	E	93	A	B	C	D	E
19	A	B	C	D	E	44	A	B	C	D	E	69	A	B	C	D	E	94	A	B	C	D	E
20	A	B	C	D	E	45	A	B	C	D	E	70	A	B	C	D	E	95	A	B	C	D	E
21	A	B	C	D	E	46	A	B	C	D	E	71	A	B	C	D	E	96	A	B	C	D	E
22	A	B	C	D	E	47	A	B	C	D	E	72	A	B	C	D	E	97	A	B	C	D	E
23	A	B	C	D	E	48	A	B	C	D	E	73	A	B	C	D	E	98	A	B	C	D	E
24	A	B	C	D	E	49	A	B	C	D	E	74	A	B	C	D	E	99	A	B	C	D	E
25	A	B	C	D	E	50	A	B	C	D	E	75	A	B	C	D	E	100	A	B	C	D	E

ROUGH WORK

ROUGH WORK

ROUGH WORK