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CASL 21/CAAM 21

B.B.A. (CBCS) DEGREE EXAMINATION, APRIL 2023.

Second Semester

Business Administration/Shipping and Logistics
Management/Aviation Management – Allied

BUSINESS MATHEMATICS

(For those who joined in July 2021 onwards)

Time : Three hours          Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. The distance between two points $(-6, y)$ and $(18, 6)$ is 26 units, Find the value of $y$ _____.

   (a)  4                (b)  −4

   (c)  6                (d)  −6

2. Find the slope of the line joining the points $(4, 4)$ and $(6, 8)$ _____.

   (a)  1/2             (b)  1

   (c)  2               (d)  3

3. $\overline{(A \cap B)} =$ _____.

   (a)  $A \cup B$       (b)  $A \cap B$

   (c)  $\overline{A} \cap \overline{B}$     (d)  $\overline{A} \cup \overline{B}$

4. If A, B and C are disjoint sets, $n(A \cup B \cup C)$ _____.

   (a)  0               (b)  1

   (c)  N               (d)  $n(A) + n(B) + n(C)$

5. The differential coefficient of a constant C is _____.

   (a)  0               (b)  1

   (c)  C               (d)  2

6. MR at $x = 10$ when the total revenue function $R = 1500x - 7.5x^2$ is _____.

   (a)  0               (b)  1350

   (c)  14250           (d)  920

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7. The second order condition for $y$ being a maximum is _____.

(a) $\dfrac{dy}{dx} = 0 \; and \; \dfrac{d^2y}{dx^2} = 0$ (b) $\dfrac{dy}{dx} = 0 \; and \dfrac{d^2y}{dx^2} > 0$

(c) $\dfrac{d^2y}{dx^2} < 0$

(d) $\dfrac{d^2y}{dx^2} > 0$

8. The derivative of $\dfrac{1}{x^3}$ is _____.

(a) $\dfrac{3}{x^4}$

(b) $\dfrac{-2}{x^2}$

(c) $\dfrac{-3}{x^4}$

(d) $\dfrac{2}{x}$

9. $\{3 \; 8 \; 9 \; -2\}$ is a row matrix of orders _____.

(a) $4 \times 1$

(b) $1 \times 4$

(c) $1 \times 1$

(d) $4 \times 4$

10. A matrix which has only one column is _____.

(a) A row matrix

(b) A column matrix

(c) A rectangular matrix

(d) Scalar matrix

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Prove that the points P (1, 1), Q (−1, −1) and $R\left(-\sqrt{3}, \sqrt{3}\right)$ are the vertices of an equilateral triangle.

Or

(b) Find the equation of the line passing through the point (2, −3) having the slope $-\dfrac{5}{7}$.

12. (a) Given that $A = \{0,1,3,5\}$ $B = \{1,2,4,7\}$ $C = \{1,2,3,5,8\}$ prove that $(A \cap B) \cap C = A \cap (B \cap C)$.

Or

(b) Define a set and give two examples.

13. (a) Evaluate $\lim\limits_{x \to 0} \dfrac{5x^2 - 7x + 9}{2x^2 + 3}$.

Or

(b) Differentiate with respect to $x \left(3x^2 + 4x - 5\right)^3$.

14. (a) A firm sells a product at Rs. 3 per unit. The total cost of the firm for producing $x$ units is given by $C = 20 + 0.6x + 0.01x^2$. How many units should be made to achieve maximum profit? Verify that the condition for a maximum is satisfied.

Or

(b) If $y = x\,ex^2$ Find $\dfrac{d^2y}{dx^2}$ and $\dfrac{d^3y}{dx^3}$.

15. (a) Explain the important of matrixs.

Or

(b) Find the inverse $O \begin{bmatrix} a & b \\ c & d \end{bmatrix}$.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Find the equation of the straight line through the intersection of $2x - 3y + 4 = 0$ and $3x + 4y - 5 = 0$ and parallel to $6x - 7y + 8 = 0$.

Or

(b) A company estimates that when its sales is Rs. 60,000 its variable expense will be Rs. 30,000 for a fixed expense of Rs. 10,000. Find the break-even point. What is the profit when the sales is Rs. 50,000

17. (a) Explain the types of sets.

Or

(b) In a certain city, 3 daily newspapers, the 'Times'. 'The express' and 'the daily' are mainly read. 42% of the literates from the city read 'Times', 51% read 'Express', 68 % read 'Daily', 30% read both 'Times', and 'Express', 28% read both 'express' and 'Daily', 36% read both 'Daily' and 'Times', and 8% read none of these papers.

Find the percentage of people who read all the three newspapers.

18. (a) Find $\dfrac{d}{dx}\left( \dfrac{x + x^2 - x^3}{\sqrt{x}} + \log x \right)$.

Or

(b) Find $\dfrac{d}{dx}\log\left( \dfrac{2x + 3}{5x + 7} \right)$.

19. (a) A box with square top and bottom is to be made to contain 250 cubic cms. Material for top and bottom costs Rs. 2 per square cm and the material for the side cost Rs.1 per square cm. What is the cost of least expensive box that can be made?

Or

(b) Evaluate by the method of substitution.

$$\int \frac{e^x - e^{-x}}{e^x + e^{-x}}\, dx\,.$$

20. (a) Explain the types of matrices.

Or

(b) Find the inverse of $A = \begin{bmatrix} 4 & 0 & 2 \\ 2 & 10 & 2 \\ 3 & 9 & 1 \end{bmatrix}$.

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