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ode No. : 20801 E **Sub. Code : CABA 21/ CASL 21**

B.A. (CBCS) DEGREE EXAMINATION, APRIL 2022

Second Semester

Business Administration/Shipping and Logistics Management — Allied

BUSINESS MATHEMATICS

(For those who joined in July 2021 onwards)

ne : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

Find the distance between $A(4, -3)$ and $B(-2, 5)$

(a) 11 (b) 9

(c) 10 (d) 8

The second order condition for y being a maximum is

(a) $\frac{dy}{dx}=0$ and $\frac{d^2y}{dx^2}<0$

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

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

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

$\int a^x dx =$ ————

(a) $\frac{a^{x+1}}{x+1}+c$ (b) a^x+c

(c) $\frac{a^x}{\log a}+c$ (d) none of them

The product of the matrices $[7\ 5\ 3]\begin{bmatrix}7\\3\\2\end{bmatrix}$ is ————

(a) [15] (b) [25]

(c) [49] (d) [70]

2. Find the equation of the straight line with a slope of 3 and a Y - intercept of 1 ————.

(a) $3X+Y-1=0$ (b) $3X-Y+1=0$

(c) $X+3Y+1=0$ (d) $X-3Y-1=0$

3. If $A=\{2, 7, 3\}$ and $B=\{4, 5\}$, $A\cup B=$

(a) {2, 7, 3} (b) {4, 5}

(c) $\cup$ (d) {2, 3, 4, 5, 7}

4. $A=\{0\}$ is

(a) an universal set (b) an infinite set

(c) a singleton set (d) a null set

5. The second derivative of $y=x^n$ is ————

(a) nx^{n+1} (b) nx^{n-1}

(c) $n(n-1)x^{n-2}$ (d) n^2x^{n-2}

6. The derivative of $f(x)=99x$ at $x=100$ is ————

(a) 99 (b) 9900

(c) 0 (d) 100

10. A matrix which has only one column is

(a) a row matrix

(b) a column matrix

(c) a rectangular matrix

(d) a square matrix

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) Find the equation of the line passing through the point (2, –3), having the slope –5/4.

Or

(b) Find the point of intersection of the lines $5x+2y=11$ and $x-3y=9$.

12. (a) Explain the methods of description of sets.

Or

(b) If $A=\{1, 2, 4, 6, 8\}$, $B=\{2, 3, 4, 5, 6\}$, $C=\{3, 6, 9, 12, 5\}$ find $A-B$, $B-C$ and $C-A$.

13. (a) Find the differential co-efficient of $x^2 + x^3$ with respect to x.

Or

(b) Find the elasticity if the demand curve is given by $qp^n = c$ where c, n are constants.

14. (a) Evaluate $\int_0^2 e^{2x} dx$.

Or

(b) Explain the concept of consumer's surplus.

15. (a) If $A = \begin{bmatrix} 2 & 3 \\ -1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 & 2 \\ -2 & 3 & 1 \end{bmatrix}$ find AB.

Or

(b) Find the rank of $\begin{bmatrix} -2 & 1 & 3 & 4 \\ 0 & 1 & 1 & 2 \\ 1 & 3 & 4 & 7 \end{bmatrix}$.

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 fired expense of Rs. 10,000. Find the break-even point. What is the profit when to sales is Rs. 50,000?

17. (a) What are the types of sets? Illustratively Explain them.

Or

(b) In a certain city, 3 daily newspapers, the 'Times', the 'Express' and the 'Daily' and mainly read. 42% of the literates from the city read 'Times', 51% read 'Express' 68% read 'Daily', 33% 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 news papers.

18. (a) Prove that $\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$ where u and v are functions of x.

Or

(b) Find $\frac{d}{dx}\{(x^2 + 2)e^{3x}\}$.

19. (a) Examine the function $y = 2x^2 - x^3 + 5$ for maximum and minimum.

Or

(b) Find the producer's surplus for the supply function $y = x^2 + x + 2$ (where y is the price, x the quantity supplied) when $x_0 = 6$.

20. (a) $A = \begin{bmatrix} 4 & -1 & 0 \\ -3 & 5 & -6 \\ 2 & -7 & 8 \end{bmatrix}$ $B = \begin{bmatrix} -1 & 0 & 1 \\ 5 & -2 & 2 \\ 3 & 4 & 3 \end{bmatrix}$

A and B are 3 × 3 matrices. There for $A + B$ and $A - B$ are also 3 × 3 matrices.

Or

(b) Find the rank of $\begin{bmatrix} 1 & -2 & 0 & 1 \\ 2 & -1 & 1 & 0 \\ 3 & -3 & 1 & 1 \\ -1 & -1 & -1 & 1 \end{bmatrix}$.

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