647510 **BBA2AtbA102x** **Seat No :_____**

B.B.A. Semester - 2 (*CBCS*) Examination
March/April – 2024 (As Per Syllabus Year-2018)
Advanced Techniques of Business Mathematics (ALLIED)

Time: 2:30 Hours **Marks: 70**

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Que.1 (A) Prove that $\begin{vmatrix} a & b & ax+by \\ b & c & bx+cy \\ ax+by & bx+cy & 0 \end{vmatrix} = (b^2 - ac)(ax^2 + 2bxy + cy^2)$ (07)

(B) Explain: Rules of determinants. (07)

OR

Que.1 (A) Prove that $\begin{vmatrix} -2a & a+b & a+c \\ b+a & -2b & b+c \\ c+a & c+b & -2c \end{vmatrix} = 4(a+b)(b+c)(c+a)$ (07)

(B) Solve the equation, using cramer's Rule (07)

$3x + 5y + 6z = 4$

$x + 2y + 3z = 2$

$2x + 4y + 5z = 3$

Que.2 (A) Explain: (07)

(1) Transpose of a matrix

(2) Unit matrix

(3) Inverse of a matrix

(4) Orthogonal matrix]

(5) Scalar Matrix

(B) $\begin{bmatrix} -1 & 3 & 5 \\ 1 & -3 & -5 \\ -1 & 3 & 5 \end{bmatrix}$ = A then find A^3 (07)

OR

Que.2 (A) Write properties of Inverse of Two Matrix and Multiplication of Two matrix. (07)

(B) Solve the following system of two linear equations by using inverse matrix method. (07)

$3(x + y) + 2(x - y) = 11$

$5(x + y) - 3(x - y) = 12$

Que.3 Find the following limits: (Any seven) (14)

(1) $\lim_{x \to 5} \frac{x^2-2x-15}{x^2-25}$

(2) $\lim_{x \to 4} \frac{x^3-64}{x^4-256}$

(3) $\lim_{x \to 3} \frac{\sqrt{1}+x-2}{x-3}$

(4) $\lim_{n \to \infty} \frac{(2n+1)(n+1)(n-1)}{n(n+2)(n+3)}$

(5) $\lim_{n \to \infty} \frac{\Sigma n}{n2}$

(6) $\lim_{x \to 0} \frac{7^x - 5^x}{x}$

(7) $\lim_{x \to \infty} \frac{\Sigma n}{(n+1)(n+2)}$

(8) $\lim_{x \to \infty} \frac{\Sigma n}{(n+1)(n+2)}$

Que.4 Find $\frac{dy}{dx}$ (any four) (14)

(1) $y = e^{3x+5}$

(2) $\log\left(\frac{x+1}{x-1}\right)$

(3) $y = x^{\log x}$

(4) $y = e^{3x} \cdot \log(5x)$

(5) $y = (2x-4)(5x+7)$

(6) $y = \left(x + \frac{2x+3}{x+2}\right)\left(x + \frac{4x+10}{x+3}\right)$

Que.5 (A) Explain: Compound Interest (07)

(B) Explain: Sinking Fund (07)

OR

Que.5 (A) A person has to pay 10 instalments each of Rs. 18,000 at the end of every year against a loan. If the rate of interest is 10% per annum, find the amount of the loan. (07)

(B) A person deposits Rs. 400 at the end of every month. The rate of interest is 12% compounded monthly. Find the total amount he will receive after 35 years. (07)

(Take $(1.01)^{420} = 63.97$)

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