

B.B.A. Semester - 2 (CBCS) Examination**March/April - 2024 (As Per Syllabus Year-2016)****ADVANCE TECHNIQUES OF BUSINESS MATHEMATICS (ELECTIVE)****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) $\lim_{x \rightarrow 5} \frac{x^2 - 2x - 15}{x^2 - 25}$

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

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

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

$$(5) \lim_{n \rightarrow \infty} \frac{\Sigma n}{n^2}$$

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

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

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

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