

B.B.A. Semester - 2 (CBCS) Examination**March/April – 2026 (New Course)****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) Explain : transpose of a matrix and its properties. (07)
- (B) If $B = \begin{pmatrix} 0 & 4 & 3 \\ 1 & -3 & -3 \\ -1 & 4 & 4 \end{pmatrix}$ then prove that $B^2 = I$ (07)
- OR
- Que.1 (A) If $A = \begin{pmatrix} 1 & -1 \\ 2 & -1 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 1 \\ 4 & -1 \end{pmatrix}$ then prove that $(A + B)^2 = A^2 + B^2$ (07)
- (B) Find X and Y using matrix inversion method. (07)
- $3x - y = 1$, $2x + y = 4$
- Que.2 (A) Write rules of determinant (07)
- (B) Without expanding, only using properties of determinant Prove that (07)
- $$\begin{vmatrix} Y+Z & Z+X & X+Y \\ X+Y & Y+Z & Z+X \\ Z+X & X+Y & Y+Z \end{vmatrix} = 2 \begin{vmatrix} X & Y & Z \\ Z & X & Y \\ Y & Z & X \end{vmatrix}$$
- OR
- Que.2 (A) Prove that $\begin{vmatrix} 1-Y & 1 & 1 \\ 1 & 1-Y & 1 \\ 1 & 1 & 1-Y \end{vmatrix} = y^2(3-y)$ (07)
- (B) Solve using Cramer's method (07)
- $3(x-1) + 3(y-1) = 15$
- $3(x-1) + 4(y+1) = 21$
- Que.3 Find Limits (Any Five) (14)
- (1) $\lim_{x \rightarrow 4} \frac{x^2 - 3x - 4}{x^2 - 2x - 8}$ (4) $\lim_{n \rightarrow \infty} \frac{(2n+1)(n+1)(n-1)}{n(n+2)(n+3)}$
- (2) $\lim_{x \rightarrow -1} -1 \frac{x^9 + 1}{x + 1}$ (5) $\lim_{n \rightarrow \infty} \frac{\sum n}{n^2}$
- (3) $\lim_{x \rightarrow 0} \frac{\sqrt{x+1} - 1}{x}$ (6) $\lim_{x \rightarrow 0} \frac{7^x - 5^x}{x}$
- Que.4 Find $\frac{dy}{dx}$ (Any Four) (14)
- (1) $y = e^{3x-5}$ (4) $y = e^x \cdot \log(x)$
- (2) $y = \log(7x+7)$ (5) $y = (2x-4)(5x+7)$
- (3) $y = x^3 - 6x^2 - 11x + 7$ (6) $y = \frac{3x-4}{4x+5}$
- Que.5 (A) Define (i) simple Interest (ii) compound Interest (iii) Effective rate (07)
- (B) A Company pays 16% rate of interest compounded quarterly. Find the effective rate of Interest. (07)
- OR
- Que.5 (A) Define (i) Annuity (ii) present value of Annuity (iii) Sinking Fund (07)
- (B) What would be the compound interest of Rs.24,000 at 12% rate of interest to be compounded quarterly for 8 years. (07)
