

Bankim Sardar College

Semester V

B.Com. (Honours)

Paper: DSE 5.1A

Module: II

Subject: Advanced Business Mathematics

F.M. 45

Group - A

Answer any one question

1. If $A = \begin{bmatrix} -1 & 2 & 3 \\ 2 & 4 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 7 & 2 \\ 1 & 9 & -2 \end{bmatrix}$ find $2A + 3B$. 5
2. If $f(x) = \frac{cx+d}{dx+c}$, then find the value of $f(x) \cdot f\left(\frac{1}{x}\right)$. 5
3. Evaluate $\lim_{h \rightarrow 2} \frac{f(2+h)-f(2)}{h}$ where $f(x) = 2x^2 - x + 1$. 5

Group - B

Answer any four questions

4. Solve by Cramer's Method: $2x - y + 3z = -2$; $3x + 2y + 3z = 9$; $x + 2y - z = 9$. 10
5. Verify that the matrix equation $A^2 - 4A + 3I = 0$ is satisfied by the matrix $A = \begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix}$ where $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ and $0 = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$. Hence obtain A^{-1} . 10
6. If $y = Ae^{mx} + Be^{nx}$, show that $\frac{d^2y}{dx^2} - (m+n)\frac{dy}{dx} + mny = 0$. 10
7. The total cost function C for producing x units of an article is given by $C = Rs. (400 - 16x + 2x^2)$. Find the average cost function and the level of output at which this function is minimum. 10
8. Find by integration the area of the triangle whose sides are $y = 4x$, $2x + y = 6$ and $y = 0$. Verify your result by using the definition of area of a triangle. 10
9. Evaluate: (i) $\int \frac{dx}{\sqrt{16x^2+25}}$ (ii) $\int_1^2 \left(\frac{x^2-1}{x^2}\right) e^{x+\frac{1}{x}} dx$. 5 + 5
10. Evaluate $\frac{dy}{dx}$: (i) $x = 2at, y = at^2$ (ii) $y = x^x + x^2$ 5 + 5
11. Show that the matrix $A = \frac{1}{3} \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ -2 & 2 & -1 \end{bmatrix}$ is orthogonal. Hence find A^{-1} . 10

12. Prove that $\begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-a-b \end{vmatrix} = (a+b+c)^3$. 10