



Sub: Applied Mathematics -1 FE ALL DIVISIONS Date: 22.09.2014 Duration 50 minutes Max Marks 20

Q1. Answer any two questions:

[2 x 4 = 08]

(1). Prove that if $y = \sin rx + \cos rx$ then prove that $y_n = r^n [1 + (-1)^n \sin 2rx]^{1/2}$

(ii) If matrix $A = \frac{1}{9} \begin{pmatrix} a & 1 & b \\ c & b & 7 \\ 1 & a & c \end{pmatrix}$ is orthogonal find a, b, c

(iii) Test the set of vectors are linearly independent or not : $[3, 1, 1]$; $[2, 0, -1]$; $[4, 2, 1]$

Q2. Answer any two questions:

(i) Investigate for what values of λ and μ the equations have (i) no solution (ii) a unique solution

(iii) infinite number of solutions $2x + 3y + 5z = 9$; $7x + 3y - 2z = 8$; $2x + 3y + \lambda z = \mu$

(ii) Apply Gauss-Seidel iteration method to solve the equations [four iteration and four decimals]

$$5x + y - z = 10; 2x + 4y + z = 14; x + y + 8z = 20$$

(iii) If ϕ is a function of x, y, z where $x = \sqrt{vw}$, $y = \sqrt{wu}$, $z = \sqrt{uv}$

$$\text{then show that } x \frac{\partial \phi}{\partial x} + y \frac{\partial \phi}{\partial y} + z \frac{\partial \phi}{\partial z} = u \frac{\partial \phi}{\partial u} + v \frac{\partial \phi}{\partial v} + w \frac{\partial \phi}{\partial w}$$