Dr. Babasaheb Ambedkar Technological University

Lonere-402103

Winter Semester Examination Dec-2017

Branch: B. Pharmacy | Semester: I
Subject: Remedial Mathematics (BP106RMT) | Date:30.12.17
Time: 2 Hrs | Maximum Marks: 35

Q.1 Attempt any one of the following (10×1)

1) a) Find the Eigen values and corresponding Eigen vectors for the following matrix.

$$A = \begin{bmatrix} 4 & 2 & -2 \\ -5 & 3 & 2 \\ -2 & 4 & 1 \end{bmatrix}$$

b) Find the Eigen values of matrix A, A^T, A^{-1} & A^4, Where A= $\begin{bmatrix} 1 & 9 & 7 \\ 0 & -4 & 5 \\ 0 & 0 & 2 \end{bmatrix}$

2. a) Differentiate with respect to x,
   i) e^{-x} ii) $sin(logx)\,, x > 1$ iii) $\cos^{-1}(e^x)$ iv) e^{cosx}

   b) Find the integral:
   $\int sin^3 x cos^2 x\, dx.$

Q.2 Attempt any five of the following (5×5)

1. Show that the differential equation $xcos\left(\frac{y}{x}\right)\frac{dy}{dx} = y\, cos\left(\frac{y}{x}\right) + x$ is homogeneous and solve it.
2. Find the general solution of the differential equation $y\,dx - (x + 2y^2)dy = 0.$
3. Show that the system $3x + 4y + 5z = \alpha, 4x + 5y + 6z = \beta, 5x + 6y + 7z = \gamma$ is the consistent only when α, β, γ in arithmetic progression i.e. $2\beta = \alpha + \gamma$
4. Evaluate $\int \frac{x^2+1}{x^2-5x+6}\, dx$
5. Find $\int \left[\sqrt{cotx} + \sqrt{tanx}\,\right] dx$
6. If $y = \sin^{-1} x$ then show that $(1 - x^2)\,\frac{d^2y}{dx^2} - x\frac{dy}{dx} = 0.$
7. Is the function f defined by

$$f(x) = \begin{bmatrix} x & if\ x \le 1 \\ 5 & if\ x > 1 \end{bmatrix}$$

   Is continuous at $x = 0$? At $x = 1$? At $x = 2$?
