



P. E. S. College of Engineering, Mandya - 571401

(An Autonomous Institution Affiliated to VTU, Belagavi)

Department of Mathematics

Assignment - II

Linear Algebra and Analysis (VI semester)

(Common to all Branches)



Sl. No.	Questions	CO's	PO's
1	Find the rank of the following matrix by reducing it to normal form $A = \begin{bmatrix} 1 & 2 & 2 & 0 \\ 2 & 5 & 3 & 1 \\ 3 & 8 & 4 & 2 \\ 2 & 7 & 1 & 3 \end{bmatrix}$	CO2	PO1
2	Find the inverse of the matrix $A = \begin{bmatrix} 1 & 3 & -4 \\ 1 & 5 & -1 \\ 3 & 13 & -6 \end{bmatrix}$	CO2	PO2
3	Find the characteristic equations and the inverse of the matrix $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 13 & 1 & 1 \end{bmatrix}$	CO2	PO2
4	Find the minimal polynomial of the matrix $A = \begin{bmatrix} 7 & 4 & -1 \\ 4 & 7 & -1 \\ -4 & 6 & 4 \end{bmatrix}$	CO2	PO1
5	Solve the wave equation $\frac{\partial^2 u}{\partial t^2} = 4 \frac{\partial^2 u}{\partial x^2}$ subject to $u(0, t) = 0, u(5, t) = 0$ $u_t(x, 0) = 0$ and $u(x, 0) = x^2(x - 5)$ by taking $h = 1$ for $0 \leq t \leq 1$.	CO3	PO1
6	Solve $u_t = u_{xx}$ subject to the conditions $u(0, t) = 0, u(1, t) = 0, u(x, 0) = \sin(\pi x)$ for $0 \leq t \leq 0.1$ by taking $h = 0.2$. Write down the following values from the table a) $u(0.2, 0.04)$ b) $u(0.4, 0.08)$	CO3	PO1
7	Solve the elliptic equation $u_{xx} + u_{yy} = 0$ for the square mesh of the following figure with boundary values as shown.	CO3	PO2
8	Solve $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$ in $0 < x < 5, t \geq 0$ given that $u(x, 0) = 20, u(0, t) = 0, u(5, t) = 100$. Compute u for time step with $h = 1$ by Crank – Nicholson Method.	CO3	PO2

