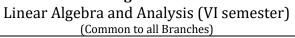
**Subject code: P18MA0651** 



## P. E. S. College of Engineering, Mandya - 571401 (An Autonomous Institution Affiliated to VTU, Belagavi)

## Department of Mathematics Assignment - II







| 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  | P01  |
| 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 $0 \le t \le 1$ .                        | CO3  | P01  |
| 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 $0 \le t \le 0.1$ 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  | P01  |
| 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 $0 < x < 5$ , $t \ge 0$ given that $u(x, 0) = 20$ , $u(0, t) = 0$ , $u(5, t) = 100$ .<br>Compute $u$ for time step with $h = 1$ by Crank – Nicholson Method. | CO3  | PO2  |