

Roll No.

Total Pages : 3

CBTP/M-20

16141

MATHEMATICS-II

Paper-205

Time : Three Hours]

[Maximum Marks : 60

Note : Attempt *five* questions in all, selecting at least *one* question from each unit.

UNIT-I

1. (a) Using the Gauss-Jordan method, find the inverse of

the matrix
$$\begin{vmatrix} 1 & 1 & 3 \\ 1 & 3 & 3 \\ 2 & 4 & 4 \end{vmatrix}$$
 6

- (b) Find the eigen values and eigen vectors of the matrix

$$\begin{vmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{vmatrix}$$
 6

2. (a) Using Cayley-Hamilton theorem. Find A^8 if

$$A = \begin{vmatrix} 1 & 2 \\ 2 & 1 \end{vmatrix}$$
 6

- (b) Find the values of l and μ for which the equations $x + l y + z = 3$; $x + 2y + 2z = \mu$; $x + 5y + 3z = 9$ are consistent. When will these equations have unique solution ? 6

UNIT-II

3. (a) Solve $\frac{d^2y}{dx^2} - 2 \frac{dy}{dx} - y = xe^x \sin x$. 6
- (b) Solve by the method of variations of parameters $yc'' - 2y' + y = e^x \log x$. 6
4. (a) Find the orthogonal trajectories of the curve $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$, where l is a parameter. 6
- (b) Solve $(x^2 - ay)dx - (ax - y^2)dy = 0$. 6

UNIT-III

5. (a) Prove that $\int_0^{\infty} \frac{e^{-t} - e^{-3t}}{t} dt = \log 3$. 6
- (b) Find the inverse transform of $\log \frac{1-s}{s}$. 6

6. (a) Evaluate $\int_0^{\pi} e^t \sin^4 t \, dt$. 6

(b) Find L.T. of $f(t) = \begin{cases} 4, & 0 \leq t \leq 3 \\ 2, & t > 3 \end{cases}$. 6

UNIT-IV

7. (a) Obtain a P.D.E. by eliminating the arbitrary functions from $z = f(x - ay) + g(x + ay)$. 6

(b) Solve $z(p - q) = z^2 + (x + y)^2$. 6

8. Solve $p = (qy + z)^2$ by Charpit's method. 12
