Name. _____	**Printed Pages:01**
Student Admn. No.: _____	

School of Basic Sciences

Back Paper Examination Even Semester (Non - Graduating Batches) – June 2024

[Programme: B.Sc. PCM][Semester: II) [Batch:]

Course Title: Matrices and Differential Equation & Geometry	**Max Marks: 100**
Course Code: B030201T	**Time: 3 Hrs.**

Instructions:

1. *All questions are compulsory.*
2. *Assume missing data suitably, if any.*

		K Level	COs	Marks
	SECTION-A (15 Marks) **5 Marks each**			
1.	Find the general solution of the D.E. $\frac{d^5y}{dx^5}-\frac{d^3y}{dx^3}=0$		CO1	5
2.	Find the value of k if the matrix $\begin{pmatrix} k & 1 & 2 \\ 0 & -1 & 5 \\ 2 & 0 & 1 \end{pmatrix}$ is singular		CO1	5
3.	Find the equation of a plane through P(a, b, c) & perpendicular to OP where O is an origin ?		CO2	5
	SECTION-B (40 Marks) **10 Marks each**			
4.	Derive the polar equation of a conic whose focus being at pole.		CO2	10
5.	Solve the differential equation $\frac{dy}{dx}=\frac{x^3+y^3}{xy^2}$		CO3	10
6.	Test the consistency and hence solve the following set of equations x+2y+z=6, 3x+y-2z=1, 4x-3y-z=3, 2x+4y+2z=4		CO3	10
7.	Determine the rank of the matrix $A=\begin{bmatrix} 1 & 3 & 4 & 3 \\ 3 & 9 & 12 & 9 \\ 1 & 3 & 4 & 1 \end{bmatrix}$		CO3	10
	SECTION-C (45 Marks) **15 Marks each**			
8.	Trace the conic $x^2-3xy+y^2+10x-10y+21=0$		CO4	15
9.	A variable plane is at a constant distance *P* from origin *O* and meets the axes in A,B,C. Show that the locus of the centroid of tetrahedron OABC is $\frac{1}{x^2}+\frac{1}{y^2}+\frac{1}{z^2}=\frac{16}{p^2}$		CO4	15
10	Solve the method of variation of parameters $\frac{d^2y}{dx^2}-2\frac{dy}{dx}=e^x\sin x$		CO4	15