Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

Make Up Examinations – December 2025

Date: 26 – 12- 2025 **Time:** 1.00pm to 04.00pm

School: SOE	**Program:** B.Tech	
Course Code : MAT2071	**Course Name:** MATHEMATICS FOR ENGINEERS	
Semester: MK	**Max Marks**: 100	**Weightage**: 50%

CO - Levels	CO1	CO2	CO3	CO4	CO5
Marks	29	14	24	19	14

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks. **10Q x 2M=20M**

1.	If 3,6,9 are the eigen values of A then list the eigen values of A^{-1} .	**2 Marks**	**L1**	**CO1**
2.	Find the sum and product of the Eigen values of $\begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$.	**2 Marks**	**L1**	**CO1**
3.	Is $u = x^3 + y^3 - 2xy^2$ homogeneous function or not? If yes, then identify the degree of u.	**2 Marks**	**L1**	**CO2**
4.	Define Jacobian of x , y and z with respect to u , v and w	**2 Marks**	**L1**	**CO2**
5.	Find the Laplace transform of 2 sin2t + 4cos2t.	**2 Marks**	**L1**	**CO3**
6.	Find the inverse Laplace transform of $\frac{2}{s+3}+\frac{3}{s^2+9}$	**2 Marks**	**L1**	**CO3**
7.	What is the Z- transform of $\sin n\theta$	**2 Marks**	**L1**	**CO4**
8.	Find the inverse Z- transform of $\frac{4z}{(z-4)^2}$	**2 Marks**	**L1**	**CO4**
9.	Solve $(D^2+3D+2)y=0$	**2 Marks**	**L1**	**CO5**
10.	If the roots are -2 and 3, what is the complementary function?	**2 Marks**	**L1**	**CO5**

Part B

Answer the Questions. **Total Marks 80M**

11.	**a.**	**Find the coefficient of correlation between the heights of brothers(x) and sisters(y) from the following data and also regression lines** x: 65, 66, 67, 68, 69, 70, 71 y: 67, 68, 66, 69, 72, 72, 69	**10 Marks**	**L3**	**CO1**
		Or			
12.	**a.**	Estimate the solution of the following system of equations by Gauss elimination method. $x+y+z=9,\ x-2y+3z=8,\ \ 2x+y-z=3$	**10 Marks**	**L3**	**CO1**
13.	**a.**	Compute the extreme values of the function $f(x,y)=x^3+y^3-3x-12y+20$.	**10 Marks**	**L3**	**CO2**
		Or			
14.	**a.**	Compute the extreme values of the function $f(x,y)=x^2+y^2-4xy+2x-2y$.	**10 Marks**	**L3**	**CO2**
15.	**a.**	**Solve** $(D^2+5D+6)y=2e^{-x}$ **.**	**10 Marks**	**L3**	**CO5**
		Or			
16.	**a.**	Solve $(D^2-6D+9)y=6e^{3x}$.	**10 Marks**	**L3**	**CO5**
17.	**a.**	Compute the Eigen values and Eigen vectors of the matrix $\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$	**15 Marks**	**L3**	**CO1**
		Or			
18.	**a.**	Compute the Eigen values and Eigen vectors of the matrix $\begin{bmatrix} 2 & -3 & 0 \\ 2 & -5 & 0 \\ 0 & 0 & 3 \end{bmatrix}$	**15 Marks**	**L3**	**CO1**
19.	**a.**	Solve $y_{n+2}+6y_{n+1}+9y_n=0$ with $y_0=0, y_1=1$ using Z-transform method.	**15 Marks**	**L3**	**CO4**
		Or			
20.	**a.**	Solve $y_{n+2}+6y_{n+1}+9y_n=2^n$ with $y_0=0, y_1=0$ using Z-transform method.	**15 Marks**	**L3**	**CO4**

21.	**a.**	Use Laplace transform technique to solve $y''(t)-2y'(t)+y(t)=e^t$ with y(0)=0, y'(0)=-1	**20 Marks**	**L3**	**CO3**
		Or			
22.	**a.**	Use Laplace transform technique to solve $y''(t)+2y'(t)+y(t)=e^t$ with y(0)=y'(0)=0	**20 Marks**	**L3**	**CO3**