	Reg. No.:	
	Name :	

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MID TERM EXAMINATIONS – April 2023

Programme	:	**B.Tech.**	Semester	:	**Summer 2022-23**
Course Title	:	**Differential And Difference Equations / MAT 2001**	Slot	:	**C11+C12+C13+C14+C15**
Time	:	**1 ½ hours**	Max. Marks	:	**50**

Answer all the Questions

Q.No.	Sub. Sec.	Question Description	Marks
1		Show that the matrix $A = \begin{bmatrix} -1 & 1 & 2 \\ 0 & -2 & 1 \\ 0 & 0 & -3 \end{bmatrix}$ is diagonalizable. If yes then find diagonalizing matrix P and if not then give the reason of your answer.	**10**
2		Calculate Eigen values and Eigen vectors for the following matrix: $A = \begin{bmatrix} -1 & 2 & -2 \\ 1 & 2 & 1 \\ -1 & -1 & 0 \end{bmatrix}$	**10**
3		Obtain the Fourier series for $f(x) = 0, -2 < x < -1$ $= 1 + x, -1 < x < 0$ $= 1 - x, 0 < x < 1$ $= 0, 1 < x < 2.$	**10**
4		Find half range cosine series for the function $f(x) = (x-1)^2$,in the interval $0 < x < 1$ and deduce that $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \cdots \ldots \ldots = \frac{\pi^2}{6}$	**10**
5		Find the Fourier Transform of F(x) ,is $f(x) = \begin{cases} 1, \lvert x \rvert < a \\ 0, \lvert x \rvert > a \end{cases}$ And hence evaluate $\int_{-\infty}^{\infty} \frac{\sin sacos\ sx}{s}\, dx.$	**10**

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