MATHACHAN.
UNIVERSITY

School: School of Engineering and Technology
Program/s: BTech CE, ME, EEE
Year: 1st **Semester:** 1st
Examination: End Semester Examination
Examination year: November 2023

Course Code:	CME101	Course Name:	Mathematics I		
Date:	22/11/2023			Total Marks:	40
Time:	10:00 am to 12:00 noon			Total Pages:	1

Instructions:

➔ *Write each answer on a new page.*
➔ *Use of a calculator is permitted.*

Q. No.	Details	Marks	CO'S	BTL
Q.1	Attempt the following:		CO1, CO2, CO3	1,2,3
[1]	Solve the equation for x, y, z and t, if $2\begin{bmatrix} x & z \\ y & t \end{bmatrix} + 3\begin{bmatrix} 1 & -1 \\ 0 & 2 \end{bmatrix} = 3\begin{bmatrix} 3 & 5 \\ 4 & 6 \end{bmatrix}$	[04]		
[2]	Evaluate $\int_{-1}^{0} (x^3 - 2)\, dx$	[02]		
[3]	If $f(x,y) = xy^2 + e^{xy}$, then find $\partial f/\partial x$, $\partial f/\partial y$ at (1,0).	[04]		
Q.2	Attempt **ANY FIVE** of the following: [6 marks each]	[30]	CO1, CO2, CO3	1,2,3,5
[1]	Solve the following system of equation using Gauss elimination method: $x + 2y + z = 3, \quad 2x + 5y - z = -4, \quad 3x - 2y - z = 5$			
[2]	Find eigen values and eigen vectors of matrix $\begin{bmatrix} 10 & 2 \\ 2 & 7 \end{bmatrix}$.			
[3]	Find the directional derivatives of the function $\emptyset = x^2 - y^2 + 2z^2$, at the point (1,2,3) in the direction of $\vec{a} = 4\,\hat{\imath} - 2\,\hat{\jmath} + \hat{k}$.			
[4]	Evaluate $\int_0^2 \int_0^{2x} (1 + x + xy)\, dy\, dx$			
[5]	Find the work done when a force $\vec{F} = (x^2 - y^2 + x)\hat{\imath} - (2xy + y)\,\hat{\jmath}$ displaces a particle in the xy plane from (0,0) to (1,1) along the curve $y = x$.			
[6]	If $\vec{f} = (x^2 y)\hat{\imath} + (yz^3)\hat{\jmath} - (zx^3)\hat{k}$, find $grad(div\,\vec{f})$ at point (1, -1, 0).			

************End of Question Paper************