GOVT. MODEL ENGINEERING COLLEGE, THRIKKAKARA
(*Managed by IHRD, A Govt. of Kerala Undertaking*)
DEPARTMENT OF APPLIED SCIENCE
B. TECH DEGREE COMPUTER SCIENCE AND ENGINEERING FIRST SEMESTER
FIRST INTERNAL EXAMINATION - JANUARY 2021

Slot: A **MAT 101** **Linear Algebra and Calculus** **Academic Year:2020-21**

Duration: 1½ hrs. ***Max. Marks:50*** ***Faculty Name : Suja N Thomas***

Answer All Questions

Q. No.	Questions	Cognitive level	CO	Marks
1.	Find the rank of $A = \begin{bmatrix} 1 & 5 & 4 \\ 0 & 3 & 2 \\ 2 & 3 & 10 \end{bmatrix}$.	Understand	1	3
2.	Determine μ such that the homogeneous system 2x+y+2z=0: x+y+3z=0; 4x+3y+μz=0 have a non-trivial solution.	Understand	1	3
3.	Check whether the vectors x_1=(2,-1,3,2),x_2=(1,3,4,2) and x_3=(3,-5,2,2) are linearly independent or not.	Understand	1	3
4.	Write a diagonal matrix similar to C = $\begin{pmatrix} 4 & 1 \\ 2 & 3 \end{pmatrix}$	Understand	1	3
5.	Find $\frac{\partial^3 u}{\partial x \partial y \partial z}$ if u = $e^{x^2+y^2+z^2}$	Remember	2	3
6.	Solve the system of equations x +y-z = 0 ; 2x-y+z = 3 ; 4x+2y-2z = 2.	Apply	1	7
7.	Let A= $\begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & -3 & 3 \end{bmatrix}$. (a) Determine the algebraic and geometric multiplicity of Eigen values of A.(b) Find the Eigen Space corresponding to Eigen values.(c) Write the Dimension and Basis of Eigen Spaces.	Analyse	1	7
8.	Reduce to Canonical form and identify the type of conic, nature of the Quadratic form x_1^2+4 x_2^2+ x_3^2-4x_1x_2+2x_3x_1-4x_2x_3..	Analyse	1	7
9.	The legs of a right triangle are measured to be 3cm and 4cm with a maximum error of 0.04cm in each measurement. Use differentials to estimate the maximum possible error in calculated value of area of triangle.	Evaluate	2	7
10	Show that the local linear approximation of $e^{2x}\sin y$ at (0,0) is y.	Apply	2	7


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