



R20 Regulation

Subject code: 3B1AJ

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech I Semester Supplementary Examinations, June 2024

LINEAR ALGEBRA CALCULUS & ORDINARY DIFFERENTIAL EQUATIONS
(ECE)

Maximum Marks: 70

Date:25.06.2024 Duration: 3 hours

- Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks		(10X2M=20 Marks)	CO	Bloom Tx
1	Find the rank of the matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & -1 & 0 \\ 1 & 1 & 1 \end{bmatrix}$		1	L1
2	Define symmetric matrix.		1	L1
3	If ' λ ' is an Eigen value of the matrix A then ' λ ' is also an Eigen value of A^T		2	L1
4	Find the nature of the Quadratic form $Q = x^2 + 2y^2 + 2z^2 - 2xy + 2xz - 2yz$		2	L1
5	Find I. F. of $2xydy - (x^2 + y^2 + 1)dx = 0$		3	L1
6	Define linear differential equation		3	L1
7	Solve $(D^2 - 2D + 4)y = 0$		4	L1
8	Find General solution of $(D^3 + 2D^2 + D)y = 0$		4	L1
9	Find the value of the integral $\int_0^\infty \int_0^\infty e^{-x^2(1+y^2)} x dx dy$		5	L1
10	Evaluate $\int_0^1 \int_0^2 (x^2 + y^2) dy dx$		5	L1

Part-B

Answer All the following questions.		(10M X 5=50Marks)		
11	Find the rank of the matrix by reducing to Normal form where $A = \begin{bmatrix} 2 & 3 & 1 & 4 \\ 5 & 2 & 3 & 0 \\ 9 & 8 & 0 & 8 \end{bmatrix}$ [10]		1	L2
OR				
12	For what values of μ does the following system of equations possess a nontrivial solution? Obtain the solutions for real values of μ . $3x + y - \mu z = 0; 4x - 2y - 3z = 0; 2\mu x + 4y - \mu z = 0.$ [10]		1	L2

13	Determine the Eigen values and Eigen vectors of the following matrices ; $A = \begin{bmatrix} 1 & 1 & 1 \\ -1 & -3 & -3 \\ 2 & 4 & 4 \end{bmatrix}$ [10]	2	L2
OR			
14	Determine the Eigen values and Eigen vectors of the following matrices $A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$ [10]	2	L2
15	Solve $(1 + y^2) + (x - e^{\tan^{-1}y}) \frac{dy}{dx} = 0$ [10]	3	L2
OR			
16	Solve $3 \frac{dy}{dx} - y \cos x = y^4 (\sin 2x - \cos x)$ [10]	3	L2
17	Solve $(D^3 - 6D^2 + 11D - 6)y = e^{-2x} + e^{-3x}$ [10]	4	L2
OR			
18	Solve $(D^3 - 7D^2 + 14D - 8)y = e^x \cos 2x$ [10]	4	L2
19	By change the order of integration, evaluate $\int_0^1 \int_1^{2-x} xy dx dy$ [10]	5	L2
OR			
20	Evaluate $\iint (x^2 + y^2) dx dy$ in the positive quadrant for which $x+y \leq 1$ [10]	5	L2