R18 Regulation *Subject code: 2B2AA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech II Semester Supplementary Examinations, June 2024

Engineering Mathematics-II

(Common to CE,EEE,ME,ECE,CSE & IT)

Maximum Marks: 70 Date:24.06.2024 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 which carries 10M.
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	Solve $(x^2 + y^2)\,dx + 2xy\,dy = 0$	1	L1
2	Find the orthogonal trajectories of the family of curves y=mx	1	L1
3	Solve $(D^2 + 9)\,y = 0$	2	L1
4	Find the P.I of f(D) y = Q(x) where Q(x) = Sin bx (or) Cos bx,where 'b' is a constant.	2	L1
5	Find $L\{cos^{\square} 4t\}$	3	L1
6	Find $L^{-1}\{1/s\}$	3	L1
7	Find $\nabla(x^2 + y^2z)$	4	L1
8	Prove that $\bar{F} = yzi + zxj + yxk$ is irrotational.	4	L1
9	If $\bar{F} = 3xyi - y^2j$ evaluate $\int_c^{\square} \bar{F}.d\bar{r}$ where 'c' is the curve $y = 2x^2$ in the xy-plane From (0,0) to (1,2)	5	L1
10	State Green's theorem.	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)			
11	Solve $xy(1 + xy^2)\,dy/dx = 1$ [10M]	1	L2
	OR		
12	The number 'N' of bacteria in a culture grew at a rate proportional to 'N'. The value of 'N' was initially 100 and increased to 332 in 1 hour. What was the value of 'N' after 1.5 hours? [10M]	1	L2
13	Solve $(D^2 - 4D + 4)\,y = 8x^2 e^{2x} \sin 2x$ [10M]	2	L2
	OR		
14	$(x+1)^2\frac{d^2y}{dx^2} - 3(x+1)\frac{dy}{dx} + 4y = x^2 + x + 1$ [10M]	2	L2
15	Find Laplace transform of $te^{3t}cos2t$ [10]	3	L2

	OR		
16	Find Inverse Laplace transform of $\frac{3s+7}{s^2-2s-3}$. [10]	3	L2
17	(a) Prove that $\nabla(r^n) = nr^{n-2}\bar{r}$ [5M] (b) Find the directional derivative of $\emptyset(x,y,z) = x^2yz + 4xz^2$ at the point (1,-2,-1) in the direction of the normal to the surface $f(x,y,z) = xlogz - y^2$ at (-1,2,1). [5M]	4	L2
	OR		
18	Show that the vector $(x^2 - yz)i + (y^2 - zx)j + (z^2 - xy)k$ is irrotational and find its scalar potential. [10M]	4	L2
19	If $\bar{F} = (2x^2 - 3z)i - 2xyj - 4xk$ then evaluate $\int_v \nabla.\bar{F}dv$ where 'v' is the closed region bounded by x=0, y=0, z=0, 2x+2y+z=4 [10M]	5	L2
	OR		
20	Verify Stoke's theorem for $\bar{F} = yi + zj + xk$ and surface is the part of sphere $x^2 + y^2 + z^2 = 1$ above the xy-plane. [10M]	5	L2