R20 Regulation *Subject code: 3B2AE*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech II Semester Supplementary Examinations, June 2024

ORDINARY DIFFERENTIAL EQUATIONS, TRANSFORMS & VECTOR CALCULUS

(EEE)

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.
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	Define Integrating factor.	1	L1
2	State Newton's law of cooling.	1	L1
3	Find General solution of $(D^3 + 2D^2 + D)y = 0$.	2	L1
4	Find P.I of $(D^2+6D+9)Y = 2e^{-3x}$.	2	L1
5	State and prove first shifting theorem.	3	L1
6	Find L $\{e^{-t}(3cos5t - 4sin5t)\}$.	3	L1
7	Define divergence of a vector point function.	4	L1
8	Prove that curl grad $\emptyset = 0$.	4	L1
9	State stoke's theorem.	5	L1
10	Define surface integral.	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)			
11	Solve $3\frac{dy}{dx} - ycosx = y^4(sin2x - cosx)$. (10M)	1	L2
	OR		
12	A Bacterial culture , growing exponentially, increases from 100 to 400 grams in 10 hours. How much was present after 3 hours. (10M)	1	L2
13	Solve $(D^2 - 4D)y = x^2sin2x$. (10M)	2	L2
	OR		
14	Solve by the method of variation of parameters $(D^2 + a^2)y = secax$. (10M)	2	L2
15	Evaluate L$\left\{\int_0^t te^{-t}sin4tdt\right\}$. (10M)	3	L2
	OR		

16	Find $L^{-1}\left[\frac{s^2}{(s^2+a^2)(s^2+b^2)}\right]$ using convolution theorem. (10M)	3	L2
17	Prove that $div(\emptyset\bar{a}) = (grad\emptyset).\bar{a} + \emptyset\, div\bar{a}$. (10M)	4	L2
	OR		
18	Prove that $\nabla x(\nabla x\bar{a}) = \nabla(\nabla.\bar{a}) - \nabla^2\bar{a}$. (10M)	4	L2
19	Verify gauss divergence theorem for $F = x^3\bar{\imath} + y^3\bar{\jmath} + z^3\bar{k}$ taken over the cube bounded by x=0,x=a,y=0,y=a,z=0,z=a. (10M)	5	L2
	OR		
20	Find the work done by $\bar{f} = 3x^2\bar{\imath} + \bar{\jmath} + 2z\,\bar{k}$ along the straight line from (0,0,0) to (2,1,3). (10M)	5	L2