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 2026

ENGINEERING MATHEMATICS-II

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

Maximum Marks: 70 Date: 15.06.2026 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)	Marks	CO	BTL
1	State Law of natural growth and decay.	2M	1	L1
2	State the condition for the differential equation Mdx+Ndy=0 to be an exact differential equation.	2M	1	L1
3	Solve $(D^2+D+1)y=0$	2M	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.	2M	2	L1
5	Write the formula of $L(t^n)$,where n is a positive integer.	2M	3	L1
6	State Convolution theorem in Laplace transforms.	2M	3	L1
7	Define curl of a vector point function.	2M	4	L1
8	Define solenoidal function.	2M	4	L1
9	Write the statement of Stokes's theorem.	2M	5	L1
10	Which vector integral theorem gives a relation between surface and volume integrals.	2M	5	L1

Part-B

	Answer All the following questions. (5X10M=50Marks)	Marks	CO	BTL
11	Apply the law of natural growth: Bacteria in a culture grows exponentially so that the initial number is doubled in 3hrs. How many times the initial number will be present after 9hrs?	10M	1	L2
	OR			
12	Solve $\frac{dy}{dx} + x\sin 2y = x^3 cos^2 y$	10M	1	L2
13	Solve $x^2\frac{d^2y}{dx^2} + 4x\frac{dy}{dx} + 2y = x^2 + \frac{1}{x^2}$	10M	2	L2
	OR			
14	Solve$(D^2 + D + 1)y = xsinx$	10M	2	L2
15	Using convolution theorem, find the inverse Laplace transform of $\frac{1}{(s^2+4)(s+1)^2}$	10M	3	L2
	OR			

16	Solve the D.E $\frac{d^2x}{dt^2}$ - 4 $\frac{dx}{dt}$ -12x = e^{3t} given that x(0)=1 and x^1(0)= -2 by using Laplace Transforms.	10M	3	L2
17	Prove 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
	OR			
18	Prove that $\nabla^2[f(r)] = \frac{d^2f}{dr^2} + \frac{2}{r}\frac{df}{dr} = f''(r) + \frac{2}{r}f'(r)$, where r=$\|\bar{r}\|$	10M	4	L2
19	Verify Stoke's theorem for $\bar{F}$ = y$^2\bar{\imath}$ - 2xy $\bar{\jmath}$ taken round the rectangle bounded by x = ± b , y = 0 , y = a.	10M	5	L2
	OR			
20	Evaluate the Line integral $\int_c [(x^2 + xy)dx + (x^2 + y^2)dy]$ where 'c' is the square formed by the lines x= ±1 and y = ±1	10M	5	L2