



R18 Regulation

Subject code:2B2AA

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech II Semester Supplementary Examinations, January 2026

ENGINEERING MATHEMATICS-II

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

Maximum Marks: 70

Date: 08.01.2026

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	Define Linear Differential equation.	2M	1	L1
2	Check whether the differential equation $(x^2 + 2xy) dx + (y^2 + x^2) dy = 0$ is exact or not?	2M	1	L1
3	Solve $(D^2 + 9) y = 0$.	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 to solve: 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 will be the value of 'N' after 1.5 hours?	10M	1	L2
OR				
12	Solve $\frac{dy}{dx} + x \sin 2y = x^3 \cos^2 y$	10M	1	L2
13	Solve by the method of variation of parameters $(D^2 + a^2)y = \tan ax$	10M	2	L2
OR				
14	Solve $[(x + 2)^2 D^2 - (x + 2)D + 1]y = 3x + 4$	10M	2	L2
15	Make use of convolution theorem to evaluate $L^{-1} \left\{ \frac{1}{(s^2 + a^2)^2} \right\}$	10M	3	L2

	OR			
16	Make use of Laplace Transform to solve the differential equation $(D^2 + 4D + 4)y = e^{-t}$, Given that $y(0) = y'(0) = 0$	10M	3	L2
17	Define Divergence and curl of a vector point function. Prove that $\text{curl}(\bar{a} \times \bar{b}) = \bar{a} \text{div} \bar{b} - \bar{b} \text{div} \bar{a} + (\bar{b} \cdot \nabla) \bar{a} - (\bar{a} \cdot \nabla) \bar{b}$	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	Evaluate $\int_V (\nabla \times \bar{F}) dv$ where 'v' is the closed region bounded by $x=0, y=0, z=0, 2x+2y+z=4$ if $\bar{F} = (2x^2 - 3z)i - 2xyj - 4xk$	10M	5	L2
	OR			
20	Verify Green's Theorem for $\int_c [(xy + y^2) dx + x^2 dy]$, where c is bounded by $y = x$ and $y = x^2$	10M	5	L2