



R18 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

Subject code:2B2AA

B.Tech II Semester Supplementary Examinations, January 2024

ENGINEERING MATHEMATICS-II

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

Maximum Marks: 70

Date:19.01.2024 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 Solve $y^1 + \frac{y}{x} = x^2$
- 2 Find the orthogonal trajectories of the family $r = a\theta$
- 3 Solve $(4D^2 - 4D + 1)Y = 100$
- 4 Solve $\frac{d^4y}{dx^4} + 4y = 0$
- 5 State the first shifting theorem and find $L\{e^{-2t}\cos 3t\}$
- 6 Find $L^{-1}\left\{\log\left(\frac{s+6}{s+2}\right)\right\}$
- 7 Define Divergence of a Vector function
- 8 Prove that $\vec{F} = yzi + xj + yxk$ is irrotational.
- 9 State Stokes's theorem.
- 10 State Gauss divergence theorem.

CO1 L3

CO1 L3

CO2 L3

CO2 L3

CO3 L1

CO3 L3

CO4 L1

CO4 L3

CO5 L1

CO5 L1

Part-B

Answer All the following questions.

(5X10M=50Marks)

- 11 Solve $xy(1 + xy^2) \frac{dy}{dx} = 1$ [10]
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?
CO1 L3
- 13 Solve $D^2(D^2 + 4)y = 96x^2 + \sin 2x - k$ [10]
OR
- 14 Solve $(x^2 D^2 - 4xD + 6)y = x^2$ [10]
CO2 L3
- 15 Find the Laplace transform of $te^{-3t} \cos 4t$. [10M]
CO3 L3
- OR
- 16 Using Laplace Transform solve the differential equation
 $(D^2 + 4D + 4)y = e^{-t}$ Given that $y(0) = y'(0) = 0$
[10]
CO3 L3

- 17 Prove that the vector $(x^2 - yz)i + (y^2 - zx)j + (z^2 - xy)k$ is irrotational and find its scalar potential. [10] CO4 L3

OR

- 18 Find the directional derivative of the function $xy^2 + yz^2 + zx^2$ along the tangent to the curve $x = t, y = t^2, z = t^3$ at the point $(1,1,1)$. [10] CO4 L3

- 19 Evaluate the Line integral $\int_c [(x^2 + xy)dx + (x^2 + y^2)dy]$ where 'c' is the square formed by the lines $x = \pm 1$ and $y = \pm 1$. [10] CO5 L6

OR

- 20 Verify Stoke's theorem for $\vec{F} = yi + zj + xk$ and surface is the part of sphere $x^2 + y^2 + z^2 = 1$ above the xy-plane. [10] CO5 L4