R18 Regulation *Subject code:2B4AF*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, June 2026

NUMERICAL METHODS

(Common to CE& ME)

Maximum Marks: 70 Date:19.06.2026 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	Write the formula of Regula- falsi method	2M	1	L1
2	Define root of an equation.	2M	1	L1
3	Show that $(1-\nabla)(1+\Delta)=1$	2M	2	L1
4	Write Lagrange's interpolation formula	2M	2	L1
5	Write the formula of Simpsons 1/3 rule.	2M	3	L1
6	Write the formula of Trapezoidal rule	2M	3	L1
7	Write the formula for Taylor's series method	2M	4	L1
8	Write the formula for Modified Euler's method.	2M	4	L1
9	Write the Laplace equation and Poisson Equation for Elliptic Equations	2M	5	L1
10	What is the classification of the equation $f_{xx}+2f_{xy}+f_{yy}=0$.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Find a positive root of x^3-x-1=0 by bisection method.	10M	1	L2
	OR			
12	Using bisection method, find a positive real root of the equation $x = e^{-x}$, correct to 3 decimal places.	10M	1	L2
13	Given the values, y(5) = 150, y(7) = 392, y(11) = 1452, y(13) = 2366, y(17) =5202. Evaluate y(9) using Lagrange's formula.	10M	2	L2
	OR			
14	Use Newton forward interpolation formula to compute the pressure of the steam at temperature 142^{0}C from the following table :	10M	2	L2
15	Evaluate $\int_0^{\pi} \frac{sinx}{x} dx$ using n = 6, by a) Trapezoidal rule b) Simpson's 1/3 rule.	10M	3	L2
	OR			

temp	140	150	160	170	180
Pressure	3.685	4.854	6.302	8.076	10.225

16	Use Trepezoidal rule with n=4 to estimate $\int_0^1 \frac{1}{1+x^2}dx$	10M	3	L2
17	Solve $\frac{dy}{dx} = x^2 + y, y(0) = 1$ by Modified Eulers method and compute y(0.2), y(0.4).	10M	4	L2
	OR			
18	Using Taylor method, find an approximate value of y at x=0.2 for the DE. $y' - 2y = 3e^x, y(0) = 0$.	10M	4	L2
19	Evaluate the pivotal values of the equation $u_{tt}=16u_{xx}$, taking h=1 upto t=1.25. The boundary conditions are u(0,t)=u(5,t)=0,u_t(x,0)=0 and u(x,0)=x^2(5-x)	10M	5	L2
	OR			
20	Solve the partial differential equation $\nabla^2 u = -10(x^2 + y^2 + 10$ over the square with sides x=0=y,x=3=y with u=0 on the boundary and mesh length=1.	10M	5	L2