R20 Regulation *Subject code: 3B3AA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Supplementary Examinations, June 2026

NUMERICAL METHODS

(CE)

Maximum Marks: 70 Date:09.06.2026 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 about Bisection method	2M	1	L1
2	Find any two initial positive roots of the equation $xe^x = 2$	2M	1	L1
3	$\nabla = 1 - E^{-1}$	2M	2	L1
4	$(1 - \nabla)(1 + \Delta) = 1$	2M	2	L1
5	Evaluate $\int_0^1 x^3 dx$ by Trapezoidal Rule taking n=4.	2M	3	L1
6	Derive Newton's forward difference formula for dy/dx at x = x_0.	2M	3	L1
7	Evaluate $\int_0^{\pi/2} e^{sinx} dx$ taking h = π/6.	2M	4	L1
8	Solve by Eulers Method $y' + y = 0$ *given* $y(0) = 1$ *and find* $y(0.02)$	2M	4	L1
9	Write the Laplace equation and Poisson's Equation for Elliptic Equations.	2M	5	L1
10	Classify the equation $(1 + x^2)u_{xx} + (5 + 2x^2)u_{xy} + (4 + x^2)u_{yy}$=0	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Find a real root for x e^x = cosx, using Regula Falsi method	10M	1	L2
	OR			
12	Evaluate $\sqrt{28}$ to four decimal places by Newton's Raphson Method.	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	Find the value of y at x =1936 by using Gauss's Backward interpolation formula from the following table.	10M	2	L2

X	1901	1911	1921	1931	1941	1951
Y	12	15	20	27	39	52

15	Find the first and second derivitaves of the function tabulated below at the point x=1.5 X: 1.5, 2.0, 2.5, 3.0, 3.5, 4.0 Y: 3.375, 7.0, 13.625, 24.0, 38.875, 59.0	10M	3	L2
	OR			
16	*Evaluate* $\int_0^1 \sqrt{1+x^4}$dxmusing Simpson's 3/8 rule.	10M	3	L2
17	Given dy/dx = $-xy^2$, y(0) = 2 Compute y(0.2) in steps of 0.1 using modified Euler's method.	10M	4	L2
	OR			
18	Apply 4th order Runge-Kutta method to find y(0.1) & y(0.2) given $y' = xy + y^2$,y(0)=1.	10M	4	L2
19	Solve the equation $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$, subject to the initial condition u(x,0) = sinπx, $0 \leq x \leq 1$ *and the boundary conditions* $u(0,t) = 0, u(1,t) = 0$. Carry out computations for the two levels taking h=1/3, k=1/36	10M	5	L2
	OR			
20	Evaluate the pivotal values of the equation $u_{tt}=16u_{xx}$, taking h=1 up to 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