R18 Regulation *Subject code:2B4AF*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, July 2024

NUMERICAL METHODS
(Common to CE & ME)

Maximum Marks: 70 Date:31.07.2024 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 which carries 10M.
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	Find any two initial positive roots of the equation $e^x \sin x = 1$	1	L1
2	Define root of an equation	1	L1
3	If the interval of differencing is unity prove that $\Delta[x(x+1)(x+2)(x+3)]=4(x+1)(x+2)(x+3)$	2	L1
4	*Prove that* $(1+\nabla)(1-\Delta)=1$	2	L1
5	Write Stirling's formula to find the derivate of a function	3	L1
6	Write the Newton's Backward Difference formula to find the derivative of a function	3	L1
7	Find y(0.2) for $\frac{dy}{dx} = x - y, y(0) = 1$ Eulers method.	4	L1
8	Given $\frac{dy}{dx} = -xy^2, y(0) = 2, Compute\ y(0.1)$ using Eulers Method.	4	L1
9	What is the classification of the equation $f_{xx} + 2f_{xy} + f_{yy} = 0$	5	L1
10	Write Crank_Nicolson formula	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)			
11	Find a positive root of x^3-x-1=0 by bisection method. [10M]	1	L2
	OR		
12	Find a real root of the equation $x.\log_{10} x = 1.2$ which lies between 2 and 3 by Regula Falsi method. [10M]	1	L2
13	Use Lagranges interpolation formula to fit the unique polynomial P(x) of degree 2 or less such that P(1)=1, P(3)=27, P(4)=64 [10M]	2	L2
	OR		
14	Find y(25) using Gauss Forward Difference Formula to the following data $y_{20}=24$; $y_{24}=32$; $y_{28}=35$; $y_{32}=40$ [10M]	2	L2

15	Find f'(1.72) and f'(1.76) for the table given below [10M] x: 1.72 | 1.73 | 1.74 | 1.75 | 1.76 y: 0.17907 | 0.17728 | 0.17552 | 0.17377 | 0.17204	3	L2
	OR		
16	Dividing the range into 10 equal parts, find the approximate value of $\int_0^{\pi} sinx\,dx$ by (i) Trapezoidal Rule (ii) Simpson's Rule [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	Apply 4th order Runge-Kutta method to find y(0.1) & y(0.2) given $y' = x - y$, y(0)=1. [10M]	4	L2
19	Solve the Poisson equation $u_{xx}+u_{yy}$= -81xy , 0<x<1,0<y<1 given that u(0,y)=0,u(x,0)=0, u(1,y)=100, u(x,1)=100 and h=1/3 [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