Register Number:……..

B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2024

(Regulation 2018)

Fourth Semester

COMMON TO BT /FT /TXT

U18MAT4102: Numerical Methods

COURSE OUTCOMES

CO1: Solve a set of algebraic equations representing steady state models formed in engineering problems.
CO2: Fit smooth curves for the discrete data connected to each other or to use interpolation methods over these data tables.
CO3: Find the trend information from discrete data set through numerical differentiation.
CO4: Estimate integrals from discrete data through numerical methods.
CO5: Predict the system dynamic behaviour through solution of ODEs modeling the system.
CO6: Solve PDE models representing spatial and temporal variations in physical systems through numerical methods.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

1.	What is the condition for the convergence to solve cosx = 3x – 1 by iteration method.	CO1	[K_2]
2.	Solve the linear system 4x – 3y = 11, 3x + 2y = 4 by Gauss Jordon method.	CO1	[K_3]
3.	Write the normal equations to fit a second degree curve to a given data	CO2	[K_2]
4.	Write the Lagrangian Inverse Interpolation formula for values	CO2	[K_2]
5.	Write the Newton's forward difference formula for first and second derivative at x=xo.	CO3	[K_2]
6.	Form the divided difference table x: 1 2 7 8 y: 1 5 5 4	CO3	[K_3]
7.	Evaluate using trapezoidal rule	CO4	[K_3]
8.	Evaluate by using Simpson's one-third rule	CO4	[K_3]
9.	Apply fourth order Runge-Kutta method to find k_1, k_2 given .	CO5	[K_3]
10.	Write down the formula for one dimensional heat equation by Crank – Nicholson difference method	CO6	[K_2]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11. a) Obtain the largest eigen value and the corresponding eigen vectors of the matrix 8 CO1 [K4]

starting the initial vector by using power method.

b) Using Gauss elimination method find the solution of linear system 8 CO1 [K4]
by Gauss elimination method

12. a) Fit a straight line to the data given below. 8 CO2 [K4]

:	0	1	2	3	4
:	1	1.8	3.3	4.5	6.3

Also estimate the value of at

b) From the following table, estimate the number of students who obtained marks between 40 and 45 8 CO2 [K4]

Marks	30-40	40-50	50-60	60-70	70-80
No. of students	31	42	51	35	31

13. a) Find the first two derivatives of at x = 50 and x = 56 from the table: 10 CO3 [K4]

x	50	51	52	53	54	55	56
	3.6840	3.7084	3.7325	3.7563	3.7798	3.8030	3.8259

b) Evaluate , using trapezoidal rule. 6 CO4 [K4]

14. a) Given $y^1=1-y$, y (0) = 0. 16 CO5 [K4]
i) Find y (0.1) by Taylor series method.
ii) Find y (0.2) by Euler's method.
iii) Find y (0.3) by Improved Euler's method.
iv) Find y (0.4) by Milne's method.

15.	a)	Solve subject to with h=0.2 using Bender Schmidt method.	8	CO6	[K4]
	b)	Solve the following equation taking h=1and upto one half of the period of the oscillation ,	8	CO6	[K4]
16.	a)	Find the root between 1 and 2 of by Newton-Raphson method correct to three decimal places.	8	CO1	[K4]
	b)	Solve correct to two decimal places, at the nodal points of the following square grid, using the boundary values indicated.	8	CO6	[K4]

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