Avinashilingam Institute for Home Science and Higher Education for Women
Deemed to be University Estd. u/s 3 of UGC Act 1956, Category A by MHRD
Re-accredited with 'A++' Grade by NAAC. CGPA 3.65/4, Category I by UGC
Coimbatore-641 043, Tamil Nadu, India

Continuous Internal Assessment Test II – October 2024

Semester V

Class : III UG **Time : 2 Hours**
Branch : Maths **Max.Marks : 60**

21BMAC17 – Numerical Methods

Course Outcomes:

CO5: Find the solution for algebraic and transcendental equations.
CO4: Apply the knowledge of interpolation in analyzing the data.
CO5: Calculate numerical differentiation of data and functions.
CO4: Select appropriate numerical methods and apply them in various types of Engineering fields.
CO5: Solve ordinary differential equations using Taylor's series method.

PART-A
Circle the correct answer **6x1=6**

1. What is the order of accuracy of the trapezoidal rule? CO3K1
a. Linear b. Quadratic c. Cubic d. Exponential

2. In which of the following cases, Simpson's rule posses? CO3K1
a.Negatives b. Accuracy c. Positives d. Zero error

3. Which of the following is an iterative method? CO4K1
a. Gauss Seidel b. Gauss Jordan
c. Gauss Elimination d. Factorization

4. Which of the following is the advantage of using the Gauss Jordan method? CO4K1
a. Additional Calculations b. No labour of back substitution
c. More operations involved d. Elimination is easier

5. Numerical solutions of linear algebraic equations can be obtained by CO5K2
a. Euler's modified method b. Runge-Kutta method
c. Euler's method d. Taylor series method

6. The second-order Runge-Kutta method uses _____ as a predictor. CO5K1
a. backward order method b. forward Euler method
c. midpoint rule d. multipoint method

PART-B
Answer ALL questions **3x6=18**

7. a. From the table, find x, correct to two decimal places, for which y is maximum and find this value of y. CO3K3

x	y
1.2	0.9320
1.3	0.9636
1.4	0.9855
1.5	0.9975
1.6	0.9996

(or)

7. b. Derive Simpson's (3/8)-rule. CO4K1

8.a. Find the inverse of the matrix A = $\begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & 4 \\ 1 & 2 & 2 \end{bmatrix}$ using Gauss elimination. CO4K3

(or)

8.b. Solve the system by Gauss Jacobi method 10x-2y-z-w=3,-2x+10y-z-w=15, -x-y+10z-2w=27,-x-y-2z+10w=-9. CO4K3

9.a. Given the differential equation y″-xy′-y=0 with the conditions y(0) =1 and y′(0)=0, use Taylor's series method to determine the value of y(0.1). CO5K3

(or)

9.b. Solve by Euler's method for the differential equation y″=-y with the condition y(0) =1, choose h=0.01 and compute upto x=0.04. CO5K4

PART-C

Answer ALL questions **3x12=36**

10.a. Apply Trapezoidal and Simpson's rules to the integral I = $\int_0^1 (1-x^2)dx$ continually halving the interval h for better accuracy. CO3K2

(or)

10. b. Given $\frac{dy}{dx}$ = y-x, where y=2 when x=0, find y(0.1) and y(0.2) correct to four decimal places using Runge-Kutta second-order formula. CO5K3

11. a. Use Gauss Jordan method to solve the system 5x-2y+z=4, 7x+y-5z=8, 3x+7y+4z=10. CO4K3

(or)

11. b. Find the solution to four decimals, of the system 83x+11y-4z=95, 7x+52y+13z=104, 3x+8y+29z=71 using Gauss Seidel method. CO4K3

12. a. Given that $\frac{dy}{dx} - \sqrt{xy} = 2$, y(1)=1, find the value of y(2) in steps of 0.1 using Euler's modified method. CO5K5

(or)

12. b. Use the Runge-Kutta fourth-order method to find the value of y when x=1 given that y=1 when x=0 and that $\frac{dy}{dx} = \frac{(y-x)}{(y+x)}$. CO5K4

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