Bachelor of Science (B.Sc. I.T.) Semester-IV (C.B.S.) Examination

NUMERICAL METHODS

Paper-VI

Tim	e : T	'hree Hours] [Maximum Marks :	50
Not	e :	-(1) All questions are compulsory and carry equal marks.	
		(2) Assume suitable data wherever necessary.	
		(3) Draw neat and labelled diagram wherever necessary.	
	EIT	HER	
1.	(a)	Discuss the following with example :	
		(i) Transcendental Equation	
		(ii) Polynomial Equation.	5
	(b)	Derive the false position formula for finding a root of equation.	5
	OR		
	(c)	Find the root of the quadratic equation $f(x) = x^3 - 2x - 5 = 0$ which lies between 2 and 3 Bisection method.	by 5
	(d)	Find the roots of equation $f(x) = x^2 - 3x + 2$ in the vicinity of $x = 0$ using Newton Raphs	son
	method.	5	
	EIT	HER	
2.	(a)	Explain the Matrix Inversion method, in detail.	5
	(b)	Solve the following system of equation using Gauss Elimination method :	
		$2\mathbf{x} + \mathbf{y} + \mathbf{z} = 10$	
		3x + 2y + 3z = 18	
		$\mathbf{x} + 4\mathbf{y} + 9\mathbf{z} = 16$	5
	OR		
	(c)	Solve the system of equations by Gauss-Jordan method :	
		$2\mathbf{x} + \mathbf{y} + \mathbf{z} = 10$	
		3x + 2y + 3z = 18	
		$\mathbf{x} + 4\mathbf{y} + 9\mathbf{z} = 16$	5
	(d)	Solve the following system of equations using Gauss Elimination method with partial pivotin	ıg:
		$x_1 + 2x_2 + 3x_3 = 8$	
		$2x_1 + 4x_2 + 9x_3 = 8$	
		$4x_1 + 3x_2 + 2x_3 = 2$	5
	EIT	HER	
3.	(a)	Derive the formula for linear interpolation.	5
	(b)	Fit a straight line to the data given below :	
		x : 2 3 4 7 8 9 5 5	
		y : 9 6 5 10 9 11 2 3	5
	OR		
	(c)	Use the method of least square to fit a curve of the form $y = ab^x$ to the following data :	
		x : 1 2 3 4	
		y : 4 11 35 100	5
	(d)	What is multiple linear regression ? Explain.	5

1

EITHER

4. (a) What is numerical integration ? Derive the formula for Trapezoidal Rule.

(b) Find the value of
$$\int_{1}^{2} \frac{dx}{x}$$
 by using Simpson's 3/8 Rule where h = 0.25. 5

OR

(c) Give the initial value problem :

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$$\frac{dy}{dx} = y - x \text{ with } y(0) = 2$$

Find y (0.1) and y (0.2) by using Runge-Kutta Second Order method.

(d) Solve
$$\int_{0}^{6} \frac{dx}{1+x^2}$$
; using Simpson 1/3 Rule. Divide the interval into 6 subinterval. 5

5. Attempt All :

(a)	Derive the formula for Secant method.	21/2
(b)	Explain the existence of solution for linear equations.	21/2
(c)	State whether the following piecewise polynomial is spline or not ?	

$$f(x) = \begin{cases} x+1 & -1 \le x \le 0\\ 2x+1 & 0 \le x \le 1 \end{cases}$$
 2¹/₂

(d) What is Gaussian Integration ? Explain. 2¹/₂

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