Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA- SEMESTER– II• EXAMINATION – WINTER 2017

Subject Code: 2620004 Date: 03/01/2018

Subject Name: Computer Oriented Numerical Methods

Time:02:30pm TO 05:00pm Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** What is Total Numerical Error? Explain different types of numerical errors with suitable example. **07**

(b) Use Gauss-Seidel method to find the solution of the following system of equations. **07**

$$20x + 2y + z = 30$$
$$x - 40y + 3z = -75$$
$$2x - y + 10z = 30$$

Q.2 **(a)** Use bisection method to find the root of the equation $x^3 - 9x + 1 = 0$,in the interval[0,1], correct up to two significant digit accuracy. **07**

(b) Use false-position method to find a root of the equation x^2- 17 correct up to three significant digit accuracy. **07**

OR

(b) the polynomial equation $f(x)= 2x^3 - 5x + 1 = 0$,taking initial value as using Birge-Vieta Method up to two significant digit accuracy. **07**

Q.3 **(a)** Find the interpolation polynomial which takes following values by using Newton's Forward Difference Interpolation.(hint $x_0=0$, h=1) **07**

X	0	1	2	3	4	5
Y	41	43	47	53	61	71

(b) Fit a straight line y=ax + b to the following data by the method of least square. **07**

X	3.4	4.3	5.4	6.7	8.7	10.6
Y	4.5	5.8	6.8	8.1	10.5	12.7

OR

Q.3 **(a)** Derive an expression for Newton's Backward Difference interpolation formula with example. **07**

(b) Using Lagrange's Interpolation, find the value of f(0) at the table given below **07**

X	-1	-2	2	4
f(X)	-1	-9	11	69

Q.4 **(a)** Evaluate f(9) by using Newton's Divided Difference Interpolation Formula. **07**

X	5	7	11	13	17
Y	150	392	1452	2366	5202

(b) Find a root of equation $x^3 - 2x - 5 = 0$ using Secant Method correct to three significant digit accuracy. **07**

OR

Q.4 **(a)** Use Gauss-Elimination method to find the solution of the following system of equations, find x_1, x_2, x_3. **07**

$$x_1 + 2x_2 + x_3 = 0$$
$$2x_1 + 2x_2 + 3x_3 = 3$$
$$-x_1 - 3x_2 = 2$$

(b) Find out A+ B, A – B, 3A + 4B and 3A – 4B form given data, **07**

$$A = \begin{bmatrix} 1 & 3 & -2 \\ 4 & 6 & 7 \\ 2 & -5 & 0 \end{bmatrix} \qquad B = \begin{bmatrix} 10 & 5 & -4 \\ 0 & -7 & -8 \\ 9 & 11 & 6 \end{bmatrix}$$

Q.5 **(a)** The following table shows age(X) and blood pressure(Y) of 8 persons, obtain the Regression equation of Y on X and also find the expected blood-pressure of a person who is 49 years old. **07**

X	52	63	45	36	72	65	47	25
Y	62	53	51	25	79	43	60	33

(b) From the following data fit a straight line and parabola,also find which fit is More reliable. **07**

X	0	1	2	3	4
Y	1	5	10	22	38

OR

Q.5 **(a)** Apply Runge-Kutta 4^{th} order method to find y(0.1),if $dy/dx = x^2 + 2y$ **07**
$y(0) = -1, h = 0.1$

(b) Define any six type of matrix with example. **07**

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