Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER– II • EXAMINATION – WINTER 2016

Subject Code: 2620004 **Date:05/01/2017**

Subject Name: Computer Oriented Numerical Methods

Time:02.30 PM TO 05.00 PM **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) **Do as directed :** 07

(i) Find relative error for 3.14 as a approximation of 22/7
(ii) Round off four decimal digit: 0.00345575
(iii) True/False : Number of row and Number of column is always same in scaler matrix
(iv) Write the formula of A^{-1} (Assume A is a matrix).
(v) Define Symmetric and skew symmetric matrix with example.
(vi) Find positive root of $x^3 + 3x^2 - 27x + 25$ by discarte's Rule of sign.
(vii) Give any two names of closed iterative method & Open iterative method

(b) Determine the root of equation $x^4 - x - 10 = 0$ correct upto 3 place of decimal by using Bisection method 07

Q.2 (a) Determine the root of equation $e^x = 2x + 1$ correct upto 3 place of decimal by using Newton Raphson(NR) method. 07

(b) Determine the root of equation $f(x) = x - \cos x$ correct upto 3 place of decimal by using False position method (Perform 5 iterations only) 07

OR

(b) Find the root of the equation $x^3 + 2x^2 + 10x - 20 = 0$ using Birge-Vieta method (Take r0 = 1). Perform only three iterations. 07

Q.3 (a) The population of a certain town as obtained from census data is given in the following table : 07

Year	1931	1941	1951	1961	1971
Population	40.62	60.80	79.95	103.56	132.65

Find the rate of growth of the population in the year 1961.

(b) Fit a Straight line Y=aX+b by the method of Least square to the following data. 07

X	1	3	5	7	9
Y	1.5	2.8	4.0	4.7	6.0

OR

Q.3 (a) Using langrange's interpolation, find f (0) when the data are given in the following table. 07

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

(b) Find out y(0.05) by using Newton's appropriate interpolation method when y(0)= 1 ,y(0.1)= 0.9975 ,y(0.2)=0.9900 , y(0.3)=0.9980 07

Q.4 (a) Find $\int_0^4 (x^3 - 2x^2 + 1)\,dx$ using Trapezoidal rule and Simpson's $\frac{3}{8}$ rule taking h = 1 for both the cases. 07

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

OR

Q.4 (a) Find $\int_0^1 \frac{dx}{1+x}$ using Simpson's 1/3 rule by taking 10 sub intervals. 07

(b) Apply Gauss elimination method to find root of following linear equations. 07

$x + 2y + 3z = 4$
$x + y + z = 3$
$2x + 2y + z = 1$

Q.5 (a) Using Runge-Kutta method of order 2, find y for x=1 given that differential equation $dy/dx = y + x^2$, $y(0) = 1$ and h=0.5 07

(b) Find Transpose of matrix , Trace of matrix and Adjoint of following matrix 07

$$\begin{bmatrix} 3 & 7 & -2 \\ 2 & 3 & 1 \\ 4 & 5 & 9 \end{bmatrix}$$

OR

Q.5 (a) Find y(0.4) by using Milne's predictor corrector method when dy/dx= xy+1 & y(0)=1, y(0.1)=1.1053, y(0.2)=1.2229,y(0.3)=1.3552 07

(b) Find out cubic alpine for following data & also find out y(1.5) by cubic spline method when y(1)= – 6 ,y(2) = – 1 , y(3)= 16 07

****