Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Winter Examination-2015

Subject Name : COMPUTER ORIENTED MATHEMATICAL REASONING

Subject Code :4CS02IMR1 Branch : B.SC(INFORMATION TECHNOLOGY)

Semester :2 Date :19/11/2015 Time :10:30 To 01:30 Marks :70

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 **Attempt the following questions:** **(14)**

a) In gauss elimination method, the given system of simultaneous equations is transformed into ___

a. Diagonal
b. Identity
c. Lower triangular
d. Upper triangular

b) In false position method, the first approximation is given by___

a. $x_1 = \frac{bf(b) - af(a)}{f(b) - f(a)}$ b. $x_1 = \frac{af(b) - bf(a)}{f(b) - f(a)}$

c. $x_1 = \frac{bf(a) - af(b)}{f(a) - f(b)}$ d. $x_1 = \frac{af(a) - bf(b)}{f(a) - f(b)}$

c) Which of the following is an alternate name for method of false position?

a. Method of chords b. Method of tangents
c. Method of bisection d. Regula falsi

d) In solving simultaneous equations by Gauss Jordan method, the coefficient matrix is reduced to ____

a. Unit matrix
b. Diagonal matrix
c. Null matrix
d. Square matrix

e) Which of the following symbols is called forward difference operator ?

a. Δ
b. $\forall$
c. ∇

d. E

f) Two point Gaussian Quadrature formula is exact for polynomials up to degree

a. 3
b. 5
c. 2
d. 4
e.

g) Newton-Raphson method is applicable to the solution of

a. Both algebraic and transcendental equations
b. Both algebraic and transcendental and also used when the roots are complex
c. Algebraic equations only
d. Transcendental equations only

h) The secant method of finding root of nonlinear equations falls under the category of __ method.

a. Bracketing
b. Graphical
c. Open
d. Random

i) Which of the following is numerical integration methods ?

a. Trapezoidal
b. Newton forward
c. Newton backward
d. Bisection

j) Define : optimum solution

k) Define : interpolation

l) Give difference between Least cost method and north west corner method.

m) Write down the equation of bisection method.

n) $\Delta y1 =$ ____

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions**

(1) Apply Gauss- Elimination method to solve the following equations **(7)**

$x+y+z=6 \quad 2x-y+z=3 \quad 3x+y+z=8$

(2) Apply Gauss Jordan method to solve the following equations **(7)**

$x+y+z=6 \quad 2x+y+3z=13 \quad 3x+2y-z=4$

Q-3 **Attempt all questions**

(1) Obtain an initial basic feasibility solution to the following transportation problem by using Vogel's Approximation method. **(7)**

Origin	Destination				
	1	2	3	4	Available
O1	11	13	17	14	250
O2	16	18	14	10	300
O3	21	24	13	10	400
Requirement	200	225	275	250	

(2) Explain forward difference table and backward difference table. **(7)**

Q-4 **Attempt all questions** **(14)**

(1) From the following table, estimate the number of students who obtains marks between 40 and 50. **(5)**

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

(2) Apply newton backward method for finding out the no. of students who obtained marks 36 or more but less than 40. **(5)**

Marks less than	20	25	30	35	40
No. of students	20	45	115	210	225

(3) Find a root of the equation X3-3X-1=0 using false position method. **(4)**

Q-5 **Attempt all questions**

(1) Find the cubic polynomial which takes the following values, then evaluate at f(4) **(5)**

X	0	1	2	3
F(x)	1	2	1	10

(2) From the following data estimate the value of y when x=5 by langrage's interpolation. **(5)**

X	2	3	6
y	4	9	36

(3) Find a root of the equation X^3-2X-2=0 using bisection method **(4)**

Q-6 **Attempt all questions**

(1) Obtain an initial basic feasible solution to the following transportation table using north – west corner method **(5)**

Origin	Destination 1	2	3	4	Available
O1	7	9	3	2	16
O2	4	4	3	5	14
O3	6	4	5	8	20
Requirement	11	9	22	8	

(2) Obtain an initial basic feasible solution using least cost method **(5)**

Origin	Destination 1	2	3	4	Available
O1	7	9	3	2	16
O2	4	14	3	5	14
O3	16	5	5	8	20
Requirement	11	9	22	8	

(3) Evaluate $\sqrt{12}$ to four decimal places by Newton Raphson method. **(4)**

Q-7 **Attempt all questions**

(1) **(5)**

Evaluate $\int_0^1 x^3\,dx$ considering five sub intervals by using trapezoidal rule.

(2) Explain newton raphson method. **(5)**

(3) Draw the backward difference table from the following data. **(4)**

X	3	4	5	6	7	8	9
Y	4.8	8.4	14.5	23.6	36.2	52.8	73.9

Q-8 **Attempt all questions**

(1) **(5)**

Evaluate $\int_0^6 \frac{dx}{x^2+1}$ considering six sub intervals by using Simpson's 1/3 rule.

(2) Integrate the following data using Simpson's 3/8 rules. **(5)**

ans : 0.7412

X	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7
Y	1.543	1.669	1.811	1.971	2.151	2.352	2.577	2.828

(3) Explain secant method. **(4)**