

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, JUNE 2014

(CUCSS)

Computer Science

CSC 2E 08—NUMERICAL AND STATISTICAL METHODS

Time : Three Hours

Maximum : 36 Weightage

I. Answer *all* questions :

- 1 Classify errors.
- 2 What are iterative methods ? Give two examples.
- 3 Define Root of an equation.
- 4 What is a Pivot element ?
- 5 Define Interpolation. Mention any *two* methods.
- 6 What is a differential equation ?
- 7 Define Integration.
- 8 Define Conditional probability.
- 9 State Baye's theorem.
- 10 How do you detect unboundedness in Simplex method ?
- 11 How do you detect optimality for a minimization problem ?
- 12 What is an artificial variable ?

(12 x 1 = 12 weightage)

II. Answer any *six* questions :

- 13 Distinguish between Direct and Iterative methods.
- 14 Define Linear and Non-linear equations.
- 15 Distinguish between Interpolation and Extrapolation.
- 16 Define Finite and Divided differences.
- 17 Derive the formula for Heunn's polygon method of differential equation.
- 18 The probability of n independent events are P_1, P_2, \dots, P_n . Find the probability of atleast one of the event happening.

Turn over

19 A random variable x has a probability function $f(x) = kx^2$ for $0 < x < 3$
 $= 0$ otherwise. Find k .

20 Find the feasible solution using two-phase method to solve Max. $Z = 5x + 3y$ such that
 $2x + y < 1$, $x + 4y > 6$ and $x, y > 0$.

21 Obtain the initial basic feasible solution with North-West corner method for the data given below :

		Destination			Supply
		A	B	C	
Source	1	2	7	4	5
	2	3	3	1	8
	3	5	4	7	7
	4	1	6	2	14
Demand		7	9	18	34

(6 x 2 = 12 weightage)

III. Answer any *three* questions :

22 Derive Newton-Raphson's formula.

23 Explain linear interpolation.

24 Derive Gauss-Seidel formula.

25 Derive Runge-Kutta IVth order method formula.

26 (a) Three factories F_1, F_2, F_3 produce 1000, 4000 and 5000 parts of which 20, 40 and 50 are defective. All the parts are put in one stock pile. One is selected at random and found to be defective. What is the probability that it is from F_1 ?

(b) It has been claimed that in 20% of solar heat installations, the utility bill will be reduced by at least $1/3$ rd. Find the probability that the bill is reduced by $1/3$ rd in :

(i) 40 out of 100 installations.

(ii) At least 40 out of 100 installations.

27 Using the below profit matrix, determine optimal job assignment and the profit of the assignment :

		Job				
		1	2	3	4	5
Mechanic	A	10	3	3	2	8
	B	9		8	2	7
	C	7	5	6	2	4
	D	3	5	—	2	4
	E	9	10	9	6	10

(3 x 4 = 12 weightage)