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Name...

Reg. No...............................

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, JULY 2009

Computer Science

CS 205 D—NUMERICAL AND STATISTICAL METHODS

(2005 Admissions)

Time : Three Hours   Maximum : 80 Marks

Part A

Answer any five of the following. Each question carries equal marks.

1. **Discuss different types of errors in computing with examples.**

2. **Distinguish between False Position and Secant methods and hence develop an algorithm to solve a given non-linear equation by Secant method.**

3. **Discuss Ill-conditioned Systems of equations. Explain how it can be reduced.**

4. **Explain Differential equations. Derive an equation for the Runge – Kutta IV Order method.**

5. **a) For any two events   B, show that $P(A \cap B) \leq P(A) 5 P(A \cup B)$. Define conditional probability and verify the expression of conditional probability in an example.**   **(5)**
   b) The chances that Dr. A diagnosis a disease X correctly is 60%. Chances that a patient will die by his treatment after correct diagnosis is 40% and the chances of death by wrong diagnosis is 70%. A patient of Dr. A who had disease X died. What is the probability that his disease was diagnosed correctly?   **(^{3})**

6. **a) A shipment of 100 tape recorders contains 25 defectives. If 10 are randomly chosen, what is the probability that 2 are defective? Use two different formulae for** computing the answer. Compare & comment.   (5)
   b) Assume the mean height of soldiers to be 68.22 inches with variance of 10.8 inches. How many soldiers in a regiment of 2000 would you expect to be atleast 6ft tall? Assumed heights to be normally distributed.   (3)

7. Solve using graphical method. Min. $Z = 2x + y$ subject to $5x + 10y < 50$, $x + y > 1$, $y < 4$ and a 7 y are non negative.

                                                   (5 x 8 = 40 marks)

                                                   Turn over

PART – B

Answer any four of the following. Each question carries equal marks.

8. Derive an iterative formula for the method of Newton Raphson to find solution to non-linear equations. Also solve the given equation to an accuracy upto 3 decimal places.

$$f(x) = x^2 - 2x - 1$$

9. Discuss the method of Trapezoidal rule and hence find the area under the curve

$$\int_0^1 \frac{1}{1 + x^2} dx \text{ with 6 strips}$$

10. Solve the following equations by Gauss Seidel method

$$9x + 2y - 4z = 20$$
$$x + 10y + 4z = 6$$
$$2x - 4y + 10z = -15$$

11. Minimize $Z = 3x + 2y$ subject to $3x + y > 3$, $4x + 3y > 6$ and $x + y < 3$ given x, y > 0. Solve the above problem using dual simplex method.

12. A manager needs to assign 4 jobs to 4 workers. Cost of assignment is given in the following table. Find the optimal assignment.

Worker	Job			
	1	2	3	4
1	50	50	-	20
2	70	40	20	30
3	90	30	50	-
4	70	20	60	70

Worker 1 cannot do job 3 and Worker 3 cannot do job 4.

13. (a) Three boxes contain balls as follows

Box	White	Black	Red
1	2	1	2
2	3	2	4
3	4	3	2

A box is selected randomly and 2 balls are drawn successively. Find the probability that both are white (i) when $1s^t$ ball is replaced

(ii) when 1 ball is not replaced (4)

(b) Find mean and variance of exponential distribution (6)

[4 x 10 = 40 marks]