

(7 pages)

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M.C.A. DEGREE EXAMINATION, APRIL 2012.

Second Semester

Computer Applications

MFCS — II

(For those who joined in July 2008 and afterwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

1. What is operations Research?
2. Write the role of pivot element in simplex method.
3. Explain transportation problem.
4. Explain how the profit maximization transportation problem can be converted to an equivalent cost minimization problem.
5. Explain how the maximization assignment model can be solved.

6. Give any two properties of loops in T.P.
7. What is game?
8. How do you solve a game when saddle point exists?
9. State the order of convergence and the converse condition of Newton's raphson method.
10. State Newton's interpolation formula.

PART B — (5 × 5 = 25 marks)

Answer ALL questions choosing (a) or (b).

11. (a) A toy manufacturer produced two types o dolls : a basic version doll A and a deluxe version doll B. Each doll of type B takes twice as long to produce as one doll of type A. The company has time to make a minimum of 2000 dolls per day and each type requires equal amount of it type B required a fancy dress of which these are only 600 per day available. If the company makes a profit of Rs. 30 and Rs. 50 per doll respectively, on doll A and B; how many of each should be produced per day in order to maximize profit? formulate a linear programming model.

Or

- (b) Solve graphically the following LPP
Maximize $Z = 7x_1 + 3x_2$ subject to the constraints :

$$x_1 + 2x_2 \geq 3$$

$$x_1 + x_2 \geq 4$$

$$0 \leq x_1 \leq 7/2$$

$$0 \leq x_2 \leq 3/2$$

12. (a) Explain North-west corner method to solve T.P.P. for an initial solution.

Or

- (b) Find the starting solution in the following transportation problem by North-west corner rule.

From	To			
	A	B	C	Available
I	6	8	4	14
II	4	9	8	12
III	1	2	6	5
Demand	6	10	15	

13. (a) Give the mathematical formulation of an assignment problem.

Or

- (b) Give in detail the computational procedure of solving the assignment problem.

14. (a) Explain the maximum and minimax principle used in Game Theory.

Or

- (b) Explain the theory of dominance in the solution of rectangular games.

15. (a) Find a positive root of the equation $x^3 - 4x + 9 = 0$ by bisection method.

Or

- (b) Find an iterative formula to find the reciprocal of a given number N and hence find the value of $\frac{1}{19}$.

PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing (a) or (b).

16. (a) Use penalty method to maximize $z = x_1 + 2x_2 + 3x_3 - x_4$

$$\text{Subject to } x_1 + 2x_2 + 3x_3 = 15,$$

$$2x_1 + x_2 + 5x_3 = 20,$$

$$x_1 + 2x_2 + x_3 + x_4 = 10,$$

$$x_1, x_2, x_3, x_4 \geq 0.$$

Or

- (b) Discuss in detail the three types of models.

17. (a) Obtain the initial solution to the following T.P.

	D1	D2	D3	D4	Availability
01	1	2	1	4	30
02	3	3	2	1	50
03	4	2	5	9	30
Requirement	20	40	30	10	

Using

- (i) North west corner rule and
(ii) VAM method.

Or

- (b) Solve the following transportation problem

	To					
	9	12	9	6	9	10
	7	3	7	7	5	5
From	6	5	9	11	3	11
	6	8	11	2	2	10
	4	4	6	2	4	2

18. (a) Solve the following Assignment problem.

18	26	17	11
13	28	14	26
38	19	18	15
19	26	24	10

Or

- (b) Solve the following assignment problem.

	V	W	X	Y	Z
A	3	5	10	15	8
B	4	7	15	18	8
C	8	12	20	20	12
D	5	5	8	10	6
E	10	10	15	25	10

19. (a) Solve the following game.

	Player B			
	I	II	III	IV
Player A I	3	2	4	0
II	3	4	2	4
III	4	2	4	0
IV	0	4	0	8

Or

(b) Solve the following problem graphically

$$\begin{array}{c} \text{Player B} \\ \text{Player A} \begin{pmatrix} 3 & -3 & 4 \\ -1 & 1 & -3 \end{pmatrix} \end{array}$$

20. (a) Find the real positive root of $3x - \cos x - 1 = 0$ by Newton's method correct to 6 decimal places.

Or

- (b) Estimate $e^{1.9}$ from the given data.

$x:$ 1.00 1.25 1.50 1.75 2.00

$y:$ 0.3679 0.2865 0.2231 0.1738 0.1353
