MCA (Sem. - 4th)
COMPUTER BASED OPTIMIZATION METHODS
SUBJECT CODE : MCA - 305
Paper ID : [B0116]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours   **Maximum Marks : 60**

Instruction to Candidates:

   1)   Attempt any one question from each Sections - **A, B, C & D**.

   2)   Section - E is **Compulsory**.

   3)   Use of non-programmable **scientific calculator** is allowed.

Section - A

(1 × 10 = 10)

Q1)   (a)   What is operations research? State any four applications?

   (b)   A firm manufactures headache pills in two sizes A and B. Size A contains 2 grains of aspirin, 5 grains of bicarbonate and 1 grain of codeine. Size B contains 1 grain of aspirin, 8 grains of bicarbonate and 6 grains of codeine. It is found by users that it requires at least 12 grains of aspirin, 74 grains of bicarbonate and 24 grains of codeine for providing immediate relief. Formulate the problem as standard LPP.

Q2)   (a)   Apply graphical method to solve the LPP

   Maximize $z = x_1 - 2x_2$

   Subject to $-x_1 + x_2 \leq 1$

   $6x_1 + 4x_2 \geq 24$

   $0 \leq x_1 \leq 5, 2 \leq x_2 \leq 4$

   (b)   Describe in detail standard and canonical form of Linear Programming Problem.

(1 × 10 = 10)

Q3) In the following matrix, O_1, O_2 and O_3 are the origins, D_1, D_2, D_3 and D_4 are the destinations and the figures in the different cells of the matrix are the unit transportation cost, in rupees, from origin to destination.

Origin	Destination				Supply
	D_1	D_2	D_3	D_4	
O_1	6	4	1	5	14
O_2	8	9	2	7	16
O_3	4	3	6	4	5
Required	6	10	15	4	35

Solve the above transportation problem by any suitable technique and give your conclusion as clearly as possible.

Q4) The owner of a small machine shop has four machinists available to assign jobs for the day. Five jobs are offered with the expected profit (in Rs) for each machinist on each job as follows:

Job

Machinist	A	B	C	D	E
1	6.20	7.80	5.00	10.10	8.20
2	7.10	8.40	6.10	7.30	5.90
3	8.70	9.20	11.10	7.10	8.10
4	4.80	6.40	8.70	7.70	8.00

Find the assignment of machinists to jobs that will result in maximum profit. Which job should be declined?

Section - C

(1 × 10 = 10)

Q5) With the help of an example, describe in detail decision under risk.

Q6) Write short notes on:

(a) Sample space and Probability.

(b) Decision making.