Roll No: ....

Total No. of Questions : 09] [Total No. of Pages :03

Paper ID [B0116]

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MCA (Sem. - 4th)

COMPUTER BASED OPTIMIZATION METHODS

(MC - 305)

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**.

Section - A

(1 × 10 = 10)

Q1) Give the Linear Programming formulation of the following problem:

The products A and B are produced in three machine centers X, Y and Z. Each product involves operation of each of the machine centers. The time required for each operation unit amount of each product is given below: Time available at machine centers X, Y and Z are 100, 77 and 80 hours respectively. The profit per unit of each of A and B is Rs. 12 and Rs. 3 respectively.

Product	Machine Centers			Profit Per Unit
	X	Y	Z	
A	10	7	2	12
B	2	3	4	3

Q2) What are the various applications, limitations and use of operation research. Explain with example.

Section - B

(1 × 10 = 10)

Q3) A firm produces four products. There are four operators who are capable of producing any of these four products. The processing time varies from operator to operator. The firm records 8 hours a day and allows 30 minutes for lunch. The processing time in minutes and the profit for each of the products are given below:

Operators	Products			
	A	B	C	D
1	15	9	10	6
2	10	6	9	6
3	25	15	15	9
4	15	9	10	10
Profit (Rs.) Per unit	8	6	5	4

Find the optimal assignment of products to operators that maximizes the profit.

Q4) What is a traveling salesman problem. How it can be solved optimally. Explain with example.

Section - C

(1 × 10 = 10)

Q5) What are the various techniques for decision making under uncertainty. Explain with a case study.

Q6) How probability and uncertainty are related to each other. What is the conditional probability.

Section - D

(1 × 10 = 10)

Q7) Solve the following problem using dynamic programming:

Maximize $2x_1 + 5x_2 + x_3$

subject to $x_1 + 2x_2 + 3x_3 \leq 7$

$x_i \geq 0, x_i$ integer,

$i = 1, 2, 3$

Q8) What is integer programming? What type of problems are formulated and solved in integer programming?