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Roll No

MCADD-405

**M.C.A. (Dual Degree/Integrated Course),
IV Semester**

Examination, May 2018

Computer Oriented Optimization Techniques

Time : Three Hours

Maximum Marks : 70

- Note:* i) Attempt any five questions.
ii) All questions carry equal marks.

1. a) Solve by graphically

$$\text{Maximum } z = 45x_1 + 80x_2$$

$$\text{Subject to } 5x_1 + 20x_2 \leq 400$$

$$10x_1 + 15x_2 \leq 450$$

$$\text{and } x_1, x_2 \geq 0$$

b) A dealer wishes to purchase a number of fans and sewing machines. He was only Rs. 5760 to invest and has space for almost 20 items. A fan costs him Rs. 360 and a sewing machine is Rs. 240. His expectations is that he can sell a fan at profit of Rs. 22 and a sewing machine at a profit of Rs. 18. Formulate the above as a linear programming problem to maximise the profit.

2. a) Solve by simplex method

$$\text{Maximum } z = 4x_1 + 10x_2$$

$$\text{Subject to } 2x_1 + x_2 \leq 10$$

$$2x_1 + 5x_2 \leq 20$$

$$2x_1 + 3x_2 \leq 18$$

$$\text{and } x_1, x_2 \geq 0$$

- b) There are 5 jobs each of which must go through to two machine A and B in order AB. Processing time are given below:

Job	1	2	3	4	5
Machine 1	5	1	9	3	10
Machine 2	2	6	7	8	4

3. a) Find an optimal solution to the transportation problem given below:

		Destinations				
		D ₁	D ₂	D ₃	D ₄	Supply
O ₁		5	2	4	3	22
O ₂		4	8	1	6	15
O ₃		4	6	7	5	08
Demand		07	12	17	09	

- b) Discuss the mathematical formulation of an assignment problem.
4. a) Draw the network diagram for the project whose activities and their precedence relationship are as given below:

Activity	A	B	C	D	E	F	G
Predecessor							
Activity	-	-	A	A	B	C	D, E

- b) A small project is composed of seven activities whose time estimates are listed in the table as follow:

Activity	1-2	1-3	1-4	2-5	3-5	4-6	5-6
Optimistic Time	1	1	2	1	2	2	3
Most likely Time	1	4	2	1	5	5	6
Pessimistic Time	7	7	8	1	14	8	15

- i) Draw the project network diagram.
 - ii) Find the expected duration and variance of each activity.
 - iii) What is the probability that the project will be completed within 19 weeks.
5. a) Discuss Kendall's notation for classification of queueing model.
- b) In a service department managed by one server, on an average one customer arrives every 10 minutes. It has been found out that each customer requires 6 minutes to be served. Find out :
- i) Average queue length
 - ii) Average time spent in the system
 - iii) The probability that there would be two customer in the queue.
6. a) Obtain the steady state solution of the queueing model $(M|M|1) : (\infty|FCFS)$.
- b) If for a period of 2 hours in a day (08-10 a.m.) trains arrive at the yard every 20 minutes but the service time continues to remain 36 minutes. Then calculate for this period.
- i) The probability that yard is empty.
 - ii) Average queue length on the assumption that the line capacity of the yard is limited to 4 trains only.