

Roll No

MCA-301

M.C.A. III Semester

Examination, November 2019

Computer Oriented Optimization Techniques

Time : Three Hours

Maximum Marks : 70

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

1. a) Use graphical method to solve the L.P.P. : 7

Maximize $Z = 2x_1 + 4x_2$
 subject to, $x_1 + 2x_2 \leq 5$
 $x_1 + x_2 \leq 4$
 and $x_1, x_2 \geq 0$.

b) Solve the following L.P.P using Simplex method. 7

Maximize $Z = 6x_1 + 4x_2$
 subject to, $2x_1 + 3x_2 \leq 100$
 $4x_1 + 2x_2 \leq 120$
 and $x_1, x_2 \geq 0$.

2. a) Find the initial feasible solution by VAM for the following transportation problem: 7

Destinations →	D ₁	D ₂	D ₃	D ₄	Supply ↓
S ₁	19	30	50	10	7
Sources S ₂	70	30	40	60	9
S ₃	40	8	70	20	8
Demand →	5	8	7	14	

b) There are six jobs each of which must go through the two machines in the order AB. Processing times are given in the table below 7

Job	:	1	2	3	4	5	6
Machine A	:	5	9	4	7	8	6
Machine B	:	7	4	8	3	9	5

Determine a sequence for the six jobs that minimize the total Elapsed time, also find the Elapsed time.

3. a) Distinguish between CPM and PERT. 7

b) A small maintenance project consists of the following jobs whose precedence relationships is given below: 7

Jobs	1-2	1-3	2-3	2-5	3-4	3-6	4-5	4-6	5-6	6-7
Duration (Days)	15	15	3	5	8	12	-	14	3	14

- i) Draw an arrow diagram
- ii) Find the total float for each activity
- iii) Find the critical float for path and the total project duration.

4. a) Discuss the Queuing Model (M/M/S : N/FCFS). 7

b) A particular item has a demand of 9000 units/year the cost of one setup is Rs.100, and the holding cost per unit is Rs.2.40 per year. The production is instantaneous and no shortages are allowed. Determine: 7

- i) The economic lot size
- ii) The number of orders per year
- iii) The total cost per year of the cost of one unit is Rs.1.

5. a) What are the advantages and disadvantages of having Inventory? 7
- b) Trains arrive at the yard every 15 minutes and service time is 33 minutes. If the capacity of the yard is limited to 4 trains, find: 7
- The probability that the yard is empty
 - The average number of train in the system.
6. a) Write algorithm for solving integer programming problem using Branch and Bound Method. 7
- b) Solve the following assignment problem. 7

		I	II	III	IV	V
Person	A	1	3	3	8	2
	B	7	10	12	5	10
	C	15	2	8	10	7
	D	6	5	3	2	8
	E	9	15	20	6	30

7. a) What are the three time estimates used in the context of PERT? How are the expected duration of a project and its standard deviation calculated? 7
- b) A supermarket has two girls serving at the counters. The customers arrive in a Poisson fashion at the rate of 12 per hour. The service time for each customer is exponential with mean 6 minutes. find : 7
- The probability that an arriving customer has to wait for service.
 - The average number of customers in the system
 - The average time spent by a customer in the supermarkets.

8. a) Define : 7
- Slack and surplus variables
 - Deterministic and probabilistic models
- b) Use the dynamic programming to solve the L.P.P. 7
- Maximize $Z = x_1 + 9x_2$
 Subject to, $2x_1 + x_2 \leq 25$
 $x_2 \leq 11$
 and $x_1, x_2 \geq 0$
