

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. http://www.rgpvonline.com

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
i) The probability that the yard is empty
ii) 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

		Job				
		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
i) The probability that an arriving customer has to wait for service.
ii) The average number of customers in the system
iii) The average time spent by a customer in the supermarkets.

8. a) Define : 7
i) Slack and surplus variables
ii) 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 $x_1, x_2 \geq 0$

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