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Roll No

MCA-301

M.C.A. III Semester

Examination, November 2018

Computer Oriented Optimization Techniques

Time : Three Hours

Maximum Marks : 70

Note: i) Answer any five questions.

ii) All questions carry equal marks.

1. a) Solve the following LPP 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 $x_1, x_2 \geq 0$

b) Write algorithm for solving integer programming Problem using Branch and Bound method. 7

2. a) Obtain the optimal solution of the following transportation problem: 7

		Destinations					
		D ₁	D ₂	D ₃	D ₄	D ₅	Capacity
Origin	O ₁	12	4	9	5	9	55
	O ₂	8	1	6	6	7	45
	O ₃	1	12	4	7	7	30
	O ₄	10	15	6	9	1	50
Requirements		40	20	50	30	40	

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b) There are seven jobs, each of which has to go through the machines A and B in the order AB Processing times in hours are given as

Jobs	1	2	3	4	5	6	7
Machine A	3	12	15	6	10	11	9
Machine B	8	10	10	6	12	1	3

Determine a Sequence of these jobs that will minimize the total elapsed time and total elapsed time.

3. a) Write the difference between PERT and CPM. 7

b) Constructed the network diagram comprising activities B,C,...Q and N , such that following constraints are satisfied.

B<E,F; C<G,L; E,G<H; L,H<I; L<M; H<N; H<J; IJ<P; P<Q.

The notation $x < y$ means that the activity x must be finished before y can begin. 7

4. a) Define : 7

i) Transient state and steady state

ii) Queuing process

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 2.40per 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 if the cost of one unit is Rs 1.

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- 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) Prove that dual of dual is primal. 7
- b) Use dynamic programming to solve the LPP 7

Maximum $Z = x_1 + 9x_2$
 Subject to $2x_1 + x_2 \leq 25,$
 $x_2 \leq 11$
 and $x_1, x_2 \geq 0$

- 7. a) Define: 7
 - i) Optimistic time estimate
 - ii) Most likely time estimate
 - iii) Pessimistic time estimate
- b) Solve the following minimal assignment problem. 7

		Job				
		1	2	3	4	5
Machine	A	10	3	3	2	8
	B	9	7	8	2	7
	C	7	5	6	2	4
	D	3	5	8	2	4
	E	9	10	9	6	10

- 8. a) Discuss the queuing model (M/M/S: N/FCFS). 7
- b) Define: 7
 - i) Deterministic and probabilistic models
 - ii) Bellman's optimality principles
