Total No. of Questions : 8]   *[Total No. of Printed Pages : 4*

Roll No ....

MCADD-405

M.C.A. (Integrated), IV Semester

Examination, June 2020

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 the following linear programming problem by Graphical method.

   Maximize : $Z = 5x_1 + 7x_2$

   Subject to constraints

   $$x_1 + x_2 \leq 4$$
   $$3x_1 + 8x_2 \leq 24$$
   $$10x_1 + 7x_2 \leq 35$$
   $$x_1, x_2 \geq 0$$

   b) Use simplex method to solve L.P.P.

   Maximize $Z = 3x_1 + 5x_2 + 4x_3$

   Subject to : $2x_1 + 3x_2 \leq 8$

                  $2x_2 + 5x_3 \leq 10$

          $3x_1 + 2x_2 + 4x_3 \leq 15$

              and $x_1, x_2, x_3 \geq 0$

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2. a) Use Big-M method to solve the L.P.P. or solve the following L.P.P.

   Minimize $\qquad Z = -3x_1 + x_2$

   Subject to constraints: $\quad 2x_1 + x_2 \geq 2$

   $$x_1 + 3x_2 \leq 2$$
   $$x_2 \leq 4$$
   $$x_1, x_2 \geq 0$$

   b) Write short notes on :

   i) Feasible solution

   ii) Optimal solution

   iii) Basic feasible solution

   iv) Integer programming problem

3. a) Solve the transportation problem

		D_1	D_2	D_3	Supply
	O_1	2	2	3	10
Origin	O_2	4	1	2	15
	O_3	1	3	1	40
	Demand	20	15	30	65/65

Destinations

   b) Solve the following traveling salesman problem.

To

		A	B	C	D
	A	∞	46	16	40
	B	41	∞	50	40
From	C	82	32	∞	60
	D	40	40	36	∞

4. a) Write a short note on inventory control techniques.

   b) There are four jobs 1, 2, 3 and 4 are to be processed on each of the 5 machine A, B, C, D and E in the order ABCDE. Find the total minimum elapsed time of no passing permitted also find the idle time for each machine

   Machine

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

5. a) Distinguish between CPM and PERT.

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

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.

6. a) A super market has two girls ringing up sales at the counters. If the service time for each customer is exponential with mean 4 minutes and if people arrive in a poisson fashion at the rate of 10 an hour. Then calculate the.

   i) Probability of having to wait for service.

   ii) Expected percentages of idle time for each girl.

b) Determine the value of u_1, u_2, u_3 so as to maximize (u_1, u_2, u_3), subject to $u_1 + u_2 + u_3 = 10$ and $u_1, u_2, u_3 \geq 0$

7. a) What is the concept involved in Gromory's cutting plane method?

b) A company has demand of 12000 units/year for an item and it can produce 2000 such items per month. The cost of one set up is Rs. 400 and the holding cost/unit/month is Rs. 0.15. Find the optimum lot size and the total cost per year, assuming the cost of one unit is Rs. 400. Also find the maximum inventory and total time.

8. a) Discuss the queuing model (M/M/S:N/FCFS).

b) Define:

i) Deterministic and probabilistic models

ii) Bellman's optimality principles

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