Roll No ....

MCADD-405

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

Examination, May 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) What are the conditions for the application of the optimality test in case of transportation problem ? Briefly explain as to why these conditions should be satisfied.

   b) Find the optimum solution for the following transportation problem in which the cell values are unit transportation cost in rupees from source S_1, S_2, S_3 and S_4 to destination D_1, D_2 and D_3.

	D_1	D_2	D_3	SOURCE
S_1	1	2	3	50
S_2	3	2	1	80
S_3	4	5	6	75
S_4	3	1	2	95
DEMAND	120	80	100	

2.　An Air force is experimenting with three types of bombs P, Q and R in which three kinds of explosive. Viz, A, B and C will be used. Taking the various factors into account, it has been decided to use not more than 600 kg of explosive A, at least 480 kg of explosive B and exactly 540 kg of explosive C. Bomb P requires 3, 2, 2 kg, Bomb Q requires 1, 4, 3 kg and Bomb R requires 4, 2, 3 kg of explosives A, B and C respectively. Bomb P is estimated to give the equivalent of 2 ton explosion, Bomb Q, a3 ton explosion and Bomb R, a4 ton explosion respectively. Under what production schedule can the Air Force make the biggest bang?

3.　Five wagons are available at stations 1, 2, 3, 4, 5. These are required at five stations I, II, III, IV, V. The mileages between various stations are given by the table below. How should the wagons be transported so as to minimize the total mileage covered ? Solve by Hungarian method.

	I	II	III	IV	V
1	10	5	9	18	11
2	13	9	6	12	14
3	3	2	4	4	5
4	18	9	12	17	15
5	11	6	14	19	10

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

b) Define and explain the terms safety stock, lead time and EOQ with the help of ideal inventory model.

　　　　　　　　　　　　　　　Contd...

5. a) Discuss the similarities and differences of CRM and PERT.

   b) The utility data for a network are given below. Determine the total, free independent and interfering floats and identify the critical path.

Activity	0-1	1-2	1-3	2-4	2-5	3-4	3-6	4-7	5-7	6-7
Duration	2	8	10	6	3	3	7	5	2	8

6. a) Discuss in detail a deterministic queuing model.

   b) A branch of Punjab National Bank has only one typist. Since the typing work various in length (number of pages to be typed), the typing rate is randomly distributed approximating a Poisson distribution with mean service rate of 8 letters per hour. The letters arrives at a rate of 5 per hour during the entire 8-hour work day. If the typewriter is valued at Rs. 1.50 per hour, determine.

   i) Equipment utilization

   ii) The per cent time that an arriving letter has to wait

   iii) Average system time

   iv) Average cost due to waiting on the part of typewriter i.e., it remaining idle

7. a) 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 $u_1, u_2, u_3 \geq 0$.

   b) What is the concept involved in the Gomory's cutting plane method?

8. a) Explain sequencing problem in proper details.

   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.

Job	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 T. Also find T and idle time for machines A and B.

******

MCADD-405