

Roll No.

Total No. of Questions : 07]

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MBA (Sem. – 3rd)

APPLIED OPERATIONS RESEARCH

SUBJECT CODE : MB – 301 (2008 – 10 Batch)

Paper ID : [C0197]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Four** questions from Section - B.

Section - A

Q1)

(10 × 2 = 20)

- a) What is an artificial variable and why should it be introduced into a solution?
- b) Define Earliest Start Time (EST), Latest Start Time (LST), Earliest Finish Time (EFT) and Latest Finish Time (LFT).
- c) In what kind of situations is queuing analysis most appropriate?
- d) What are the characteristics of a game?
- e) What is a degenerate Transportation problem?
- f) Differentiate between basic and non-basic variable.
- g) List down the important characteristics of Economic Order Quantity model.
- h) What are the operating characteristics for a single-channel waiting line with Poisson arrivals and exponential service times?
- i) Explain different types of games.

- j) The reward matrix of a manager of a multinational company and the union of workers is:

	Proposal	Contract		
		A	B	C
1		9.5	12.0	7.0
2		7.0	8.5	6.5
3		6.0	9.0	10.0

Formulate the LP problem to determine the optimum strategy for the union and the optimum strategy of the manager.

Section - B

(4 × 10 = 40)

- Q2)** (a) List and discuss the steps of decision making process.
 (b) What are the advantages of analyzing and experimenting with a model as opposed to real situations?
- Q3)** Discuss the special cases of infeasible and unbounded solution by giving examples in a linear programming problem.
- Q4)** Write short notes on
 (a) Deterministic queues
 (b) Waiting line models
- Q5)** Find the most optimal solution by using Least Cost Method for the following transportation problem

3	6	7	60
8	5	7	30
4	9	11	30
35	55	30	

Q6) The following project network and associated costs are given below:

Activity	Predecessor	Normal		Crash	
		Tn(days)	Cn(Rs.)	Tc(Days)	Cc(Rs.)
A	-	9	10	6	16
B	-	8	9	5	18
C	A	5	7	4	8
D	A	8	9	6	19
E	B	7	7	3	15
F	C	5	5	5	5
G	E, D	5	8	2	23

- (a) Draw the network diagram.
- (b) What is the earliest the project can be completed? What is the lowest cost for completing it in this time?

Q7) A mining company produces 100 tons of red ore and 80 tons of black ore each week. These can be treated in different ways to produce three different alloys, Soft, Hard or Strong. To produce 1 ton of Soft alloy requires 5 tons of red ore and 3 tons of black. For the Hard alloy the requirements are 3 tons of red and 5 tons of black, whilst for the Strong alloy they are 5 tons of red and 5 tons of black. The profit per ton from selling the alloys are £250, £300 and £400 for Soft, Hard and Strong respectively. Formulate the problem of deciding how much of each alloy to make each week as a L.P. problem and use the Simplex method to find the optimal solution.

