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Total No. of Pages : 02

Total No. of Questions : 16

B.Tech. (Ind. Engg. & Mgt. (TQM) (Sem.-5)

OPERATIONS RESEARCH

Subject Code : IEM-502

M.Code : 70993

Time : 3 Hrs.

Max. Marks : 40

INSTRUCTIONS TO CANDIDATES :

1. Attempt any EIGHT out of TEN Questions from SECTION-A carrying THREE marks each.
2. Attempt any FOUR out of SIX questions from SECTION-B carrying NINE marks each.

SECTION-A

- 1) Discuss the significance and scope of operations research
- 2) What are the assumptions in formulating a linear programming problem?
- 3) What do you mean by "Duality"?
- 4) What is degeneracy in transportation problem?
- 5) State the differences between transportation problem and assignment problem
- 6) What are the basic characteristics of a queuing system?
- 7) Enlist the factors considered in replacement decision
- 8) Define the term "Economic Order Quantity".
- 9) What is meant by decision variable?
- 10) Define buffer stock and lead time?

SECTION-B

- 11) The arrival rates of customers at petrol pump distribution, with an average time of 10 minutes between one customer and the next. The duration of a fill up of a vehicle is assumed to follow exponential distribution with a mean time of three minutes.
 - a) What is the average length of the queue?
 - b) What is the probability that the person arriving at the booth will have to wait?

- 12) ABC company produces a cable at the rate of 5000 metres per hour. The cable is used at the rate of 2500 metres/hour. The cost of the cable is Rs. 5 per metre. The inventory carrying cost is 25 percent and set-up costs are Rs. 4050 per set-up. Determine the optimal number of cycles required in a year for the manufacture of this cable.
- 13) Solve the following transportation problem :

Warehouses	W1	W2	W3	W4	Capacity
Factories					
F1	19	30	50	10	7
F2	70	30	40	60	9
F3	40	8	70	20	18
Requirement	5	8	7	14	34

- 14) There are 3 jobs A, B and C and three machines X, Y, Z. All the jobs can be processed on all machines. The time required for processing job on a machine is given below in the form of matrix. Make allocation to minimize the total processing time.

Machines (time in hours)

Jobs	X	Y	Z
A	11	16	21
B	20	13	17
C	13	15	12

- 15) Solve the following transportation problem :

Warehouses	W ₁	W ₂	W ₃	W ₄	Capacity
Factories					
F1	19	30	50	10	7
F2	70	30	40	60	9
F3	40	8	70	20	18
Requirement	5	8	7	14	34

- 16) A dealer wishes to purchase a number of fans and sewing machines. He has only Rs. 5760 to invest and has space for almost 20 items. A fan costs him Rs. 360 and a sewing machine Rs. 240. His expectation is that he can sell a fan at profit of Rs. 22 and a sewing machine at a profit of Rs. 18. Assuming that he can sell all the items that he can buy, how he should invest his money in order to maximize his profit. Formulate it as L.P.P. and use the graphic method to solve it.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.