PG – 948

II Semester M.B.A. Degree Examination, July 2016
(2007-08 Scheme)
Management
2.6 : QUANTITATIVE METHODS AND OPERATIONS RESEARCH

Time : 3 Hours Max. Marks : 75

SECTION – A

1. Answer **any six** questions. **Each** question carries **two** marks. **(2×6=12)**
   a) What is objective function ?
   b) What is unbalanced assignment model ?
   c) Mention the assumptions made in sequencing problem.
   d) Distinguish between pure and mixed strategies.
   e) State any four limitations of operation research.
   f) What are the important techniques used in operation research ?
   g) Distinguish between initial feasible solution and feasible solution in the context of transportation problem.
   h) What are the assumptions of EOQ model ?

SECTION – B

Answer **any three** of the following. **Each** question carries **eight** marks. **(3×8=24)**

2. What is simulation ? What are the advantages and limitations of simulation ? Also specify the areas where simulations can be used.

3. Explain the following terms :
   i) Balking
   ii) Traffic intensity
   iii) Saddle point
   iv) Replacement model.

P.T.O.

4. The following information is provided :

   Annual usage is 30000 units, ordering cost are Rs. 150 per order, carrying cost are 22% price of each item is Rs. 22, lead time is 10 days. There are 250 working days per year. Determine the EOQ and orders per year. In the past two years, the usage rate has gone as high as 150 units per day for a recording system, based on inventory level. What safety stock is required to protect against this higher usage rate ? What should be the reorder point at this safety stock level ?

5. Determine the optimal sequence of jobs that minimizes total clapsed time. Jobs are to be processed on three machines M_1, M_2 and M_3 in the order M_1 M_3 M_2 (time in hrs.)

Job	A	B	C	D	E	F	G
M_1	3	8	7	4	9	8	7
M_2	4	3	2	5	1	4	3
M_3	6	7	5	11	5	6	12

6. Suggest optimum assignment to sales territories, where the estimates of sales to be made by each salesman in different territories are given below :

		Territories				
		I	II	III	IV	V
Salesman	A	10	15	17	14	14
	B	6	18	10	12	16
	C	12	5	13	13	6
	D	8	11	16	10	12

   If salesman B cannot be assigned to territory II for certain reasons, will the optimum assignment change. If so, what will be the new assignment schedule and the total sales ?

SECTION – C

Answer **any two** of the following questions. **Each** question carries **twelve** marks. **(2×12=24)**

7. In constructing any OR model, it is essential to realize that the most important purpose of the modelling process is 'to help manager better', keeping this purpose in mind, state the OR models that can be of help to chartered accountants in advising their clients.

8. Solve the following transportation problem for maximum profit :

Per unit profit (Rs.)

Warehouse	A	B	C	D
X	12	18	6	25
Y	8	7	10	18
Z	14	3	11	20

Availability at warehouses (units)	**X** 200	**Y** 500	**Z** 300	
Demand in the market (units)	**A** 180	**B** 320	**C** 100	**D** 400

9. A project consists of the following activity and different time estimates :

Activity	t_o	t_m	t_p
1-2	3	6	15
1-3	2	5	14
1-4	6	12	30
2-5	2	5	8
2-6	5	11	17
3-6	3	6	15
4-7	3	9	27
5-7	1	4	7
6-7	2	5	8

a) Draw a network.
b) Determine the critical path and their variances.
c) Find the earliest and latest expected times to reach each node.
d) What is the probability that the project will be completed by 27^{th} day ?

SECTION – D

10. **Compulsory** (Case Study) : **(15×1=15)**

A company manufactures 3 type of parts which use precious metals platinum and gold. Due to shortage of these precious metals, the government regulates the amount that may be used per day. The relevant data with respect to supply requirements and profit are summarised in the table shown below :

Product	Platinum per unit (gm)	Gold per unit (gm)	Profit per unit (Rs.)
A	2	3	500
B	4	2	600
C	6	4	1200

Daily allotments of platinum and gold are 160 gm and 120 gm respectively. How should the company decide the supply of scarce precious metals ? What is the optimum profit ? Solve by simplex method.