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MS-51

MANAGEMENT PROGRAMME

01464

Term-End Examination

December, 2010

MS-51 : OPERATIONS RESEARCH

Time : 3 hours *Maximum Marks : 100*

(Weightage 70%)

Note : *Answer any **four** questions.*
*All questions carry **equal marks**.*

1. (a) Many believe that Operations Research (OR) is a technique which help in resolving conflicts between production, finance, marketing, and personnel functions of an manufacturing unit. Do you agree ? Explain your answer giving two suitable examples.

   (b) A firm makes product X and product Y and has a total production capacity of 9 tons per day. X and Y are requiring the same production capacity. The firm has a permanent contract to supply atleast 2 tons of X and atleast 3 tons of Y per day to another company. Each ton of X requires 20 machine hours production time and each ton of Y requires 50 machine hours production time. The daily maximum

possible number of machine hours is 360. All the firm's output can be sold and the profit is Rs. 80 per tons of X and Rs.120 per tons of Y. Determine the production schedule to maximize the profit. Also calculate the optimum profit.

2. (a) Discuss the impact of quantity discount on economic order quantity and hence on inventory control procedure.

(b) An aircraft company uses rivets at an approximately constant rate of 5000 kg per year. The rivets cost Rs.20 per kg. The company personnel estimate that it costs Rs.200 to place an order and the carrying cost of inventory is 10% per year. Find.

(i) How frequently should orders for rivets be placed, and what quantities should be ordered for ?

(ii) If the actual costs are Rs.500 to place an order and 15% for carrying cost, how much is the company losing per year with EOQ determined in (i) ?

3. (a) "Game theory provides a systematic quantitative approach for analyzing competitive situations in which the

competitors make use of logical process and techniques in order to determine an optional strategy for winning". Do you agree with this statement ? Justify your answer with suitable examples.

(b) In a game of matching coins with two players suppose A wins one unit of value when there are two heads, wins nothing when there are two tails and losses ½ units of value when there are one head and one tail. Determine the pay off matrix, the best strategies, for each player, and the value of the game to A.

4. (a) The XYZ company has five jobs A, B, C, D and E to be done and five men L, M, N, O and P to do these jobs. The number of hours each man would take to accomplish each job is given by the following table :

		JOBS				
		L	M	N	O	P
MEN	A	4	6	11	16	9
	B	5	8	16	19	9
	C	9	13	21	21	13
	D	6	6	9	11	7
	E	11	11	16	26	11

Find the optimal schedule with time for the above assignment problem.

(b) Solve the following transportation problem starting with the initial solution obtained by Vogel Approximation Method.

DESTINATIONS

		D_1	D_2	D_3	D_4	SUPPLY
SOURCE	O_1	2	2	2	1	3
	O_2	10	8	5	4	7
	O_3	7	6	6	8	5
	DEMAND	4	3	4	4	

Also find its optimal solution by using MODI method.

5. (a) Describe 'Duality' in linear programming. What is the essential difference between regular simplex method and dual simplex method? What are the properties of the dual problem ?

(b) At IOC petrol pump, customers arrive according to a Poisson process with an average time of 6 minutes between arrivals. The service time is exponentially distributed with mean time = 3 minutes. On the basis of this information, find out

(i) What would be the average queue length ?

(ii) What would be the average number of customers in the queue system ?

(iii) What is the average time spent by a car in the petrol pump ?

(iv) What is the average waiting time of a car before receiving petrol ?

6. Write short notes on *any three* of the following:

(a) Goal programming.

(b) Monte Carlo Simulation.

(c) Periodic Review system in Inventory control.

(d) Dynamic programming.

(e) Sensitivity Analysis in linear programming problem.