

JAMNALAL BAJAJ INSTITUTE OF MANAGEMENT STUDIES
UNIVERSITY OF MUMBAI
SUBJECT: QUANTITATIVE METHODS IN MANAGEMENT
FIRST YEAR- FIRST SEMESTER (2014-15)

Date: 11th November, 2014

Time: 2.30 to 5.30 p.m.

Marks: 60

Note: (1) ANSWER ANY FIVE QUESTIONS. (2) ALL QUESTIONS CARRY EQUAL MARKS

Q. 1.a Solve the following Linear Programming Problem given these constraints and objective function:

Maximize profit $Z = 30X_1 + 40X_2$

Subject to :

$$4X_1 + 2X_2 \leq 16$$

$$2X_1 - X_2 \leq 2$$

$$X_2 \leq 2 \quad X_1, X_2 \geq 0$$

- (a) Graph the feasible region
- (b) Evaluate the objective function at each corner point
- (c) Identify the optimal solution

Q.1 b $\begin{pmatrix} 1 & 7 & 2 \\ 6 & 2 & 7 \\ 5 & 1 & 6 \end{pmatrix}$ Solve the game

1084 Q. 2 a Solve the following transportation problem for minimum cost by taking initial feasible solution both by (a) North- West Corner Rule and (b) Vogel's Approximation Method. The entries in the matrix indicate the cost in rupees of transporting a unit from a particular source to a particular destination.

ORIGIN	DESTINATION				AVAILABILITY
	1	2	3	4	
1	10	8	11	7	20
2	9	12	14	6	40
3	8	9	12	10	35
REQUIREMENT	16	18	31	30	95

(12)

Q. 2 b ABC Company is engaged in manufacturing 5 brands of packed snacks. It is having five manufacturing setups each capable of manufacturing any of its brands one at a time. The cost to make a brand on these set ups vary according to the table below:

	S1	S2	S3	S4	S5
B1	4	6	7	5	11
B2	7	3	6	9	5
B3	8	5	4	6	9
B4	9	12	7	11	10
B5	7	5	9	8	11

Assuming five setups are S1, S2, S3, S4 and S5 and five brands are B1, B2, B3, B4 and B5, find the optimum assignment of products on these setups resulting in the minimum cost using the Hungarian Assignment Method.

Q 3 a Manohar Machinery specializes in developing weed- harvesting equipment that is used to clear small lakes of weeds. George Manohar, President of Manohar Machinery, is convinced that harvesting weeds is far better than using chemicals to kill weeds. Chemicals cause pollution, and the weeds seem to grow faster after chemicals have been used. George is contemplating the construction of a machine that would harvest weeds on narrow rivers and waterways. The activities that are necessary to build one of these experimental