NEW

2016

M B A

2nd Semester Examination

OPERATIONS RESEARCH

PAPER—MBA-205

Full Marks : 100

Time : 3 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

1. Answer any *four* of the following : 4×5

(a) Demonstrate the process to handle a situation that gives rise to alternative solutions to an assignment problem.

(b) Prove that the evaluations of empty cells (for Optimality Test) under Stepping Stone Method and 'Modi Method' or 'uv Method' are the same in magnitude but opposite in sign. Assume a 4×4 matrix with imaginary figures. 3+2

(c) Explain the term 'Artificial Variable' and mention the situations when it is used in linear programming.

(d) Why is square evaluation of empty cells made in solving a transportation problem? If you commit a mistake in evaluating an empty cell in any of the iterations, can you ever reach the right optimal solution without detecting the mistake?

(e) Write the dual of the following linear programming problem :

Minimise $Z = X_1 + X_2 + X_3$

Subject to $X_1 + 3X_2 + 4X_3 = 5$

$$X_1 - 2X_2 \leq 3$$

$$2X_2 - X_3 \geq 4$$

Where X_1, $X_2 \geq 0$ and X_3 is unrestricted.

(f) Examine the effects of the following on the solution of an assignment problem :

(i) Addition of a constant element to all the effectiveness elements ;

(ii) Multiplying all the effectiveness elements by a constant element.

2. Answer any *two* of the following : 2×10

(a) What is 'mixed strategy' in the solution of a game problem? How is it determined?

(b) What is critical path in a network? Will crashing of activities not lying on the critical path reduce project completion time? Give resource for your answer.

(c) What do you understand by the terms 'direct cost' and 'indirect cost' in PERT costing techniques? How do they behave in project cost with range duration?

3. Answer any *two* questions : 2×5

(a) What is back ordering situation? What are its causes?

(b) From the following determine the EOQ Level :

Lot size price per unit.

Less than 200	10	
200-399	8	Ordering Cost per order = Rs. 4
400-599	5	Carrying Cost per unit per annum = Rs.2
600-799	4	Annual demand =1600 units.
800 and above	3	

(c) Write a note an 'ABC analysis' in inventory management.

4. Attempt any *four* questions : 4×10

(a) There are four jobs : A B, C and D and these are to be performed on four different machine centres : W, X, Y and Z. One job is to be allocation to a machine centre, though each machine is capable of doing any job at different costs as given by the matrix below :

Jobs	Machine Centres			
	W	X	Y	Z
A	21	30	40	50
B	15	14	12	16
C	23	22	24	25
D	30	34	32	33

(i) Find an allocation of jobs to the machine hours so that the total cost of processing is minimum.

(ii) If the machine centre Y goes out of order, which jobs will then be allocated to the rest of the centres at minimum cost? 5+5

(b) (i) A contractor has to supply 10,000 bearings per day to an automobile manufacturer. He finds that when he starts productions run, he can produce 25,000 bearings per day. The cost of holding a bearing in stock for a year is Rs. 2 and the set-up cost of a production run is Rs.180. How frequently should production run be made?

(ii) What is EOQ ? What are the various assumptions of EOQ Model?

(c) (i) Draw the network for the following activities and find all types of floats.

(ii) If indirect cost is Rs. 100 per week find the optimum project cost. (1+2)+7