

Code: 9F00205

MCA II Semester Regular & Supplementary Examinations May 2016

OPERATIONS RESEARCH

(For students admitted in 2010, 2011, 2012, 2013, 2014 & 2015 only)

Time: 3 hours

Max. Marks: 60

Answer any FIVE questions
 All questions carry equal marks

- 1 (a) Explain why and how operations research methods have been valuable in aiding executive decisions.
 (b) Two of the major limitations of linear programming are assumption of "Additivity" and "Single objective". Elaborate by giving appropriate examples.
- 2 (a) What is the essential difference between simplex method and dual simplex method?
 (b) Use dual simplex method to solve:
 Minimize $Z = x_1 + x_2$
 subjected to $2x_1 + x_2 \geq 2$
 $-x_1 - x_2 \geq 1$ and
 $x_1, x_2 \geq 0$

- 3 (a) Explain how to resolve degeneracy in a transportation problem.
 (b) The matrix shows the processing time in hours. Solve this assignment problem using Hungarian method.

		Operator				
		1	2	3	4	5
Job	1	20	22	35	22	18
	2	4	26	24	24	7
	3	23	14	17	19	19
	4	17	15	16	18	15
	5	16	19	21	19	25

- 4 Find the sequence that minimizes the total time required in performing the following jobs on three machines in the order ABC. Processing times in hours are given in the following table.

Job	1	2	3	4	5
Machine A	8	10	6	7	11
Machine B	5	6	2	3	4
Machine C	4	9	8	6	5

Also determine the idle time for machines A, B and C.

- 5 (a) What is replacement? Describe some important replacement situations.
 (b) The cost of a machine is Rs. 6,100 and its scrap value is only Rs.100, from experience the maintenance costs are found to be:

Year	1	2	3	4	5	6	7	8
Maintenance	100	250	400	600	900	1250	1600	2000

When should the machine be replaced?

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6 Define the following dynamic programming terms:

- (a) Stage.
- (b) State variable.
- (c) Decision variable.
- (d) Optimal return.

7 Solve the following game.

		Player B			
Player A	3	2	4	0	
	3	4	2	4	
	4	2	4	0	
	0	4	0	8	

8 (a) Derive an EOQ formula with different rates of demand in different cycles.

(b) Compare EOQ and the total variable cost for the following items.

Annual demand = 500 units ; Unit price = Rs 20

Order cost = Rs 16 ; Storage rate = 2% per annum

Interest rate = 12% per annum ; Obsolescence rate = 6% per annum

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