Roll No. | | | | | | | | | | | | **Total No. of Pages : 04**

Total No. of Questions : 15

MBA (2012 & Onward) (Sem.–3)

APPLIED OPERATIONS RESEARCH

Subject Code : MBA-301

Paper ID : [C1169]

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A contains SIX questions carrying FIVE marks each and students has to attempt any FOUR questions.**
2. **SECTIONS-B consists of FOUR Subsections : Units-I, II, III & IV. Each Subsection contains TWO questions each carrying EIGHT marks each and student has to attempt any ONE question from each Subsection.**
3. **SECTION-C is COMPULSORY and consists of ONE Case Study carrying EIGHT marks.**

SECTION A

1. What is Degeneracy in Transportation problems? How does it arise? How can we deal with this problem?

2. Can there be multiple optimal solutions to an assignment problem? How would you identify if possible, the existence of multiple solutions in the Hungarian assignment method?

3. Why is the critical path of such importance in large projects scheduling and control? Can a critical path change during the course of project? Why?

4. Discuss the basic characteristics of a queuing system.

5. How would you deal with replacement of items that fail completely and suddenly?

6. What do you understand by "zero sum" in the context of game theory? Can there be a non-zero sum game also?

SECTION B

UNIT-I

7. What are the essential characteristics of Operation Research? Discuss the role and scope of quantitative methods for scientific decision making in business management.

8. For the data given in the table below, draw the network. Crash the activities and determine the optimal cost of the project and the optimal duration

Activity	Normal		Crash	
	Duration	Cost	Duration	Cost
1-2	8	1000	6	2000
1-3	4	1500	2	3500
2-4	2	500	1	900
2-5	10	1000	5	4000
3-4	5	1000	1	2000
4-5	3	800	1	1000

Indirect cost is Rs.700 per day.

UNIT-II

9. Solve the following LPP :

Minimize $Z = -x_1 + 2x_2$

Subject to constraints :

$-x_1 + 3x_2 \leq 10$

$x_1 + x_2 \leq 6$

$x_1 - x_2 \leq 2$

where $x_1, x_2 \geq 0$

10. Solve the following transportation problem for minimum cost :

Destination	Origin				Requirements
	A	B	C	D	
1	7	4	3	4	15
2	3	2	7	5	25
3	4	4	3	7	20
4	9	7	5	3	40
Availabilities	12	8	35	25	