

Code: 9E00207

MBA & MBA (Finance) II Semester Supplementary Examinations December/January 2017/2018

OPERATIONS RESEARCH

(For students admitted in 2013, 2014, 2015 & 2016 only)

Time: 3 hours

Max. Marks: 60

Answer any FIVE questions
All questions carry equal marks

1 "Quantitative analysis is a framework for managerial decisions", - Discuss.

2 Solve the following LPP:

$$\text{Maximize } z = 5x_1 + 2x_2$$

$$\text{Subjected to } 2x_1 + 3x_2 \leq 150$$

$$3x_1 \leq 150$$

$$5x_2 \leq 200$$

$$\text{and } x_1, x_2 \geq 0$$

3 Find the optimal solution to the following transportation problem.

Centres					
Factories	P	Q	R	S	Availability
A	10	8	7	12	500
B	12	13	6	10	500
C	8	10	12	14	900
Demand	700	550	450	300	

4 (a) Discuss the mathematical formulation of an assignment problem.

(b) Five jobs are to be assigned to 5 machines. The cost of assigning these jobs to the machine in rupees is given in the following matrix. Determine the optimal assignment, so as to minimize the total cost. Calculate the total cost of optimal assignment:

		Machines				
		A	B	C	D	E
Jobs	1	6	7	5	9	4
	2	7	5	10	9	6
	3	5	4	3	6	5
	4	8	3	5	6	4
	5	4	7	5	6	6

5 Solve the game for the given pay off matrix.

	B ₁	B ₂
A ₁	1	-3
A ₂	3	5
A ₃	-1	6
A ₄	4	1
A ₅	-5	0

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- 6 We have five jobs each of which must go through the machines A,B and C in the order ABC

Processing times (in hours)

Job no	1	2	3	4	5
Machine A	5	7	6	9	5
Machine B	2	1	4	5	3
Machine C	3	7	5	6	7

Determine a sequence for the jobs that will minimize the total elapsed time and idle time for each machine.

- 7 Customers arrive at a one-window drive in bank according to a Poisson distribution with mean 10 per hour. Service time per customer is exponential with mean 5 minutes.
- (i) What is the probability that an arriving customer has to wait?
- (ii) What is the average waiting time of the customer in the system?
- (iii) Find the number of customers waiting for service in the system.

- 8 A project plan is as follows:

Activity	A	B	C	D	E	F	G	H	I	J	K	L
Predecessor	-	-	A	B	B	C,D	E	E	G	H	I,J	F
Time	8	2	1	9	4	5	6	3	3	5	2	3

Construct a PERT network and compute earliest and latest times. Identify the critical path.
