



Code: 9E00207

MBA & MBA (Finance) II Semester Supplementary Examinations June/July 2018

OPERATIONS RESEARCH

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

Time: 3 hours

Max. Marks: 60

Answer any FIVE questions
All questions carry equal marks

- 1 Define operations research. Describe the scope and applications of operations research.
- 2 Solve the following LPP.
Maximize $Z = 5X_1 + 8X_2$
Subject to $2X_1 + 3X_2 \leq 12$
 $X_1 \leq 5$
 $X_2 \leq 3$
 $X_1, X_2 \geq 0$
- 3 Suppose an auto company has three plants in cities A, B and C and two major distribution centers in D and E. The capacities of the three plants during the next quarter are 1000, 1500 and 1200 cars. The quarterly demands of the two distribution centers are 2300 and 1400 cars. The transportation costs (which depend on the mileage, transport company etc.) between the plants and the distribution centers is as follows:

	D	E
A	80	215
B	100	108
C	102	68

Which plant should supply how many cars to which outlet so that the total cost is minimum?

- 4 A company is having four tasks (1, 2, 3, 4) that are to be assigned to four persons (W, X, Y, Z) and the costs are set out in the following table. Assign tasks to the persons using Hungarian procedure so as to minimize the cost.

	W	X	Y	Z
1	8	20	15	17
2	15	16	12	10
3	22	19	16	30
4	25	15	12	9

- 5 Solve the game for the given pay off matrix using principle of dominance method.

	B ₁	B ₂	B ₃
A ₁	5	6	6
A ₂	2	3	7
A ₃	1	1	4
A ₄	0	1	1
A ₅	4	5	2

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- 6 Five jobs are performed first on machine Y and then on machine X. hours by each job on each machine is given below.

	A	B	C	D	E
Machine X	4	1	3	1	2
Machine Y	1	3	2	5	7

- 7 Each airline passenger and his or her luggage must be checked to determine whether he or she is carrying weapons onto the plane. Suppose that at Gotham City Airport, an average of 10 passengers per minute arrive (inter arrival times are exponential). To check passengers for weapons, the airport must have a checkpoint consisting of a metal detector and baggage X-Ray machine. Whenever a checkpoint is in operation, two employees are required. A checkpoint can check an average of 12 passengers per minute (the time to check a passenger is exponential). Under the assumption that the airport has only one checkpoint, answer the questions:
- (i) What is the probability that a passenger will have to wait before being checked for weapons?
 - (ii) On the average how many passengers are waiting in line to enter the checkpoint?
 - (iii) On the average, how long will a passenger spend at the checkpoint?

- 8 A project plan is as follows:

Activity	A	B	C	D	E	F	G	H	I	J
Predecessor	-	A	B	B	D	B	F	C,E,G	H	I
Time	5	4	7	1	5	6	2	3	4	1

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