

Code: 14E00205

MBA II Semester Supplementary Examinations June 2019

OPERATIONS RESEARCH

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

Time: 3 hours

Max. Marks: 60

All questions carry equal marks

SECTION – A

Answer the following: (05 X 10 = 50 Marks)

- 1 Explain about nature, scope and quantitative analysis as a frame work for managerial decisions.
- 2 Use simplex method to solve the following L.P.P maximize $Z = 4x_1 + 10x_2$ subject to the constant $2x_1 + x_2 \leq 50$, $2x_1 + 5x_2 \leq 100$, $2x_1 + 3x_2 \leq 90$.
 $x_1, \geq 0$ and $x_2 \geq 0$.
- 3 Find the starting solution in the following transportation problem by Vogel's approximation method. Also obtain the optimum solution:

	D_1	D_2	D_3	D_4	Supply
S_1	3	7	6	4	5
S_2	2	4	3	2	2
S_3	4	3	8	5	3
Demand	3	3	2	2	

OR

- 4 Solve the following transportation problems to maximize the profit

	Destination				Supply
	40	25	22	33	100
Source	44	35	30	30	30
	38	38	28	30	70
Demand	40	20	60	30	

- 5 In a factors, there are Six jobs to perform, each which should go through two machines A and B in the order the processing timings (in hours) for the jobs are given here. You are required to determine the sequence for performing the jobs that would minimize the total elapsed time T. What is the value of T?

Job	J_1	J_2	J_3	J_4	J_5	J_6
Machine A	1	3	8	5	6	3
Machine B	5	6	3	2	2	10

OR

- 6 Consider a "modified" form of matching biased coins game problem. The matching player is paid Rs. 8.00 if the two coins turn both heads and Rs. 1.00 if the coins turn both tails. The non-matching player is paid Rs. 3.00 when the two coins do not match. Given the choice of being the matching or non-matching player, which one would you choose and what would be your strategy.

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- 7 Assume that the goods trains are coming in a yard at the rate of 30 trains per day and suppose that the inter-arrival times follow an exponential distribution. The service time for each train is assumed to be exponential with an average of 36 minutes. If the yard can admit 9 trains at a time (There being 10 lines, one of which is reserved for shunting purposes). Calculate the probability that yard is empty, find the average wave length.

OR

- 8 If for a period of 2 hours in the day (8 to 10 a.m.) Trains arrive at the yard every 20 minutes but the service time continues to remain 36 minutes then calculate for this period:
(i) The probability that the yard is empty.
(ii) Average number of trains in the system, on the assumption that the line capacity of the yard is limited to 4 trains only.

- 9 In a machine shop a particular cutting tool costs Rs.6 to replace. If a tool breaks on the job, the production disruption and associate costs amount Rs.30. The part life of a tool is given as follows:

Job No	1	2	3	4	5	6	7
Proportion of broken tools on job	0.01	0.03	0.09	0.13	0.25	0.55	0.95

After how many jobs, should the shop replace a tool before it breaks down?

OR

- 10 A small project is composed of seven activities whose time estimates are listed in the as follows:

Activity		Estimated duration (weeks)		
i	j	Optimistic	Most likely	Pessimistic
1	2	1	1	7
1	3	1	4	7
1	4	2	2	8
2	5	1	1	1
3	5	2	5	14
4	6	2	5	8
5	6	3	6	15

- (a) Draw the project network.
(b) Find the expected duration and variance of each activity. What is the expected project length?
(c) Calculate the variance and standard deviation of project length. What is the probability that the project will be completed: (i) At least 4 weeks earlier than expected? (ii) No more than 4 weeks later than expected.

SECTION – B

(Compulsory question, 01 X 10 = 10 Marks)

- 11 **Case Study/Problem:**

Five men are available to do five different jobs. From past records, the time (in hours) that each man takes to do each job is known and given in the following table:

		Jobs				
		I	II	III	IV	V
Men	A	2	9	2	7	1
	B	6	8	7	6	1
	C	4	6	5	3	1
	D	4	2	7	3	1
	E	5	3	9	5	1

Find the assignment of men to jobs that will minimize the total time taken.