(iv) Estimate the fraction of a day that the phone will be in use.

7. (a) Discuss the similarities and differences of PERT and CPM.

(b) Describe application of network techniques.

(c) Discuss the role of network models of operation research for managerial Decision making.

(d) Describe the all types of Floats used in Network models.

Section–D

8. (a) What is decision - making ? What are the different environment in which decision are made ?

(b) Writre short notes on :

(i) Decision environments

(ii) Advantages and limitations of decision tree.

9. (a) Discuss the methods of Monte Carlo Simulation.

(b) A manufacturing company purchases 9000 parts of machine for its annual requirements, ordering one month usage at a time. Each part cost Rs. 20. The ordering cost per order is Rs. 1 5 and carrying charges are 15% of the avarage inventory per year. You have been assinged to suggest a more economical purchasing policy for the Company. What advice would you offer and how much would it save the company per year ?

B. Tech. 7th Semester (ME) F-Scheme Examination,

December–2017

OPERATION RESEARCH

Paper–ME–405-F

Time allowed : 3 hours] *[Maximum marks : 100*

Note : ***Question No. 1 is compulsory.*** *Attempt total 5 questions with selecting* ***one*** *question from each section.All questions carry equal marks.*

1. (a) Discuss various phases is solving an O.R problem.

(b) Write a note on sensitivity analysis in LPP

(c) Discuss the various parameters for Queuing problem.

(d) Define float. Explain its different types and their importance

(E) Write a short note on M/M/1 models and their applications. 4×5

Section–A

2. (a) Discuss applications and limitations of O.R. What are different models used in OR ?

(b) Solve the following LP Problem by Simplex Method

Max. $Z = 4x_1 + 3x_2$

Subject to

$x_1 + x_2 \leq 6$

$x_1 + 2x_2 \geq 4$

x_1 and $x_2 \geq 0$

3. Solve the following LP problem by BIG M method :

Minimize : $Z = 2x_1 + x_2$

Subject to : $3x_1 + x_2 = 3$

$4x_1 + 3x_2 \geq 6$

$x_1 + 2x_2 \leq 3$

$x_1, x_2 \geq 0$

Section–B

4. (a) Discuss the concept of degeneracy in transportation problems.

(b) Find the optimum solution to the following transportation problem in which the cells contain the transportation cost in rupees :

	W1	W2	W3	W4	W5
F1	7	6	4	5	9
F2	8	5	6	7	8
F3	6	8	9	6	5
F4	5	7	7	8	6

5. (a) What is the purpose of post-optimality and sensitivity analysis ?

(b) A marketing manager has 5 salesmen and 5 sales districts. Considering the capabilities of the salesmen and nature of districts, the marketing manager estimates that sales per month in hundreds of rupees for each salesman in each

district would be as follows.

		District				
		A	B	C	D	E
sales men	1	32	38	40	28	40
	2	40	24	28	21	36
	3	41	27	33	30	37
	4	22	38	41	36	36
	5	29	33	40	35	39

Find the assignment of salesmen to districts that would result in the maximum sales.

Section–C

6. The rate of arrival of customers at a public telephone booth follows Poisson distribution, with an average time of ten minutes between one customer and the next. The durations of the phone call is assumed to follow exponential distribution, with mean time of 3 minutes.

(i) What is the probability that a person arriving at the booth will have to wait ?

(ii) What is the average length of the non empty queues from time to time ?

(iii) The Mahanagar Telephone Nigam Ltd. will install a second booth when it is convinced that the customer would expect waiting for at least 3 minutes for their turn to make a call. By how much time should the flow of customers increase in order to justify a second booth ?