

SECTION - D

8. (a) Give a logical flow chart for single server and parallel server simulation model. 10
- (b) Three points are chosen at random on the circumference of a circle. Find by Monte Carlo method the probability that they lie on the same semi-circle. 10
9. (a) With suitable example discuss laplace criterion (Bayes criterion). 6
- (b) With suitable example describe criterion for realism (Hurwicz criterion). 6
- (c) A newspaper boy has the following probabilities of selling a magazine :

No. of Copies Sold	Probability
10	0.10
11	0.15
12	0.20
13	0.25
14	0.30

Cost of a copy is 30 paise and sale price is 50 paise. He cannot return unsold copies. How many copies should he order? 8

Roll No.

24478

B. Tech. 7th Semester (ME)

Examination – December, 2016

OPERATION RESEARCH

Paper : ME-405-F

Time : Three Hours] [Maximum Marks : 100

Before answering the question, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is compulsory. Attempt five questions in total by selecting at least one question from each Section. All question carry equal marks.

1. Discuss about following : 4 × 5 = 20
- (a) Decision making under certainty.
- (b) Float in network
- (c) Stepperg stone method
- (d) Post optimality

SECTION - A

2. (a) "Operation research is a tool for decision support system." Justify. 10
- (b) What are the ways of improving productivity ? Discuss the role of operation research in improving the productivity. 10

3. (a) Describe the assumptions made in Linear Programming. 5

(b) Solve the LP problem graphically : 15

$$\text{Maximize } Z = 100X_1 + 50X_2$$

Subject to :

$$4X_1 + 6X_2 \leq 24$$

$$X_1 \leq 4$$

$$X_2 \leq 4/3$$

$$X_1, X_2 \geq 0$$

SECTION - B

4. (a) Describe zero-one programming model for assignment problem and discuss types of assignment problem with suitable examples. 15

(b) Discuss practical application of transportation model. 5

5. (a) Prove that dual of a dual is primal. 5

(b) Solve the following LP problem using the result of its dual problem. 15

$$\text{Minimize } Z = 24X_1 + 30X_2$$

Subject to :

$$2X_1 + 3X_2 \geq 10$$

$$4X_1 + 9X_2 \geq 15$$

$$6X_1 + 6X_2 \geq 20$$

$$X_1, X_2, \geq 0$$

SECTION - C

6. (a) Discuss the application areas of queuing theory. 5

(b) Discuss in detail a deterministic queuing model. 5

(c) Vehicles pass through a toll gate at a rate of 90 per hour. The average time to pass through the gate is 36 seconds. The arrival rate and service rate follow Poisson distribution. There is complaint that the vehicles wait for long duration. The authorities are willing to install one more gate to reduce the average time to pass through the toll gate to 30 seconds if the idle time of the toll gate is less than 10% and the average queue length at the gate is more than 5 vehicles. Check whether the installation of the second gate is justified. 10

7. (a) Distinguish between resource leveling and resource allocation. 5

(b) Consider the data of a project as shown in table :

Activity	Normal Time (weeks)	Normal Cost (Rs.)	Crash Time (weeks)	Crash Cost (Rs.)
1-2	13	700	9	900
1-3	5	400	4	460
1-4	7	600	4	810
2-5	12	800	11	865
3-2	6	900	4	1130
3-4	5	1000	3	1180
4-5	9	1500	6	1800

If the indirect cost per week is Rs. 160, find the Optimal crashed project completion time. 15