USN | | | | | | | | | |

10MN761

Seventh Semester B.E. Degree Examination, Dec.2019/Jan.2020
Operations Research

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO full questions from each part.***

PART – A

1 a. What is Operations Research? Explain the steps (phases) involved in the problem solving procedures of OR. **(14 Marks)**

b. What are the features and limitations of OR. **(06 Marks)**

2 a. With the notations used, explain the canonical form of LPP. **(06 Marks)**

b. Explain the following terms:
i) Feasible solution
ii) Optimal solution
iii) Redundancy
iv) Degeneracy. **(04 Marks)**

c. Solve the given LPP, graphically
Maximize $Z = x + 1.5y$
Subject to the constrain $x + 2y \leq 160$
$3x + 2y \leq 240$
$x, y \geq 0$ **(10 Marks)**

3 a. Explain Big-M method with steps. **(08 Marks)**

b. Solve the given LPP by dual simplex method
Minimize $Z = 2x_1 + x_2$
Subject to constraint $3x_1 + x_2 \geq 3$
$4x_1 + 3x_2 \geq 6$
$x_1 + 2x_2 \geq 3$
$x_1, x_2 \geq 0$ **(12 Marks)**

4 a. Find the basic feasible solution for the given transportation problem by
i) North-west corner rule
ii) Least cost method
iii) Vogel's approximation method.

	P	Q	R	Supply
A	5	7	8	70
B	4	4	6	30
C	6	7	7	50
Demand	65	42	43	

Table 4(a) **(10 Marks)**

b. Explain the steps involved in solving transportation problem using MODI-method in case of degeneracy. **(10 Marks)**

PART – B

5 a. Explain Queue discipline. **(10 Marks)**
b. Explain M/M/I Quenching Model. **(10 Marks)**

6 a. Explain:
i) PERT
ii) Optimistic time (t_o)
iii) Pessimistic time (t_p)
iv) Most likely time (t_m) **(08 Marks)**
b. The three times estimates of a certain project are given below Table 6(b) Draw network, find the control path.

Activity	Time Optimist	Time Normal	Time Pessimistic
0-1	2	3	4
1-3	15	16	17
1-2	3	06	9
1-4	6	10	14
2-3	4	8	12
3-4	3	5	7
4-5	2	3	4

Table 6(b)

(12 Marks)

7 a. Explain the basic steps involved in PERT/CPM techniques. **(06 Marks)**
b. Write the advantages and application of PERT/CPM. **(10 Marks)**
c. Explain the common errors committed in Network C onstruction. **(04 Marks)**

8 a. What are the characteristics of a Game? **(06 Marks)**
b. List the assumptions made in Two-Person-Zero sum game. **(06 Marks)**
c. Define the following:
i) Strategy
ii) Mixed strategy
iii) Pure strategy
iv) Saddle point. **(08 Marks)**

* * * * *