Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF MANAGEMENT

BBA Winter 2019 - 20 Examination

Semester: 5 **Date: 16/12/2019**
Subject Code: 06191306 **Time: 10:30am to 1:00pm**
Subject Name: Operations Research **Total Marks: 60**

Instructions

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Do as Directed.

A). Multiple choice type questions. (Each of 1 mark) **(05)**

1. The value of the fair game
   a) 0 c) 1
   b) -1 d) None of the above
2. The degeneracy arises in transportation problem when positive allocations are not equal to…
   a) $m - n$ c) $m + n - 1$
   b) $m + n$ d) $m + n + 1$
3. Which method is used to verify the optimality of the current solution of the Transportation problem
   a) Least cost method c) Vogel's approximation method
   b) Modi Method d) All of the above
4. Optimal solution is obtained in LP model,
   a) $c_j - z_j \leq 0$ c) $c_j - z_j \geq 0$
   b) $c_j - z_j > 0$ d) None of the above
5. A balanced transportation problem is,
   a) Supply=demand c) supply is not equal to demand
   b) supply>demand d) none of these

B). Define the following. (Each of 1 mark) **(05)**

1. Group Replacement Policy
2. Critical Path
3. Dominance rule in Game theory
4. Hungarian Method
5. MODI Method

C). Direct questions. (Each of 1 mark) **(05)**

1. If transportation problem is unbalanced, then how can you solve transportation problem.
2. Define Basic feasible solution in LP model.
3. Write Limitations of Operations Research
4. Define Unbalanced Assignment problem
5. Define Saddle point in Game theory.

Q.2 Answer the following questions.

A). Use the graphical method to solve the following LP problem. **(07)**

Maximize Z=10x+ 6y

Subject to constraints,

$$5x + 3y \leq 30$$
$$x + 2y \leq 18$$
$$x, y \geq 0$$

B). Find optimal solution (MODI) for following problem **(08)**

	D_1	D_2	D_3	D_4	Supply
S_1	19	30	50	10	7
S_2	70	30	40	60	9
S_3	40	8	70	20	18
Demand	5	8	7	14	34

Q.3 Answer the following questions.

A). Solve the assignment problem for minimization. **(07)**

	Jobs				
Machines	1	2	3	4	5
A	9	6	5	4	2
B	7	6	3	2	8
C	6	7	4	5	3
D	2	6	4	9	6

B). The data on the operating costs per year and resale prices of equipment A whose purchase price is Rs. 10,000 are given here: **(08)**

Year	1	2	3	4	5	6	7
Operating cost (Rs)	1500	1900	2300	2900	3600	4500	5500
Resale value (Rs)	5000	2500	1250	600	400	400	400

What is the optimum period for replacement?

Q.4 Attempt any two questions. (Each of 7.5 mark) **(15)**

A) Find value of game and best strategy for each player.

	Player B			
Player A	B_1	B_2	B_3	B_4
A_1	1	7	3	4
A_2	5	6	4	5
A_3	7	2	0	3

B) Write difference between CPM and PERT and consider the network which consists following activities. Draw the diagram,

Activity	A	B	C	D	E	F	G	H	I	J
Predessors	-	-	A, B	A, B	B	C	D	F, G	F, G	E, H

C) Solve LPP by Simplex method.

$$\max z = 3x_1 + 2x_2$$
$$x_1 + x_2 \leq 4$$
$$x_1 - x_2 \leq 2$$
$$x_1, x_2 \geq 0$$