Seat No: _____ Enrollment No: _____

PARUL UNIVERSITY

FACULTY OF MANAGEMENT

BBA, Summer 2017 - 18 Examination

Semester: 5 **Date: 13/06/2018**
Subject Code: 06191306 **Time: 10:30 am to 01: 00 pm**
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/Fill in the blanks. (Each of 1 mark) **(05)**

1. The column which is introduced in the matrix to balance rim requirements, is known as
   a) Key column c) Slack column
   b) Dummy column d) Idle column
2. Transportation problem is basically a
   a) Maximization c) Minimization
   b) Transshipment d) Iconic
3. The total number of allocation in a basic feasible solution of transportation problem of $m \times n$ size is equal to:
   a) m+n-1 c) mn
   b) m/n d) m+n+1
4. If u_i and v_j are row and column numbers respectively, then the implied cost is given by:
   a) $u_i\, v_j$ c) $u_i + v_j$
   b) $u_i - v_j$ d) u_i / v_j
5. Graphical method is suitable for,
   a) 2 variable LPP c) 5 variable LPP
   b) n variable LPP d) none of these

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

1. What is an assignment problem? Explain it with an example.
2. What is basic feasible solution.
3. What is Vogel's approximation method?
4. What is transportation problem.
5. Define LPP.

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

1. Define Artificial variable.
2. Define Degenerate solution.
3. Define Slack variable.
4. VAM stands for…….
5. MODI stands for…….

Q.2 Answer the following questions.

A. Determine the age at which the following type of machine be replaced: Cost price is Rs 8,000. Operating price is Rs 1,000 for the first year; increasing by Rs 500 every year. Resale value is Rs 4,000 for the first year and decreasing by Rs 500 every year. **(07)**

B. Solve, by graphical method, maximize $z = 18x_1 + 16x_2$ **(08)**
Subject to

$$15x_1 + 25x_2 \leq 375$$
$$24x_1 + 11x_2 \leq 264 \;\&\; x_1, x_2 \geq 0$$

Q.3 Answer the following questions.

(07)

A. Three jobs X, Y and Z are to be done on three machines P, Q and R. The following matrix shows the costs of doing different jobs on different machines. Assign the three jobs to the three machines so as to minimize the total cost.

	Machines (cost in Rs.)		
Jobs	P	Q	R
X	21	24	31
Y	11	19	17
Z	15	17	13

(08)

B. For the game with payoff matrix

	Player B		
Player A	B_1	B_2	B_3
A_1	-1	2	-2
A_2	6	4	-6

Determine the optimal strategy for players A and B. Also determine value of game.

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

1. Write Definition of Operation Research and define its scope and limitations.
2. Write short note on CPM and PERT network.
3. Obtain initial basic feasible solution by Least cost method.

	D_1	D_2	D_3	D_4	Supply
S_1	8	5	9	7	20
S_2	6	4	2	10	40
S_3	6	1	3	3	60
Demand	20	50	25	25	120

4. Solve LPP by Simplex method

$Max\ z = 3x_1 + 4x_2$

subject to constraint

$2x_1 + 3x_2 \le 16,$

$2x_1 + x_2 \le 8,$

$x_1, x_2 \ge 0$