LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **STATISTICS**

SIXTHSEMESTER – APRIL 2017

ST 6604 / ST 6607 - OPERATIONS RESEARCH

Date: 22-04-2017 Dept. No. Max. : 100 Marks
09:00-12:00

PART-A

Answer ALL the questions: (10x2=20)

1. Define objective function.
2. Define non-degenerate basic solution
3. Define pseudo-optimal solution.
4. When the dual simplex method is used?
5. Define balanced transportation problem.
6. Give mathematical formulation of a transportation problem.
7. What is a project?
8. Define activity in a network analysis.
9. Define states of nature.
10. Define saddle point for a game.

PART-B

Answer any five questions:- (5x8=40)

11. Explain in detail about the main phases of OR.
12. A company produces 2 types of hats. Each hat A require twice as much labour time as the second hat B. If all are of hat B only, the company can produce a total of 500 hats a day. The market limits daily sales of the hat A and hat B to 150 and 250 hats. The profits on hat A and B are Rs. 8 and Rs.5 respectively. Solve graphically to get the optimal solution.
13. Describe briefly the Big-M method of solving a LPP with artificial variables.
14. Construct the network for the project whose activities and their precedence given below: A,B,C can start simultaneously $A < F, E$; $B < D$, $C, E, D < G$.
15. Explain in detail about four methods in decision theory with example.
16. Explain the simplex algorithm of solving a Linear programming problem.
17. The assignment cost of assigning any one operator to any one machine is given in the following table.

Operators Machine	I	II	III	IV
A	10	5	13	15
B	3	9	18	3
C	10	7	3	2
D	5	11	9	7

Find the optimum assignment schedule.

18. How a game will be solved when saddle point does not exists?

PART-C

Answer any Two questions: **(2x20=40)**

19. a). Explain the general methods of Solving O.R. models.

b). Use simplex method to

$$Min\ Z = x_2 - 3x_3 + 2x_5$$
$$subject\ to,$$
$$3x_2 - x_3 + 2x_5 \leq 7$$
$$-2x_2 + 4x_3 \leq 12$$
$$-4x_2 + 3x_3 + 8x_5 \leq 10$$
$$and\ x_2, x_3, x_5 \geq 0$$

20. a. Use penalty method to solve

$$Max\ Z = 2x_1 + x_2 + x_3$$
$$4x_1 + 6x_2 + 3x_3 \leq 8$$
$$3x_1 - 6x_2 - 4x_3 \leq 1$$
$$2x_1 + 3x_2 - 5x_3 \geq 4$$
$$and\ x_1, x_2, x_3 \geq 0$$

b. Explain the disadvantage of Big-M method over Two- phase method.

21. a. Solve the transportation problem with unit transportation costs, demands and supplies as given below:

Destination Source	D1	D2	D3	D4	Supply
S1	6	1	9	3	70
S2	11	5	2	8	55
S3	10	12	4	7	70
Demand	85	35	50	45	

b. Compute the earliest start, earliest finish latest start and latest finish of each activity of the project given below:

Activity	1-2	1-3	2-4	2-5	3-4	4-5
Duration (in days)	8	4	10	2	5	3

22. a. For the following cost matrix suggest the best decision according to

(i) Maximin Criterion

(ii) Hurwicz criterion with α=0.2

	States of nature	
Decision	N1	N2
D1	30	35
D2	-20	10

Here the negative quantities represent profit.

b. Using graphical method, solve the rectangular game whose payoff matrix for player A is

Player B

$$\text{Player A} \begin{bmatrix} 2 & -1 & 5 & -2 & 6 \\ -2 & 4 & -3 & 1 & 0 \end{bmatrix}$$

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