ST. JOSEPH'S EVENING COLLEGE (AUTONOMOUS)
II SEMESTER BCA EXAMINATIONS APRIL 2018

OPERATIONS RESEARCH

Duration: 2.5 Hours   **Max. Marks: 70**

SECTION - A

I)   **Answer any SIX of the following questions.**   **(6x3=18)**

1. What is Operation research? Mention any three limitations of OR.
2. Define Slack and Surplus variable with an example.
3. Briefly explain Least-cost Method.
4. What is balanced and unbalanced Transportation problem?
5. Explain the saddle point with an example.
6. Differentiate between PERT and CPM.
7. What are pure strategy and mixed strategy? Explain the difference.
8. Two players A and B match coins. If the coins match, then A gets Rs 5 from B and if the coins do not match B gets Rs 10 from A. Write the pay-off matrix and then solve the games.

SECTION - B

II)   **Answer any FOUR of the following questions.**   **(4x8=32)**

9. Solve by using Graphical Method

    Max $Z=20X_1 + 30X_2$

    STC $3X_1 + 3X_2 \leq 36$

    $5X_1 + 2X_2 \leq 50$

    $2X_1 + 6X_2 \leq 60$

    $X_1 , X_2 \geq 0$

10. Use Big-M method to maximize:

    $Z=3X_1 - X_2$

    STC $2X_1 + X_2 \geq 2$

    $X_1 + 3X_2 \leq 3$

    $X_2 \leq 4$

    $X_1, X_2 \geq 0$

11. A company has factories at F1, F2 and F3 which supply to warehouses at W1, W2 and W3. Weekly factory capacities are 200, 160 and 90 units, respectively. Weekly warehouse requirements are 180, 120 and 150 units, respectively. Unit shipping costs (in rupees) are as follows:

	W_1	W_2	W_3	Supply
F_1	16	20	12	200
F_2	14	8	18	160
F_3	26	24	16	90
Demand	180	120	150	450

Find optimum solution using Modified distributed method.

12. Four jobs (J1, J2, J3, and J4) need to be executed by four workers (W1, W2, W3, and W4), one job per worker. The matrix below shows the cost of assigning a certain worker to a certain job. Solve this assignment problem by using Hungarian Method.

	J1	J2	J3	J4
W1	82	83	69	92
W2	77	37	49	92
W3	11	69	5	86
W4	8	9	98	23

13. Explain VAM for obtaining an initial basic feasible solution.

14. Following is a payoff matrix for a two person zero sum given

Player B

		I	II	III
	I	-3	5	-3
Player A	II	1	3	5
	III	-3	7	11

Using Minimax criterion , find the best strategy for each player.

SECTION - C

III)   Answer any TWO of the following questions.   (2x10=20)

15. Maximize Z = 2x + 4y
    subject to the constraints x + 4y ≤ 12,
                               x + 3y ≤ 10,
                               x ≥ 0, and y ≥ 0
    Solve using Simplex Method.

16. Find the initial Basic feasible solution using VAM.

	W1	W2	W3	W4	capacity
F1	19	30	50	10	7
F2	70	30	40	60	9
F3	40	8	70	20	18
Requirement	5	8	7	14	

17. Consider the details of a project as shown in the table.

Job	Job Time(days)	Immediate Predecessors
A	13	-
B	8	A
C	10	B
D	9	C
E	11	B
F	10	E
G	8	D,F
H	6	E
I	7	H
J	14	G,I
K	18	J

a) Construct the CPM network.
b) Determine the critical path and project completion time.
c) Prepare a table of floats (Free and total).