CLASS:	**B.TECH**	**SEMESTER: III**
BRANCH:	**PRODUCTION**	**SESSION : MO/2019**

SUBJECT : PE203 OPERATIONS RESEARCH

TIME: 2:00 HOURS   **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 25.
2. Candidates may attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.

Q1 (a) Define OR and discuss its scope and limitations.   [2]

   (b) Four factories, A, B, C and D produce sheet metals and the capacity of each factory is   [3]
        given below: Factory A produces 10 tons of metals and B produces 8 tons of metals, C
        produces 5 tons of metals and that of D is 6 tons of metals. The metal has demand in
        three markets X, Y and Z. The demand of market X is 7 tons, that of market Y is 12
        tons and the demand of market Z is 4 tons. The following matrix gives the
        transportation cost of 1 ton of metal from each factory to the destinations. Formulate
        the LP model to minimize the transportation cost.

Factories	Cost in Rs. per ton (× 100) Markets			Availability in tons
	X	Y	Z	
A	4	3	2	10
B	5	6	1	8
C	6	4	3	5
D	3	5	4	6
Requirement in tons	7	12	4	

Q2   Solve the following LP problem graphically: [5]
     Maximize Z = X +2Y
     Subject to Contraints:
$$3X + 2Y \leq 12$$
$$X + 2.3Y \leq 6.9$$
$$X + 1.4Y \leq 4.9$$
$$X, Y \geq 0$$

Q3   Solve the problem by simplex method: [5]
     Maximize Z = 3X1+ 2X2+ 5X3
     Subject to Contraints:
$$X1+2X2 +X3 \leq 430$$
$$3X1+2X3 \leq 460$$
$$X1+4X2 \leq 420 \qquad X1,X2,X3 \geq 0$$

Q4   Use duality to solve the problem.   [5]
$$Minimize \quad Z = x_1 - x_2$$
$$Subjected\,to\ 2x_1 - x_2 \geq 2$$
$$-x_1 + x_2 \geq 1$$
$$x_1, x_2 \geq 0$$

Q5   A company has three factories that supply to four marketing areas. The transportation   [5]
     cost of shipping from each factory to each marketing area is given in table below.
     Factory capacities and market requirements are also given in the table:

MARKETING AREA					
FACTORY	W1	W2	W3	W4	CAPACITY
F1	19	30	50	10	1600
F2	70	30	40	60	1200
F3	40	8	70	20	1700
DEMAND	1000	1500	800	1200	

Find the initial feasible solution by NWCR, Least cost method & VAM method.