

**MASTER OF BUSINESS ADMINISTRATION  
SECOND SEMESTER  
OPERATION RESEARCH  
MBA-207**

**Duration: 3 Hrs.**

**Marks: 70**

$$\left\{ \begin{array}{l} \text{PART : A (OBJECTIVE) = 20} \\ \text{PART : B (DESCRIPTIVE) = 50} \end{array} \right\}$$

[ PART-B : Descriptive ]

**Duration: 2 Hrs. 40 Mins.**

**Marks: 50**

[ Answer question no. One (1) & any four (4) from the rest ]

1. When Sub -Games Method used to solve a game with mixed strategy? (10)  
Solve the following Game.

B	A	I	II	III	IV	V
I		-5	5	0	-1	8
II		8	-4	-1	6	-5

2. a. Explain the role of operations research in management. (5+5=10)  
b. What are the different types of models used in operations research?  
Explain any two.
3. a. What do you mean by divisibility and non-negativity in context of LPP? (5+5=10)  
b. A company produces two types of pen, say A and B. Pen A is a superior quality and pen B is a lower quality. Profit on pens A and B is Rs.5 and Rs.3 per pen respectively. Raw material required for each pen A is twice as that for pen B. The supply of raw materials is sufficient only for 1000 pens of type B per day. Pen A requires a special clip and only 400 such clips are available per day. For pen B, only 700 clips are available per day. Formulate the problem as a linear programming model in order to maximize the profit.
4. a. Distinguish between surplus and artificial variable. (3+4=10)



b. Solve the following LPP by Graphical Method or by Simplex method.

Maximize  $Z = 6X_1 + 8X_2$  Profit function  
 Subject to  $30X_1 + 20X_2 \leq 50$  Raw Material Constraints  
 $5X_1 + 10X_2 \leq 60$  Labour constraints  
 Where  $X_1, X_2 \geq 0$

5. a. Describe the assignment problem giving a suitable example. Give two areas of its application. (5+5=10)  
 b. Solve the following Assignment problem. The cost of performing each job by each man is given below (in Rs.)

Men \ Jobs	P	Q	R	S	S
A	5	3	2	8	40
B	7	9	2	6	45
C	4	6	5	7	50
D	5	7	7	8	55

Find the optimal Assignment that will result in minimum cost to perform the jobs.

6. What do you mean by un-Balanced transportation problem? How it can be solved? (10)  
 Find the optimal minimum value of the following transportation problem by using NWCM and LCEM and compare the value and give your interpretation.

(The data given in the table refer to Production in units)

Machines \ Operators	A	B	C	D	Available
1	1	2	4	4	8
2	4	3	2	0	6
3	0	2	2	1	10
Required	4	6	8	6	24

7. a. When a competitive situation is called a game? (5+5=10)  
 b. What are the different types of strategy employed in game theory? Discuss.
8. a. What do you mean by utility and regret in context of decision theory? (5+5=10)  
 b. In the following table pay-offs of three acts  $A_1, A_2, A_3$  and the events  $E_1, E_2, E_3$ .

Events	Acts		
	$A_1$	$A_2$	$A_3$
$E_1$	25	-10	-125
$E_2$	400	440	400
$E_3$	650	740	750

The probabilities of the states of nature are respectively 0.1, 0.7 and 0.2. Calculate and tabulate E.M.V and conclude which of the acts can be chosen as the best.

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**[ PART-A : Objective ]**

Choose the correct answer from the following:

1X20=20

1. Operations research approach is \_\_\_\_\_.  
a. Multi-disciplinary  
 b. Scientific  
c. Intuitive  
d. All of these
2. Most of the constraints in the linear programming problem are expressed as \_\_\_\_\_.  
a. Equations  
 b. Inequalities  
c. Both a) and b)  
d. None of these
3. Every linear programming problem includes \_\_\_\_\_ which relates variables in the problem to the goal of the firm.  
a. Constraints  
 b. Objective function  
c. Inequalities  
d. None of these
4. Slack variables are added to constraints of the \_\_\_\_\_ type and the objective function is of maximization.  
a. =  
 b.  $\leq$   
c.  $\geq$   
d. None of these
5. Leaving variable is selected with key row having positive \_\_\_\_\_ ratio.  
a. Maximum  
 b. Minimum  
c. Both of these  
d. None of these
6. Assignment problem deals in allocating the various resources or items to various activities on \_\_\_\_\_ basis in such a way that the time or cost involved is minimised and sale or profit is maximised.  
 a. One to one  
b. One to many  
c. Many to one  
d. None of these

7. \_\_\_\_\_ is the most systematic and easiest method for obtaining initial feasible solution.  
a. Stone square method  
b. North west corner method  
c. Lowest cost entry method  
d. None of these
8. When total supply is equal to the total demand in a transportation problem, the problem is said to be \_\_\_\_\_.  
a. Unbalanced problem  
b. Balanced problem  
c. Maximisation problem  
d. None of these
9. Two person zero-sum game means that the sum of \_\_\_\_\_ to one player is Equal to the sum of the \_\_\_\_\_ to other player.  
a. Gain, loss  
b. Alternatives, Courses of action  
c. Income, Expenditure  
d. None of these
10. The rules of \_\_\_\_\_ are used to reduce the size of the payoff matrix.  
a. Probability Method  
b. Odds Method  
c. Dominance  
d. None of these
11. Use of ODDS method is possible only in case of games with \_\_\_\_\_ matrix.  
a. 2x2  
b. 3x3  
c. 4x2  
d. 2x4
12. The \_\_\_\_\_ in a pay off matrix is one which is the smallest value in its row and the largest value in its column.  
a. Saddle point  
b. Pure strategies  
c. Odds  
d. None of these
13. \_\_\_\_\_ techniques used to allocate scarce resources in an optimum manner in problems of scheduling, product mix etc.  
a. Assignment Problem  
b. LPP  
c. Network analysis  
d. None of these





14. The quantitative approach to decision analysis is a \_\_\_\_\_.
- logical approach
  - Rational approach
  - Scientific approach
  - All of the above
15. Constraints in an LP Model represents
- Limitations
  - Requirements
  - Balancing limitations and requirements
  - All of the above
16. If a negative value appears in the solution values column of the simplex table, then
- The solution is optimal.
  - The solution is infeasible.
  - The solution is unbounded.
  - None of these.
17. A game whose decision value is zero is termed as \_\_\_\_\_ game.
- Competitive
  - Fair
  - Both a and b
  - None of these
18. In decision theory  $EVPI =$  \_\_\_\_\_
- $EPPI +$  Maximum EMV
  - $EPPI -$  Maximum EMV
  - $EPPI +$  Minimum EMV
  - None of these
19. The statistical decision theory is also known as \_\_\_\_\_.
- Bayesian decision theory
  - Parametric decision theory
  - Both a & b
  - None of these
20. The course of action that maximizes the minimum possible pay-off is called \_\_\_\_\_ decision criteria.
- Maximin
  - Maximax
  - Minimax Regret
  - None of these

Course : .....

Semester : ..... Roll No : .....

Enrollment No : ..... Course code : .....

Course Title : .....

Session : ..... 2016-17 ..... Date : .....

**Instructions / Guidelines**

- The paper contains twenty (20) / ten (10) questions.
- The student shall write the answer in the box where it is provided.
- The student shall not overwrite / erase any answer and no mark shall be given for such act.
- Hand over the question paper cum answer sheet (Objective) within the allotted time (20 minutes / 10 minutes) to the invigilator.

Full Marks	Marks Obtained	Remarks
20		

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Scrutinizer's Signature

Examiner's Signature

Invigilator's Signature