

**M.SC. MATHEMATICS
THIRD SEMESTER
OPERATION RESEARCH
MSM - 304B**

**SET
A**

[USE OMR FOR OBJECTIVE PART]

Duration: 1:30 hrs.

Full Marks: 35

Time: 15 mins.

(Objective)

Marks: 10

Choose the correct answer from the following:

1×10=10

1. In operation research, theare prepared for situations.
 - a. Mathematical Models
 - b. Physical Models diagrammatic
 - c. Diagrammatic Model
 - d. All of these
2. Operations research is based upon collection information, Knowledge and advanced study of various factors impacting a particular operation. This lead to more informed.....
 - a. Management Processes
 - b. Decision Making
 - c. Procedure
 - d. None of these
3. Which of the following is not the phase of OR methodology?
 - a. Formulating a problem
 - b. Constricting a model
 - c. Establishing controls
 - d. Controlling the environment
4. Operation research was known as ability to win a war without really going in to.
 - a. Battle Field
 - b. Fighting
 - c. The opponent
 - d. Both A and B
5. Operation research has a characteristics that it is done by a team of
 - a. Scientists
 - b. Mathamaticians
 - c. Academics
 - d. All of the above
6. Hungarian Method is used to solve
 - a. A transportation problem
 - b. A travelling salesman problem
 - c. A L.P. problem
 - d. Both a & b
7. Operations research used models to help the management to determine its
 - a. Policies
 - b. Actions
 - c. Both A and B
 - d. None of the above
9. Which technique is used in finding a solution for optimizing a given objective, such as profit maximization or cost reduction under certain constrain.
 - a. Quailing Theory
 - b. Waiting Line
 - c. Both A and B
 - d. None of these

9. OR techniques help the directing authority in optimum allocation of various limited resources like _____
- Men and Machine
 - Money
 - Material and Time
 - All of the above.
10. Consider the linear equation $2x + 3x^2 - 4x^3 + 5x^4 = 10$. How many basic and non-basic variables are defined by this equation?
- One variable is basic, three variables are non-basic
 - Two variables are basic, two variables are non-basic
 - Three variables are basic, one variable is non-basic
 - All four variables are basic

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(Descriptive)

Time : 1 hr. 15 mins.

Marks : 25

[Answer question no.1 & any two (2) from the rest]

- Define 5
 - Basic Solution,
 - Feasible Solution,
 - Optimal Solution,
 - Non Degenerate BSF,
 - Linear Programming Problem
- Find all the basic solutions of the following system 10

$$\begin{aligned} x_1 + 2x_2 + x_3 &= 4 \\ 2x_1 + x_2 + 5x_3 &= 5 \end{aligned}$$

And prove that they are non-degenerate.
- A Food X contains 6 units of vitamin A per gram and 7 units of vitamin B per gram and costs 12 paise per gram. Food Y contains 8 units of vitamin A per gram and 12 units of vitamin B per gram and cost 20 paise per gram. The daily minimum requirement of vitamin A and vitamin B is 100 units and 120 units respectively. Formulate and Find the minimum cost of product mix by the Big M method. 3+7=10

4. a. Solve by TWO PHASE method

7+3=10

Maximum $Z = 5x_1 + 3x_2$

Subject to $x_1 + 4x_2 \leq 24$

$3x_1 + x_2 \leq 21$,

$x_1 + x_2 \leq 9$

$x_1, x_2 \geq$

- b. Solve the following Transportation problem by NORTH WEST CORNER method

	W_1	W_2	W_3	Supply
F_1	2	7	4	5
F_1	3	3	1	8
F_1	5	4	7	7
F_1	1	6	2	14
Demand	7	9	18	34

5. a. Describe the role of operation research in India

5+5=10

- b. Maximum value of $Z = 2x_1 + 3x_2$ with the help of Graphical method.

Subject to $x_1 + x_2 \leq 30$

$x_2 \geq 3$

$x_2 \leq 12$

$x_1 - x_2 \geq 0$

$0 \leq x_1 \leq 20$

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