

Roll No.

Total No. of Pages : 03

Total No. of Questions : 09

BBA (Sem.-5)

OPERATION RESEARCH

Subject Code : BBA-501-18

M.Code : 78193

Date of Examination : 09-12-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTIONS-B** consists of **FOUR** Sub-sections : Units-I, II, III & IV.
3. Each Sub-section contains **TWO** questions each, carrying **TEN** marks each.
4. Student has to attempt any **ONE** question from each Sub-section.

SECTION-A

- 1. Write short notes on:**
- a) Basic components of OR Models
 - b) Limitations of OR
 - c) General structure of Linear Programming
 - d) Functions of Artificial Variables.
 - e) Unbalanced transportation problem.
 - f) Optimal Solution
 - g) Merits and Demerits of PERT
 - h) Total elapsed time in sequencing problem
 - i) Group replacement policy
 - j) Identification of critical path.

SECTION-B

UNIT-I

2. State three commonly used OR techniques in India. Briefly explain each one them.
3. **Solve the following LPP : Using Big M Method**

$$\begin{array}{ll}\text{Minimize} & Z = 5X_1 + 6X_2 \\ \text{Subject to,} & 2X_1 + 5X_2 \geq 1500 \\ & 3X_1 + X_2 \geq 1200 \\ & X_1, X_2 \geq 0\end{array}$$

UNIT-II

4. A company has three production facilities S₁, S₂ and S₃ with production capacity of 7, 9 and 18 units (in 100s) per week of a product, respectively. These units are to be shipped to four warehouses D₁, D₂, D₃ and D₄ with requirement of 5, 8, 7 and 14 units (in 100s) per week, respectively. The transportation costs (in rupees) per unit between factories to warehouses are given in the table below :

	Warehouse				Supply (Availability)
	D ₁	D ₂	D ₃	D ₄	
S ₁	19	30	50	10	7
S ₂	70	30	40	60	9
S ₃	40	8	70	20	18
Demand (Requirement)	5	8	7	14	34

Use Least Cost Method (LCM) to find an initial basic feasible solution to the transportation problem.

5. What do you mean by Travelling salesman problem? Also write down the steps of Travelling Salesman Problems.

UNIT-III

6. A Book binder has one printing press, one binding machine and manuscripts of 7 different books. The times required for performing printing and binding operations for different books are shown below:

Book :	1	2	3	4	5	6	7
Printing time (hours) :	20	90	80	20	120	15	65
Binding time (hours) :	25	60	75	30	90	35	50

Decide the optimum sequence of processing of books in order to minimize the total time required to bring out all the books.

7. The following table gives the activities in a construction Project and the time duration of each activity :

Activity	A	B	C	D	E	F
Preceding Activity	–	–	A	A	B, C	D, E
Normal Time(Days)	16	20	8	10	6	12

- Draw the Activity Network of the Project.
- Find the Critical Path.
- Find the Total Float, Free-Float and Independent float for each activity.

UNIT-IV

- Explain different types of replacement problems by giving examples.
- Explain the various costs associated with inventory with examples.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.