Roll No. [redacted] Total No. of Pages : 03

Total No. of Questions : 18

BBA (Sem.–5)

OPERATION RESEARCH

Subject Code : BBA-501-18

M.Code : 78193

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) Define OR and discuss its scope.

2) Define the simplex method.

3) Define stepping stone method.

4) What is a Travelling Salesman Problem?

5) Define assignment problem.

6) Define slack and float.

7) Explain the terms: Individual, preventive and group replacements.

8) How to compute the Reorder Level of inventory?

9) Define sequencing problem.

10) Define inventory cost.

SECTION-B

UNIT-I

11) What is problem formulation in operation research? State and describe the various components of the problem formulation.

12) Give a general mathematical formulation of the L.P. problem. Explain all terms.

UNIT-II

13) What do you understand by the initial feasible solution? Explain the concept of North - West Corner rule/the Least Cost Method/VAM method.

14) What is an assignment problem? Describe the mathematical formulation of an assignment problem.

UNIT-III

15) A small project consisting of eight activities has the following characteristics :

Activity	Preceding Activity	Most Optimistic Time (a)	Most Likely Time (m)	Most Pessimistic Time (b)
A	None	2	4	12
B	None	10	12	26
C	A	8	9	10
D	A	10	15	20
E	A	7	7.5	11
F	B, C	9	9	9
G	D	3	3.5	7
H	E, F, G	5	5	5

a) Draw the PERT network for the project.

b) Prepare the activity schedule for the project.

c) Determine the critical path.

16) a) Difference between PERT and CPM. Under what circumstances would you consider PERT as opposed to CPM in project management?

b) Discuss how to process n jobs through m machines.

UNIT-IV

17) Derive the condition for the optimal replacement age of items whose maintenance costs increase with time, assuming that money value remains constant.

18) A manufacturer has to supply 12,000 units of a product per year to his customer. The demand is fixed and known and the shortage cost is assumed is to be infinite. The inventory holding cost is Rs. 0.20 per unit per month and the setup cost per run is Rs. 350. Determine :

a) The optimum run size q_0

b) Optimum scheduling period t_0

c) Minimum total variable yearly cost.

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Roll No. [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

Total No. of Questions : 09

Total No. of Pages : 03

BBA (Sem.–5)

OPERATION RESEARCH

Subject Code : BBA-501-18

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Date of Examination : 09-12-2023

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INSTRUCTIONS TO CANDIDATES :

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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

$$\text{Minimize} \quad Z = 5X_1 + 6X_2$$

$$\text{Subject to,} \quad 2X_1 + 5X_2 \geq 1500$$

$$3X_1 + X_2 \geq 1200$$

$$X_1, X_2 \geq 0$$

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				
	D_1	D_2	D_3	D_4	**Supply (Availability)**
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

a) Draw the Activity Network of the Project.

b) Find the Critical Path.

c) Find the Total Float, Free-Float and Independent float for each activity.

UNIT-IV

8. Explain different types of replacement problems by giving examples.

9. Explain the various costs associated with inventory with examples.

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Total No. of Pages : 02

BBA (Sem.–5)

OPERATION RESEARCH

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M.Code : 78193

Date of Examination : 29-11-2024

Time : 3 Hrs. **Max. Marks : 60**

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SECTION-A

1. **Write briefly :**

   a) Discuss the Objectives of Operation Research.

   b) Discuss significance of Operation Research in modern management.

   c) Explain the meaning of Artificial Variables.

   d) What do you mean by Travelling Salesman Problems?

   e) Express why transportation model is good for business.

   f) What do you understand by Pure Strategies?

   g) Explain the term PERT.

   h) State the meaning of CPM.

   i) Discuss the term Replacement of items.

   j) What are the causes of Poor Inventory Control?

SECTION-B

UNIT-I

2. State three commonly used Operation Research Techniques in India. Briefly explain each one of them.

3. What are the essential characteristics of a Linear Programming Model?

UNIT-II

4. Explain the difference between Assignment Problem and Transportation Problem

5. Find the Initial Basic Feasible Solution to the following transportation problem by:

   Least Cost Method.

		To			Supply
		2	7	4	5
	From	3	3	1	8
		5	4	7	7
		1	6	2	14
	Demand	7	9	18	34

UNIT-III

6. Find solution of process 5 jobs Through 3 Machines Problem

Job	1	2	3	4	5
Machine-1	8	10	6	7	11
Machine-2	5	6	2	3	4
Machine-3	4	9	8	6	5

7. What is Critical Path? Can a critical path change during the course of a project?

UNIT-IV

8. Explain clearly the different costs that are involved in inventory problems with suitable examples?

9. Why is replacement of items required? Distinguish between individual replacement and group replacement policies.

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