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Total No. of Pages : 03

Total No. of Questions : 10

MBA (Sem.–3)
OPERATION RESEARCH APPLICATIONS

Subject Code : MBA-952-18

M.Code : 77056

Date of Examination: 27-06-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A contains EIGHT questions carrying TWO marks each and students has to attempt ALL questions.
2. SECTION-B consists of FOUR Subsections : Units-I, II, III & IV. Each Subsection contains TWO questions each carrying EIGHT marks each and student has to attempt any ONE question from each Subsection.
3. SECTION-C is COMPULSORY and consist of ONE Case Study carrying TWELVE marks.

SECTION-A

1. Write briefly :

- a) Role of Operation Research in solving industrial problems.
- b) Historical developments in OR.
- c) Function of Artificial Variables in simplex procedure.
- d) Differentiate between Minimization versus maximization problems.
- e) Write note on "*The queue can accommodate any number of persons*".
- f) What do you mean by the terms 'FIFO' and 'LIFO'?
- g) Merits of Non-Linear programming problems.
- h) Write note on identification of critical path.

SECTION-B

UNIT-I

2. Explain the steps involved in the solution of an Operations Research problem.
3. Give a brief account of various types of Operations Research models and indicate their application to Production - inventory - distribution system.

UNIT-II

4. A chemical company produces 2 compounds A and B. The following table gives the units of ingredients C and D per kg of compounds A and B as well as minimum requirements of C and D and cost per kg of A and B. Using the Simplex method, find the quantities of A and B which would give a supply of C and D at minimum cost:

	A	B	Minimum Requirement
C	1	2	80
D	3	1	75
Cost per kg (Rs.)	4	6	

5. What are the methods to solve LPP with $\geq$ constraints? a) Graphical b) Big-M c) Two-phase.

UNIT-III

6. State the applications of dynamic programming a) To solve optimization problem b) To solve an LPP.
7. Write short notes on :
 - a) Queue with infinite space
 - b) Queue with finite space

UNIT-IV

8. Find the critical path for the following scheduling problem.

Activity Code	Immediate Predecessor Activity	Duration
A	-	10
B	A	2
C	A	3
D	A	5
E	D	6
F	C	15
G	B	5
H	G	2
I	E, F, H	7
J	F, H	18

9. Write the general structure of the constrained optimization with inequality constraints in non-linear programming.

SECTION-C

10. **Case Study :**

Four factories, A, B, C and D produce sugar and the capacity of each factory is given below: Factory A produces 10 tons of sugar and B produces 8 tons of sugar, C produces 5 tons of sugar and that of D is 6 tons of sugar. The sugar 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 sugar from each factory to the destinations. Find the Optimal Solution for least cost transportation cost by using North - West Corner Method.

Factories	Cost in Rs. per ton (x 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	$\sum b = 29, \sum d = 23$

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