



[18/A-25]

SARDAR PATEL UNIVERSITY, VALLABH VIDHYANAGAR
B.C.A. SEMESTER – 5 (NC) EXTERNAL EXAMINATION
US05FBCA01 - OPERATIONS RESEARCH

27th September 2022, Tuesday

Time : 3:30 PM to 5:30 PM

Total Marks : 70

Que.1 MCQ.

[10]

1. The _____ variable is added to the constraint of less than equal to type.
(a) Surplus (b) Slack
(c) artificial (d) basic
2. In graphical representation the bounded region is known as _____.
(a) solution (b) feasible solution
(c) basic solution (d) optimum
3. The coefficient of artificial variable in the objective function is _____.
(a) -M (b) +M
(c) 0 (d) both (a) and (b)
4. Number of basic allocation in any row or column in assignment problem can be _____.
(a) exactly one (b) at most one
(c) at least one (d) none of these
5. If total supply is equal to the total demand in transportation problem then it is called _____.
(a) balanced (b) unbalanced
(c) symmetric (d) asymmetric
6. North – West corner refers to _____.
(a) top -right corner (b) top left corner
(c) both (d) none of the above
7. In graphical method the restriction on number of constraint is _____.
(a) 2 (b) 3
(c) not more than 3 (d) none
8. _____ is indicated by dotted arrow.
(a) burst event (b) merge activity
(c) dummy activity (d) successor activity
9. Activity which starts only after finishing other activity is called _____.
(a) dummy (b) predecessor
(c) merge (d) successor
10. _____ operation is carried out on a machine at a time.
(a) at least one (b) two
(c) only one (d) none of the above

Que.2 Do as Directed.

[08]

1. Any transportation problem can be solved by Hungarian method. [True/False]
2. Assignment problem can be solved by _____ method.
3. In the graphical method feasible region is where all the constraints are satisfied simultaneously. [True/False]
4. The linear function of variable which is to be maximized or minimized is called _____.
5. The _____ method's solution for transportation problem is sometimes an optimal solution itself.
6. Activity which does not require any resources or time is called _____.
7. The full form of CPM is _____.
8. A PERT network is activity – oriented while a CPM network is event oriented. [True/False]

Que.3 Short Questions [Attempt Any Ten].

[20]

1. Define : Solution and Basic solution
2. Write the limitation of LPP.
3. What is the travelling salesman problem?
4. Write the definition of operation research.
5. What is the artificial variable?
6. What is the transportation problem?
7. Write the standard form of LPP for the following LPP:
Maximize $z = 3x_1 + 5x_2$
Subject to $2x_1 + 3x_2 \leq 4$
 $3x_1 + 2x_2 \geq 7$
 $x_1, x_2 \geq 0$
8. State any two rules for drawing network diagram.
9. Define terms ; merge event, burst event.
10. What is the condition for entering variable in simplex table?
11. What is Dynamic programming problem?
12. Define Surplus variable.

Que.4 Long Questions (Attempt Any Four)

[32]

1. Explain in detail different scope of operation research.
2. Find a solution for the following LP problem using graphical method.
Maximize $z = 50x + 18y$
Subject to restrictions :
 $2x + y \leq 100$
 $x + y \leq 80$
 $x \geq 0, y \geq 0$
3. Write a note on slack and surplus variable.
4. Solve the following problem using simplex method.
Maximize $z = 7x_1 + 5x_2$
Subject to $x_1 + 2x_2 \leq 6$
 $4x_1 + 3x_2 \leq 12$
 $x_1, x_2 \geq 0$

5. Write the steps for solving the transportation problem using least cost method.
6. Solve the assignment problem so as to minimize the time (in days) required completing the entire task.

| | | | | |
|---|----|----|----|----|
| | 1 | 2 | 3 | 4 |
| A | 22 | 30 | 21 | 15 |
| B | 18 | 33 | 9 | 31 |
| C | 44 | 25 | 24 | 21 |
| D | 23 | 30 | 28 | 14 |

7. In a printing shop 7 different books are printed and bounded on two different machines A and B. Time required on two machines are given in the table below.

| | | | | | | | |
|----------|---|---|---|----|----|---|---|
| Product | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Printing | 8 | 9 | 5 | 12 | 6 | 7 | 5 |
| Binding | 8 | 6 | 3 | 10 | 11 | 8 | 4 |

Find an optimal sequence of processing of different product in order to minimize the total manufactured time for all product. Find total ideal time for two machines and also elapsed time.

8. State the rules for drawing network diagram.

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