# 1482/IV

## B.C.A. (Part-II) Examination, 2022

## (Fourth Semester)

## Paper : II

## (BCA 402 : Operation Research)

Time : Three Hours ] [Maximum Marks : 70

**Note:** (i) Answer *five* questions in all.

(ii) Question No. **1** is **compulsory.**

(iii) Answer remaining **four** question selecting two questions form each Section **A** and **B** each.

(iv) All questions carry equal marks.

(v) Symbol have their usual meaning.

1. Answer all parts of the following.

(a) Define operation Research.

(b) Explain slack and surplus variables in L.P.P.

(c) Define Transportation problem.

(d) What do you mean by pure and mixed strategy?

## SECTION-A

2. Write an essay on the use and scope of operation Research.

3. Solve the following L, P, P,

Max, $Z = 6x + 11y$

Subject to constraints

$2x + y \leq 104$

$x + 2y \leq 76$

And $x \geq 0 \quad y \geq 0$

4. Solve the following transportation problem by matrix minima method.

| Destination | | | | | Supply |
|---|---|---|---|---|---|
| | | $D_1$ | $D_2$ | $D_3$ | |
| Origin | 01 | 2 | 7 | 4 | 5 |
| | 02 | 3 | 3 | 1 | 8 |
| | 03 | 5 | 4 | 7 | 7 |
| | 04 | 1 | 6 | 2 | 14 |
| Demand | | 7 | 9 | 18 | 34 |

5. Explain the difference between transportation problem and an assignment problem.

## SECTION-B

6. (a) Define the following :

(i) Competitive Game

(ii) Saddle Point

(iii) Rectangular Game

(iv) Pay off matrix

(b) Find the best strategy for each player and the value of the game from the following pay off matrix.

| | | Player B | | | | |
|---|---|---|---|---|---|---|
| | | I | II | III | IV | V |
| Player A | $A_1$ | 9 | 3 | 1 | 8 | 0 |
| | $A_2$ | 6 | 5 | 4 | 6 | 7 |
| | $A_3$ | 2 | 4 | 3 | 3 | 8 |
| | $A_4$ | 5 | 6 | 2 | 2 | 1 |

7. (a) Solve the following assignment problem.

| | I | II | III | IV |
|---|---|---|---|---|
| A | 1 | 4 | 6 | 3 |
| B | 3 | 7 | 10 | 9 |
| C | 4 | 5 | 11 | 7 |
| D | 8 | 7 | 8 | 5 |

(b) What is meant by Unbalanced transportation problem? Explain the method for solving a such type problem with example.

8. (a) Write short notes on PERT and CPNA techniques.

(b) The following table gives the activities of a project and duration.

| Activity | Duration (in days) | Activity | Duration (in days) |
|---|---|---|---|
| 1-2 | 2 | 4-8 | 8 |
| 1-4 | 2 | 5-6 | 4 |
| 1-7 | 1 | 6-9 | 3 |
| 2-3 | 4 | 7-8 | 3 |
| 3-6 | 1 | 8-9 | 5 |
| 4-5 | 5 | 9-10 | 2 |

(i) Draw the network for the project

(ii) Find the critical path and minimum project duration.

9. Write notes on any Two of the following:

(a) Maximization assignment problem

(b) Solution of a game

(c) Linear Programming Problem

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