

BACHELOR OF BUSINESS ADMINISTRATION (C.B.C.S.) (2015 COURSE)

B.B.A. Sem-V : WINTER- 2022

SUBJECT : INTRODUCTION TO OPERATION RESEARCH

Day : Saturday

Time : 10:00 AM-01:00 PM

Date : 24-12-2022

W-13882-2022

Max. Marks : 100

N.B.

- 1) Attempt **ANY FOUR** questions from Section – I.
- 2) Attempt **ANY TWO** questions from Section – II.
- 3) Figures to the **RIGHT** indicate **FULL** marks.
- 4) Answers to both the sections should be written in **SAME** answer book.

SECTION – I

Q.1 Describe the origin and development of operations research. What were the (15)
controlling factors giving birth to operations research?

Q.2 Solve the LP problem given below, using graphical method (15)

Maximise $Z = 2x_1 + x_2$

Subject to

$$x_1 + 2x_2 \leq 10$$

$$x_1 + x_2 \leq 8$$

$$x_1 - x_2 \leq 2$$

$$x_1 - 2x_2 \leq 2$$

$$x_1, x_2 \geq 0$$

Q.3 Find out the minimum cost solution for the following transportation problem (15)
which has cost structure as

| To \ From | P | Q | R | Availability |
|-------------|----|----|----|--------------|
| A | 16 | 19 | 12 | 14 |
| B | 22 | 13 | 19 | 16 |
| C | 14 | 28 | 8 | 12 |
| Requirement | 10 | 15 | 17 | |

Q.4 Assign workers 1,2,3,4 to jobs A,B,C,D. Time taken by workers for different jobs (15)
are given in the matrix .

| Workers | Jobs | | | |
|---------|------|----|----|----|
| | A | B | C | D |
| 1 | 45 | 40 | 51 | 67 |
| 2 | 55 | 40 | 61 | 53 |
| 3 | 49 | 52 | 48 | 64 |
| 4 | 41 | 45 | 60 | 55 |

Q.5 Write short notes on any three of the following : (15)

- a) Uses and limitations of O.R.
- b) Linear programming problem
- c) Applications and limitations of transportation problem
- d) Network analysis

PTO

SECTION – II

Q.6 What is assignment problem? Explain applications and limitations of assignment problem. **(20)**

Q.7 A confectioner sells confectionary items. Past data of demand per week in hundred kilograms with frequency is given below : **(20)**

| | | | | | | |
|-------------------|---|----|----|----|----|----|
| Demand per week : | 0 | 5 | 10 | 15 | 20 | 25 |
| Frequency : | 2 | 11 | 8 | 21 | 5 | 3 |

Use the following sequence of Random Numbers, generate the demand for the next 10 weeks. Also find out the average demand per week.

Random numbers : 35, 52, 90, 13, 23, 73, 34, 57, 35, 83, 94, 56, 67, 66, 60.

Q.8 Discuss the following terms in PERT/CPM. **(20)**

- i) Earliest time
- ii) Latest time
- iii) Total activity slack
- iv) Event slack
- v) Critical path
