

BACHELOR OF COMPUTER APPLICATIONS (CBCS - 2018 COURSE)
B.C.A. Sem-IV : WINTER- 2022
SUBJECT : OPERATIONS RESEARCH

Day : Monday

Time : 02:00 PM-05:00 PM

Date : 5/12/2022

W-18780-2022

Max. Marks : 60

N.B.

- 1) **Q.No. 4** from Section-I is **COMPULSORY**.
- 2) Attempt **ANY TWO** questions from Q.No. 1 to Q. No. 3 in Section – I.
- 3) Attempt **ANY TWO** questions from Q.No. 5 to Q. No. 7 in Section – II.
- 4) Figures to the **RIGHT** indicate **FULL** marks.
- 5) Answers to both the sections should be written in **SAME** answer book.

SECTION – I

- Q.1** Define Operations Research. Explain the different applications of Operations Research in brief. (12)
- Q.2** In a textile sales emporium four salesmen A, B, C and D are available for four counters W, X, Y and Z. each salesman can handle any counter. The service time (in hour) at each counter when managed by each salesman is given here. How should the salesmen be allocated to appropriate counters so as to maximize the service time ? (Each salesman must handle only one counter.) (12)

Counter	Salesman			
	A	B	C	D
W	39	72	43	52
X	22	32	49	65
Y	27	39	60	51
Z	45	50	48	52

- Q.3** Find the optimum solution of following LPP by Graphical Method. (12)
- Maximize $Z = 7x_1 + 3x_2$
Subject to :
- $2x_1 + 5x_2 \geq 20$
 $3x_1 + 4x_2 \geq 12$
 $x_1, x_2 \geq 0$
- Q.4** Write short notes on **ANY TWO** of the following : (12)
- a) Decision tree
 - b) Limitations of Operations Research
 - c) Degeneracy in Transportation Problem

PTO

SECTION – II

Q.5 A food product company is contemplating the introduction the introduction of a (12)
 new product with new packing to replace the existing product at higher price (A₁)
 or Moderate increase (A₂) or negligible increase in sales (S₁), No change in sales
 (S₂) and decrease in sales (S₃). The marketing department of the company worked
 out the pay off in terms of yearly new profits for each of the strategies. The
 expected sales are represented as below :

Strategies	Pay off in lakh Rs.		
	States of nature		
	S ₁	S ₂	S ₃
A ₁	7	3	1.5
A ₂	5	4.5	0
A ₃	3	3	3

Which is Maximin strategy and Maximax strategy?

Q.6 For the following project details (12)

Activity	(1-2)	(1-3)	(1-4)	(2-3)	(3-4)	(2-6)	(3-5)	(3-6)	(4-5)	(5-6)	(6-7)
Duration in weeks	3	5	7	8	2	4	3	2	3	5	6

- i) Draw Network Diagram
- ii) Find earliest and latest times
- iii) Find critical path and total project duration.

Q.7 Find I.B.F.S. of following transportation problem by (12)

- i) N.W.C.R.
- ii) V.A.M.
- iii) L.C.M.

Sources	Destination				Availability
	D1	D2	D3	D4	
S1	5	4	3	6	50
S2	2	5	4	2	40
S3	3	1	2	1	20
Demand	25	30	35	20	110
