

C.U.SHAH UNIVERSITY
Summer Examination-2019

Subject Name: Operation Research

Subject Code: 5CS03WOR1

Branch: M.Sc.I.T. (WebTech)

Semester : 3

Date : 18/03/2019

Time : 02:30 To 05:30

Marks :70

Instructions:

- (1) Use of Programmable calculator and any other electronic instrument is prohibited.
- (2) Instructions written on main answer book are strictly to be obeyed.
- (3) Draw neat diagrams and figures (if necessary) at right places.
- (4) Assume suitable data if needed.

SECTION-I

- Q-1 Attempt the Following questions (07)**
- 1 What is OR? 1
 - 2 Write full Form of LPP 1
 - 3 What is slack variable and Artificial variable 2
 - 4 What is Feasible and Infeasible solution 2
 - 5 What is Optimality check? 1
- Q-2 Attempt all questions (14)**
- 1 Solve following LP Problem Using Graphical Method (7)

$$\text{Max } Z=3X_1+ 4X_2$$
 Subject to $x_1 - x_2 = -1$
 $-x_1 +0x_2 \leq 0$
 and $x_1, x_2 \geq 0$
 - 2 Use the Simplex Method to solve the Following L.P Problem (7)

$$\text{Maximize } Z= 4x_1+3x_2$$
 Subject to Constraints $2x_1+x_2 \leq 1000$
 $x_1 +x_2 \leq 800$
 $x_1 \leq 400$
 $x_2 \leq 700$
 $x_1, x_2 \geq 0$
- OR**
- Q-2 Attempt all questions (14)**
- 1 Solve following LP Problem Using Simplex Method (7)

$$\text{Max } Z=5X_1+ 3X_2$$
 Subject to $x_1 + x_2 \leq 2$



$$5x_1 + 2x_2 \leq 10$$

$$3x_1 + 8x_2 \leq 12$$

$$x_1, x_2 \geq 0$$

- Q-3 2 Write the Algorithm Steps for simplex Method 7
- 1 **Attempt all questions** (14)
- 1 **Apply MODI method and obtain basic feasible solution by VAM** (7)

	I	II	III	Supply
A	4	8	8	76
B	16	24	16	82
C	8	16	24	77
Requirement	72	102	41	

- 2 **Find Initial Solution Using NWCM, LCM, & VAM Method** (7)

	D1	D2	D3	D4	Supply
S1	2	3	11	7	6
S2	1	0	6	1	1
S3	5	8	15	9	10
Demand	7	5	3	2	

OR

- Q-3 1 **Five Men are available to different five jobs find assignment the minimize the total time** (7)

Job Men	I	II	III	IV	V
A	85	75	65	125	75
B	90	78	66	132	78
C	75	66	57	114	69
D	80	72	60	120	72
E	76	64	56	112	68

- 2 **Advantage and disadvantages of Linear Programming** (7)

SECTION-II

- Q-4 **Attempt the Following questions** (7)
- 1 What is Unbounded solution? 1
- 2 Write the full form of PERT & CPM 2
- 3 What is Decision variables & objective Function 2
- 4 Full Form of AOA & AON 2



Q-5 Attempt all questions (14)

1 Formulate this problem as a Transportation problem to maximize profit. (7)

	W1	W2	W3	W4	Supply
F1	6	6	11	15	80
F2	4	6	10	12	120
F3	6	4	7	6	150
F4	4	10	14	14	70
F5	8	8	7	9	90
Demand	100	200	120	80	

Initial Basic Feasible

Solution obtained by VAM.

2 Describe the transportation problem with its general mathematical formulation (7)

OR

Q-5 1 Give the mathematical formulation of an assignment problem. (7)

2

Man Job	I	II	III	IV	V
A	2	9	2	7	1
B	6	8	7	6	1
C	4	6	5	3	1
D	4	2	7	3	1
E	5	3	9	5	1

Department of company has five job with five man find total man hours to minimize the total time.

Q-6 Attempt all questions (14)

1 A Research and development department break up is as follows (7)

Job	Immediate Predecessor	Time (Days)	Job	Immediate Predecessor	Time (Days)
A	-	3	F	D	4
B	A	2	G	E	3
C	A	6	H	G	25
D	A	3	I	F,H	10
E	C,D	7	J	B,I	20

(1) Draw

the arrow diagram.

(2) Identify the critical path and find the total project duration.

2 Explain events and Activities with suitable example. (7)



OR

Q-6

Attempt all Questions

1

Following table is given calculate the total estimation time, critical path, total and free float for each non critical activity.

(7)

Activity	Duration	Predecessor	Activity	Duration	Predecessor
A	14	-	H	4	E
B	4	A	I	3	H,L
C	2	B	J	12	K
D	1	C	K	4	D,F,G
E	2	A	L	2	J
F	3	E	M	2	H,L
G	2	E			

2

Discuss Errors and Dummies in Network.

(7)

