Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2018

Subject Name: Operations Research (OR)

Subject Code: 5CS04MOR1 Branch: MCA

Semester : 4 Date : 24/04/2018 Time : 10:30 To 01:30 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.

Q-1 Attempt the Following questions (07)

a. What is OR? **1**
b. Write full Form of LPP **1**
c. What is slack variable **1**
d. What is Artificial variable **1**
e. What is Degeneracy in Transportation problem **1**
f. What is Saddle point **1**
g. What is Optimality check? **1**

Q-2 Attempt all questions (14)

1 Solve following LP Problem Using Graphical Meth **(7)**

Max $Z=15X_1+ 10X_2$

Subject to $4x_1 + 6x_2 \leq 360$

$3x_1 +0x_2 \leq 180$

$0x_1 +5x_2 \leq 200$

and $x_1, x_2 \geq 0$

2 **Use the Simplex Method to solve the Following L.P Problem** **(7)**

Maximize Z= 3x1+5x2+4x3

Subject to Constraints $2x1+3x2 \leq 8$

$2x2+5x3 \leq 10$

$3x1+2x2+4x3 \leq 15_{X1}$, x2, x3 ≥ 0

OR

Q-2 **Attempt all questions** **(14)**

1 **Solve following LP Problem Using Simplex Method** **(7)**

Max $Z=3X_1+ 2X_2$

Subject to $x_1 + x_2 \leq 4$

$x_1 - x_2 \leq 2$ and $x_1, x_2 \geq 0$

2 Write the Algorithm Steps for simplex Method

Q-3 **Attempt all questions** **(14)**

1 **Apply MODI method and obtain basic feasible solution by VAM** **(7)**

	I	**II**	**III**	**IV**	**Supply**
A	**5**	**2**	**4**	**3**	**22**
B	**4**	**8**	**1**	**6**	**15**
C	**4**	**6**	**7**	**5**	**8**
Requirement	**7**	**12**	**17**	**9**	

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

	D1	D2	D3	D4	Supply
S1	19	30	50	10	7
S2	70	30	40	60	9
S3	40	8	70	20	18
Demand	5	8	7	14	34

OR

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

2	**9**	**2**	**7**	**1**
6	**8**	**7**	**6**	**1**
4	**6**	**5**	**3**	**1**
4	**2**	**7**	**3**	**1**
5	**3**	**9**	**5**	**1**

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

Q-4 **Attempt the Following questions (1 Mark)** **(07)**

a. What is Feasible Solution? **1**

b. Write the full form of PERT& CPM **1**

c. Explain Looping and Dangling **1**

d. What is dummy activity? **1**

e. What is Event? **1**

f. What is replacement? **1**

g. What is Simulation? **1**

Q-5 **Attempt all questions** **(14)**

1 Given the following pay-off matrix of a two-person zero-sum game, determine the optimal strategies for the players and the value of the game. Is the game strictly determinable? Is it fair? **(7)**

Players A strategies	Players B strategies			
	B1	B2	B3	B4
A1	2	-2	4	1
A2	6	1	12	3
A3	-3	2	0	6
A4	2	-3	7	1

2 Discuss Types of Failure in Replacement Model

OR

Q-5 **1** A dentist Schedule all his patients to 30minutes some patients takes more time and its probabilities given below **(7)**

Category of services	Times required (Minutes)	Probability
Filing	45	0.40
Crown	60	0.15
Cleaning	15	0.15
Extraction	45	0.10
Checkup	15	0.20

Random numbers 40 82 11 34 25 66 17 79 find the average waiting

2 five jobs each of which must be processed on the two machine A & B Processing time in hours are given

Job	1	2	3	4	5
Machine A	5	1	9	3	10
Machine B	2	6	7	8	4

Determine the sequence of five jobs and total elapsed 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	**---**	**5**	**F**	**D**	**2**
B	**A**	**7**	**G**	**C**	**1**
C	**B**	**2**	**H**	**E,F**	**3**
D	**B**	**3**	**I**	**G,H**	**10**
E	**C**	**1**			

(1) Draw the arrow diagram.
(2) Identify the critical path and find the total project duration.

2 The Data collected and cost price is Rs.12200 and scrape value Rs.200data are given below

Year	Running Cost
1	**200**
2	**500**
3	**800**
4	**1200**
5	**1800**
6	**2500**
7	**3200**
8	**4000**

Find an optimal replacement of machine

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	**6**	**--**	**G**	**2**	**--**
B	**4**	**A**	**H**	**10**	**G**
C	**7**	**B**	**I**	**6**	**J,H**
D	**2**	**A**	**J**	**13**	**--**
E	**4**	**D**	**K**	**9**	**A**
F	**10**	**E**	**L**	**3**	**C,K**
			M	**5**	**I,L**

2 A book binder has one printing and binding press for 7 manuscripts are as below **(7)**

Book	1	2	3	4	5	6	7
Printing (Time)	20	90	80	20	120	15	65
Binding (Time)	25	60	75	30	90	35	50

Determine optimal sequence and total time required for bring all books.