Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2018

Subject Name : Operation Research

Subject Code : 5CS03WOR1 **Branch :M.Sc.I.T. (WebTech)**

Semester : 3 **Date :26/03/2018** **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** **(7)**

a. Define : OR
b. Define : Feasible solution
c. Enlist transportation methods.
d. Decision variables are _____
e. List out phases of project management.
f. Define ; merge event.
g. Define : dummy activity.

Q-2 **Attempt all questions**

a. Explain features of OR approach. **(6)**

b. Use Vogel's approximation method in order to find the initial basic feasible solution to the following transportation problem. **(8)**

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

OR

Q-2 **Attempt all questions**

a. Use NWCM approximation method in order to find the initial basic **(7)**

feasible solution to the following transportation problem.

	D1	D2	D3	D4	Supply
S1	1	2	1	4	30
S2	3	3	2	1	50
S3	4	2	5	9	20
Demand	20	40	30	10	

b. Use graphical method to solve the following LP problem. **(7)**
maximize z=15x1+10x2

Subject to constraints, 4x1+6x2=360, 3x1≤180, 5x2≤200, x1,x2≥0

Q-3 **Attempt all questions**

a. Explain OR models. **(6)**

b. Use LCM in order to find the initial basic feasible solution to the following transportation problem. **(8)**

	D1	D2	D3	D4	Supply
S1	6	3	5	4	22
S2	5	9	2	7	15
S3	5	7	8	6	8
Demand	7	12	17	9	

OR

Q-3 **Attempt all questions**

a. Explain advantages and disadvantages of Linear Programming. **(4)**

b. Use the simplex method to solve the following LP problem. **(10)**

MAX Z= 3X1+ 2X2

Subject to the constraints,

-X1+2X2≤4, 3X1+2X2≤14, X1-X2≤3,

X1,X2≥0

SECTION – II

Q-4 **Attempt the Following questions** **(7)**

a. Who has developed simplex method ?

b. Define : Linear programming.

c. Which are the types of events ?

d. Which are the methods of graphical solutions?

e. Define : unbound solution.

f. Least cost method is also known as _____

g. PERT stands for _____

Q-5 **Attempt all questions**

a. Explain differences between PERT and CPM **(6)**

b. A computer center has 3 expert programmers, The center wants 3 application programs to be developed. The head of the computer center, after carefully studying the programs to be developed, estimate the computer time in minutes required by the experts for the application programs as follow : **(8)**

		programmers		
		A	B	C
Programs	1	120	100	80
	2	80	90	110
	3	110	140	120

Assign the programs in such a way that the total computer time is minimum.

OR

Q-5 **Attempt all questions**

a. Explain difference between transportation problem and assignment problem. **(8)**

b. Explain critical path analysis. **(6)**

Q-6 **Attempt all questions**

a. Draw a network diagram for the following activities . **(8)**

Activity	Predecessor
A	-
B	A
C	A
D	B
E	B,C
F	E
G	D,F
H	G

b. Explain Special cases in linear programming with diagram. **(6)**

OR

Q-6 **Attempt all Questions**

a. A department of a company has five employees with five jobs to be performed. The time (in hours) that each man takes to perform each job is given in the effectiveness matrix. **(7)**

		Employees				
		I	II	III	IV	V
Jobs	A	10	5	13	15	16
	B	3	9	18	13	6
	C	10	7	2	2	2
	D	7	11	9	7	12
	E	7	9	10	4	12

How should jobs be allocated one per employee, so as to minimize the total man hours.

b. A salesman has to visit five cities A,B,C,D, and E. The distance (in kms.) between the five cities are as follows : **(7)**

From city	To city					
		A	B	C	D	E
	A	-	1	6	8	4
	B	7	-	8	5	6
	C	6	8	-	9	8
	D	8	5	9	-	8
	E	4	6	7	8	-

If the salesman starts from city A and has to come back to city , which route should be select so that the total distance travelled is minimum ?