



IV Semester M.C.A. Examination, June 2016
(CBCS)
COMPUTER SCIENCE
MCA – 404 T : Quantitative Techniques

Time : 3 Hours

Max. Marks : 70

PART – A

Answer **any five** of the following. Each question carries **6** marks.**(5x6=30)**

1. Define operations research. Explain the features and uses of OR.

2. Solve LPP using graphical method :

Maximize $Z = X_1 + X_2$

Subject to $X_1 + X_2 \leq 1$

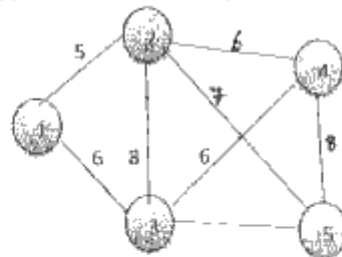
$-3X_1 + X_2 \geq 3$

$X_1, X_2 \geq 0$

3. Using Least Cost Method obtain basic feasible solution

	D1	D2	D3	D4	
O1	1	2	1	4	30
O2	3	3	2	1	50
O3	4	2	5	9	20
	20	40	30	10	

4. For the Network shown below find minimum spanning tree using Kruskal's algorithm.



P.T.O.



5. For the game given whose payoff matrix is given below. Determine the best strategy for players A and B and also the value of the game. Is the game fair or strictly determinable ?

$$\begin{array}{c}
 \text{B} \\
 \left[\begin{array}{ccc}
 -1 & 2 & -2 \\
 6 & 4 & 6
 \end{array} \right] \\
 \text{A}
 \end{array}$$

6. In a public telephone booth the arrivals are on an average of 15 per hr. A call on an average takes 3 mins. If there is just one phone, find
- Expected number of callers in the booth at any time.
 - The proportion of the time the booth is expected to be idle.
7. Using VAM method obtain basic feasible solution

	D	E	F	
A	1	2	6	7
B	0	4	2	12
C	3	1	5	11
	10	10	10	

8. Draw the Network Diagram for the table shown below :

a)

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

b)

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



PART – B

Answer **any four** of the following. **Each** question carries **10** marks. **(4x10=40)**

- 9. What is dynamic programming ? Explain the different characteristics of dynamic programming.
- 10. Solve the following using Big-M Method.

$$\begin{aligned} \text{Maximize } Z &= 3X_1 + 2X_2 \\ \text{Subject to } 2X_1 + X_2 &\leq 2 \\ 3X_1 + 4X_2 &\geq 12 \\ X_1, X_2 &\geq 0 \end{aligned}$$

- 11. Solve the following transportation problem to maximize the profit.

	D	E	F	G	
A	40	25	22	33	100
B	44	35	30	30	30
C	38	38	28	30	70
	40	20	60	30	

- 12. The owner of a small machine shop has 4 mechanics available to assign jobs for the day. Five jobs are offered with expected profit for each mechanic on each job as shown below. Find the assignment of mechanics to the job that result in maximizing profit which job should be declined.

JOBS →

	A	B	C	D	E
1	62	78	60	111	82
2	71	84	61	73	59
3	87	92	111	71	81
4	48	64	87	77	80

↑ **MACHINES**



13. A travelling salesman has to visit 5 cities. He wishes to start from a particular city. Visit each city once and then return to his starting point. Cost of going from 1 city to other is shown below. Find the least cost route.

	A	B	C	D	E
A	-	4	10	14	2
B	12	-	6	10	4
C	16	14	-	8	14
D	24	8	12	-	10
E	2	6	4	16	-

14. A small maintenance project consist of the following jobs whose precedence relationship is given below :

- Draw an arrow diagram representing the project.
- Find the critical path and total project duration.
- Find the total float for each activity.

Activity	1-2	1-3	2-3	2-5	3-4	3-6	4-5	4-6	5-6	6-7
Time	15	15	3	5	8	12	1	14	3	14

Chap 14

Motivation skill
 Negotiating
 Personality development
 Human Resource Management
 Time management
 Self confidence

Unit 20

1) Communication
 2) Types of Communication

Unit 21

1) Problem solving and Decision making
 2) Leadership process
 3) Team players

Unit 22

Attitude
 - use and use attitude
 Building self confidence
 - physical and manners

Unit 23

1) Personality
 - level of motivation
 - public speaking
 - Importance of listening and negotiating