Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech (CT)/SEM-4/CS(CT)-401/2011

2011

COMPUTER SCIENCE & OPERATION RESEARCH

Time Allotted : 3 Hours Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

[Graph sheet(s) will be provided by the institute on demand.]

GROUP – A

(Objective Type Questions)

1. Choose the correct alternatives /write brief answer for any *ten* of the following : 10 × 1 = 10

   i) What does DRAM stand for ?

      a) Double Random Access Memory

      b) Dynamic Random Access Memory

      c) Data Random Access Memory

      d) Data Random Active Memory.

   ii) Which one of the following is not an operating system ?

      a) Windows

      b) OS2

      c) Word Perfect

      d) Linux.

iii) How many bits is 1k byte ?

a) 1000 b) 1024

c) 1096 d) 512.

iv) What does DDR stand for ?

a) DRAM Double Rate b) Data DRAM Rate

c) Double Data Rate d) Double DRAM Rate.

v) Which one is the fastest ?

a) Hard Disk Drive b) Flash

c) RDRAM d) Floppy Disk Drive.

vi) $(483 \cdot 65)_{10} = (?)_2$

vii) In game theory players apply mixed strategy when there is no sadddle point.

a) True

b) False.

viii) The name of the method used in getting the optimum assignment is

a) North-West Corner Rule

b) VAM

c) Hungarian Method

d) None of these.

ix) In an assignment problem the minimum number of lines covering all zeros in the reduced cost matrix of order n can be

a) at most n b) $n + 1$

c) $n - 1$ d) at least n.

x) When the sum of gains of one player is equal to the sum of losses to another player in game, this situation is known as

a) biased game

b) unbiased game

c) fair game

d) none of these.

xi) Given a system of m simultaneous linear equations in n unknown variables ($m < n$). The No. of basic variables will be

a) m b) n

c) $n - m$ d) $m - n$.

xii) A game is solved graphically when the pay off matrix is of the form

a) $m * 1$ b) $m * n$

c) $m * 2$ d) $n * m$.

GROUP – B
(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Solve graphically the L.P.P. :

Maximize $Z = 3X_1 + 2X_2$

subject to $2X_1 + X_2 \leq 2$,

$3X_1 + 4X_2 \geq 12$

and $X_1, X_2 \geq 0$. 5

3. a) What is the difference between machine level language & assembly level language ?

b) Write & explain the working of XOR & NAND gates with a suitable diagram & truth table.

c) Name three memory devices. 2 + 2 + 1

4. Given L.P.P. :

Minimize $Z = X_1 + X_2 + X_3$

subject to $X_1 - 3X_2 + 4X_3 = 5$,

$X_1 - 2X_2 \leq 3$,

$2X_2 - X_3 \geq 4$

$X_1, X_2 \geq 0$ and X_3 is unrestricted in singn.

Formulate the dual of the L.P.P. 5

5. The time estimates (in weeks) for the activities of a PERT network are given below :

Activity	Optimistic time	Most likely time	Pessimistic time
1 – 2	1	1	7
1 – 3	1	4	7
1 – 4	2	2	8
2 – 5	1	1	1
3 – 5	2	5	14
4 – 6	2	5	8
5 – 6	3	6	15

a) Draw the project network and identify all paths through it.

b) Determine the expected project length.

c) Calculate the standard deviation of the project length. 5

6. a) What is the difference between machine ROM & RAM ?

b) Write & explain the working of OR & AND gate with a suitable diagram & truth table.

c) Name three input devices. 2 + 2 + 1

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. Solve the following L.P.P. by Big *M* method :

a) Maximize $Z = 5X_1 + 2X_2 + 2X_3$

subject to $3X_1 - 2X_2 - 2X_3 = -8$,

$3X_1 - 4X_2 - X_3 = -7$,

and $X_1, X_2, X_3 \geq 0$. 9

b) Use dominance to reduce the payoff matrix and solve the game with following payoff matrix :

		B			
		B_1	B_2	B_3	B_4
A	A_1	3	2	4	0
	A_2	2	4	2	4
	A_3	4	2	4	0
	A_4	0	4	0	8

6

8. a) Solve the following transportation problem : 9

	D_1	D_2	D_3	D_4	a_i
O_1	1	2	1	4	30
O_2	3	3	2	1	50
O_3	4	2	5	9	20
b_j	20	40	30	10	

b) Solve the following game by graphical method :

Player *B*

Player *A*	B_1	B_2
A_1	1	– 3
A_2	3	5
A_3	– 1	6
A_4	4	1
A_5	2	2
A_6	– 5	0

6

9. a) Solve the following transportation problem :

	D_1	D_2	D_3	D_4	a_i
O_1	19	30	50	10	7
O_2	70	30	40	60	9
O_3	40	8	70	20	18
b_j	5	8	7	14	

9

b) Find the optimal assignment to find the minimum cost for the assignment problem with the following cost matrix : 6

	M_1	M_2	M_3	M_4	M_5
J_1	1	3	2	3	6
J_2	2	4	3	1	5
J_3	5	6	3	4	6
J_4	3	1	4	2	2
J_5	1	5	6	5	4

10. a) Write a suitable block diagram & briefly explain the major components & their functions of any conventional computer. 3

b) In a number system there are three symbols to represent weight of each digit & they are { μ, β, £ } where μ has the least weight & £ has most. In this number system how will you represent decimal 15. 3

c) Write a C program to create a 1-D Dynamic array. 2

d) Describe OSI model of network Architecture briefly. 3

e) Describe the roles of Operating system. 2

f) What is the difference between compiler & interpreter ? 2

11. a) i) What is NULL pointer ? 1

ii) Write a *C* program to display following triangle :

```
1
1   2
1   2   3
```

2

iii) What is the difference between "function prototype" & "function definition" ? Give suitable example. 2

b) i) What are the uses of pointers ? 1

ii) Write a *C* program to swap two variables using pointers.

The function prototype will be

int swap (int*, int*); 2

iii) In how many ways you can pass an array to a function ? Give suitable example. 2

c) i) Write a *C* program to find the transpose of a matrix. 3

ii) What is the role of BIOS ? 2