Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech (CT)/SEM-4/CS (CT)-401/2010

2010

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 Institution.

GROUP – A

(Objective Type Questions)

1. Choose the correct alternatives for 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) Linus.

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) Which one is not an input device ?

a) Keyboard b) Mouse

c) Touch screen d) Monitor.

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

viii) The minimum number of lines covering all zeros in a reduced cost matrix of order n can be

a) at the most n b) at the least n

c) $n - 1$ d) $n + 1$.

ix) Which of the following is not correct ?

a) It is not necessary for the aggregate demand to be equal to the aggregate supply in a transportation problem.

b) An unbalanced transportation problem must be converted into a balanced problem before solving it.

c) The cost element in a dummy row/column shall always be taken equal to zero.

d) It is possible that in some cases both the dummy source and dummy destination, may be required to convert an unbalanced transportation problem into a balanced one.

x) Which of the following is not correct ?

a) If the primal is a maximization problem, its dual will be minimization problem.

b) The dual to the given LPP would have as many variables as the number of constraints in the primal.

c) For a three variable and two constraint primal problem, the dual would be a two variable and three constraint problem.

d) If a primal variable in non-negative, the corresponding dual constraints will be an equation.

GROUP – B

(Short Answer Type Questions)

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

2. a) What is the difference between machine level language & assembly level language ? 2

   b) Write & explain the working of XOR & NAND gates with suitable diagram & truth table. 2

   c) Name three memory devices. 1

3. a) State & discuss different network topologies. 2

   b) What is WAN ? 1

   c) What is the basic difference between router & bridge ? 2

4. a) Prove that the dual of the dual of a given primal is again primal. 3

   b) How does the problem of degeneracy arise in a transportation problem ? Explain how one overcomes it. 1 + 1

5. a) Explain the difference between a Transportation problem & an Assignment problem. 2

   b) Find the basic feasible solution of the following transportation problem by North-West Corner rule :

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

3

GROUP – C

(Long Answer Type Questions)

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

6. 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 number system how will you represent decimal 12 ? 3

   c) Define algorithm & flowchart. 3

   d) Write the algorithm to find the smallest no. among three inputed numbers. 2

   e) Draw the corresponding flowchart & also write a corresponding *C* program for the given algorithm. 2

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

7. a) Use simplex method to solve the L.P.P. :

   Maximize $Z = X_1 + X_2 + 3X_3$

   subject to $3X_1 + 2X_2 + X_3 \leq 3$

   $2X_1 + X_2 + 2X_3 \leq 2$

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

b) Formulate the Dual of the following L.P.P. :

Maximize $Z = 2X_1 + 3X_2 + 4X_3$

subject to $X_1 - 5X_2 + 3X_3 = 7$

$2X_1 - 5X_2 \leq 3$

$3X_2 - X_3 \geq 5$

$X_1, X_2 \geq 0$ and X_3 is unrestricted in sign. 6

8. a) Make the graphical representation of the set of constraints of the following L.P.P. :

Maximize $Z = 5X_1 + 7X_2$

subject to $3X_1 + 8X_2 \leq 12$

$X_1 + X_2 \leq 2$

$2X_1 \leq 3$

and $X_1, X_2 \geq 0$

and find the extreme points of the region of feasible solutions. Find also the maximum value of the objective function. 6

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

	J_1	J_2	J_3	J_4
A	1	4	6	3
B	9	7	10	9
C	4	5	11	7
D	8	7	8	5

9

9. a) Find the optimal (minimum) solution of 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 matrix game graphically : 6

		B			
		B_I	B_{II}	B_{III}	B_{IV}
	A_I	1	3	0	2
A					
	A_{II}	3	0	1	– 1