



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) $(483.65)_{10} = (?)_2$

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 is non-negative, the corresponding dual constraints will be an equation.



GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following.

$3 \times 5 = 15$

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 $\{\mu, \beta, \text{£}\}$ 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 inputted 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. :

$$\text{Maximize } Z = X_1 + X_2 + 3X_3$$

$$\text{subject to } 3X_1 + 2X_2 + X_3 \leq 3$$

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

$$\text{and } X_1, X_2, X_3 \geq 0.$$

9



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

$$\text{Maximize } Z = 2X_1 + 3X_2 + 4X_3$$

$$\text{subject to } X_1 - 5X_2 + 3X_3 = 7$$

$$2X_1 - 5X_2 \leq 3$$

$$3X_2 - X_3 \geq 5$$

$$X_1, X_2 \geq 0 \text{ and } X_3 \text{ is unrestricted in sign.} \quad 6$$

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

$$\text{Maximize } Z = 5X_1 + 7X_2$$

$$\text{subject to } 3X_1 + 8X_2 \leq 12$$

$$X_1 + X_2 \leq 2$$

$$2X_1 \leq 3$$

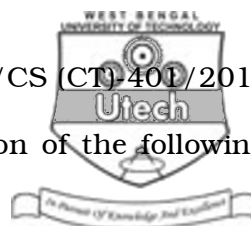
$$\text{and } X_1, X_2 \geq 0$$

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	A_I	1	3	0	2
	A_{II}	3	0	1	-1

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