

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.

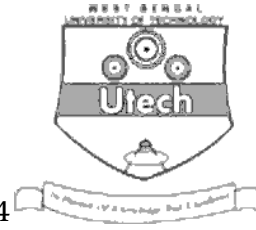
*Candidates are required to give their answers in their own words
as far as practicable.*

[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.

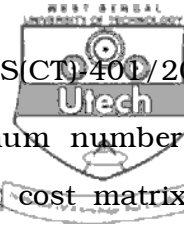
vi) $(483 \cdot 65)_{10} = (?)_2$

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

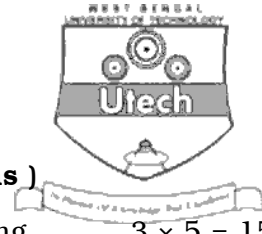
- a) True
- b) False.

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. :

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

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

$$3X_1 + 4X_2 \geq 12$$

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

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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. :

$$\text{Minimize } Z = X_1 + X_2 + X_3$$

$$\text{subject to } X_1 - 3X_2 + 4X_3 = 5,$$

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

$$2X_2 - X_3 \geq 4$$

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

Formulate the dual of the L.P.P.

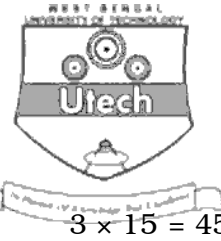
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5. The time estimates (in weeks) for the activities of a PERT network are given below :

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.

$3 \times 15 = 45$

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 $X_1, X_2, X_3 \geq 0.$

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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

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8. a) Solve the following transportation problem :

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	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

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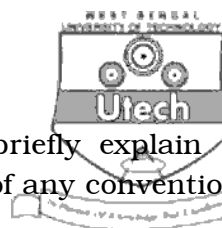
9. a) Solve the following transportation problem :

	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	

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

	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 $\{\mu, \beta, \text{£}\}$ 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 :

$$\begin{array}{ccccccc} & & & & & & 1 \\ & & & & & 1 & 2 \\ & & 1 & & 2 & & 3 \end{array}$$
 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

$$\text{int swap (int*, int*);}$$
 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