Roll No.:.....

National Institute of Technology, Delhi

Name of the Examination: B.Tech

Branch	**:ECE**	**Semester**	**:3rd**
Title of the Course	**: Digital Electronics**	**Course Code**	**: ECB202**

Time: 2 Hours **Maximum Marks: 25**

Note: Contains Five (05) questions of 5 marks each. All Questions are compulsory.

Q1:

a) Expand $\overline{A} + \overline{B}$ to minterms and Maxterms.

b) Simplify the expression given as: $Y = ((A \oplus B) \odot (A + B))$

c) Prove that : $\overline{\overline{ABC} + \overline{A}\overline{B} + BC} = \overline{A}\,\overline{B}$

d) Implement the following expression using 2 input NAND gates only:

$$(A + \overline{B}C) + D$$

e) Write the truth table for the following function:

$$f(x,y,z) = xy + xz$$

1*5

Q2: Find the minimal SOP and POS (both) expressions for the following functions:

a) $f(A,B,C,D) = \sum m\,(0,2,6,10,11,12,13) + d(3,4,5,14,15)$

b) $f(A,B,C,D) = \prod M\,(3,4,5,7,11,13,15).d(6,8,10,12)$ **2*2.5**

Q3:

a) Design a 4-bit "**The Carry Look Ahead Adder**" using basic logic gates. And also verify the addition of two 4-bit numbers given as: A=1101 and B=1010 using the same adder.

b) Design a combinational circuit that accepts a 3-bit binary number and generates an output 6-bit binary number equal to the square of the input number. **2*2.5**

Q4:

a) Use an 8:1 multiplexer to implement the logic function $F = A \oplus B \oplus C$

b) Use a 4:1 multiplexer to implement the logic function $F = A \odot B \odot C$ **2*2.5**

Q5:

a) Design a 2-bit comparator using two 1-bit comparators and basic logic gates.

b) Implement a full adder using 3:8 decoder **2*2.5**

********All The Best********

Roll No.:.....

National Institute of Technology, Delhi

Name of the Examination: M. Tech.

Branch : CSE **Semester : 3rd**

Title of the Course : Social Media and Online Media Analytics **Course Code: CSL528**

Time: 2 Hours **Maximum Marks: 25**

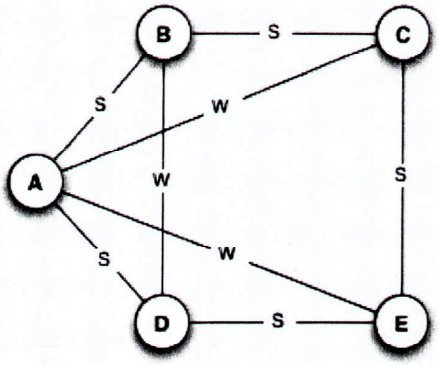
Note : All questions are compulsory. There may be choices within the questions. Make necessary assumptions if any to be made.

Q1. Do any six of the following : **(1x6 = 6 marks)**

a) State the properties of local bridges.
b) Define embeddedness of an edge.
c) What is clustering coefficient of a node ?
d) What are Information Linkage Graphs? Explain by giving example.
e) What is neighborhood overlap of an edge ?
f) How did Cameron Marlow and his colleagues classify the links while analyzing the Facebook data? Name the types only.
g) What are Pareto Optimal outcomes ?
h) Give some example of Battle of Sexes game.

Q2. Do the following questions :

a) In the social network depicted in Figure below with each edge labeled as either a strong or weak tie, which two nodes violate the Strong Triadic Closure Property? Provide an explanation for your answer. **(2 marks)**



b) State whether True or False. Outcomes that are Socially Optimal may or may not be Pareto Optimal. Give the reason for your answer. **(2 marks)**

c) What does Game Theory deal with ? **(1 mark)**

Q3. a) Prove the claim "if a node A in a network satisfies the Strong Triadic Closure Property and is involved in atleast 2 strong ties, then any local bridge it is involved in must be a weak tie." **(2 marks)**

b) How is clustering coefficient related to Triadic Closure ? **(1 mark)**

Q4. Do the following questions:

a) Consider the two-player game with players, strategies and payoffs described in the following game matrix.

		Player B		
		L	M	R
Player A	t	0, 3	6, 2	1, 1
	m	2, 3	0, 1	7, 0
	b	5, 3	4, 2	3, 1

i) Does either player have a dominant strategy? **(2marks)**

ii) Find all pure strategy Nash equilibria for this game. **(2 marks)**

b) Find Mixed Strategy Nash Equilibria for the game described in the following payoff matrix. **(2 marks)**

		Player B	
		L	R
Player A	U	1, 1	4, 2
	D	3, 3	2, 2

Q5. In the payoff matrix below the rows correspond to player A's strategies and the columns correspond to player B's strategies. The first entry in each box is player A's payoff and the second entry is player B's payoff.

		Player B	
		x	y
Player A	x	4, 4	3, 5
	y	5, 3	5, 5

a) Find all pure strategy Nash equilibria. **(2marks)**

b) Find all Evolutionarily Stable strategies. Give a brief explanation for your answer. **(2marks)**

c) How are Nash Equilibria and Evolutionary Stable Strategies related? **(1 mark)**