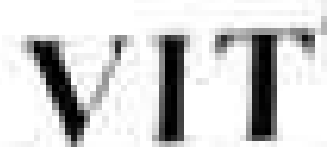




Continuous Assessment Test – I



Yonsei Institute of Technology
 Yonsei University, 505-1 Yonsei-ro, Seoul 120-749, Korea

Winter Semester 2019-2020

Programme Name & Branch: B.Tech & All Branch

Course Name & Code: Digital Logic and Design & CSE1003

Class Number: 11125/11474/12497/13306/13587/14499/15249/15838/16191/16214/16386

Slot C1+TC1

Exam Duration: 90 minutes

Maximum Marks: 50

Answer all the questions (5 X 10 =50)		
S.No.	Question	Marks
1.	<p>i. Find out the following problem answer as overflow / underflow / correct result?</p> <p>a. Let A=69 and B=90. If A and B are unsigned decimal 8-bit integers, then what is the result of A-B?</p> <p>b. Let A=69 and B=90. If A and B are sign and magnitude 8-bit integers, then what is the result of A+B?</p> <p>(Note: Need Justification for the your result)</p> <p>ii. What is the radix of the number hold by the equation $312/20 = 13.1?$</p> <p>iii. Compute $(FACE)_{16} / (12)_{16}$</p> <p>iv. Convert to base 6: $3BA.25_{14}$</p> <p>v. The state of a 12-bit register is 100001001011. What is its content if it represents</p> <p>a. Three decimal digits in the excess-3 code?</p> <p>b. Three decimal digits in BCD?</p>	<p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p>
2.	<p>I. A burglar alarm is designed so that it senses four input signal lines. Line A is from the secret control switch, line B is from a pressure sensor under a steel safe in a locked closet, line C is from a battery-power clock, and line D is connected to a switch on the locked closet door. The following conditions produce logic 1 voltage on each line.</p> <p>A : The control switch is closed.</p> <p>B : The safe is in its normal position in the closet.</p> <p>C : The clock is between 10:00 and 14:00 hours.</p> <p>D : The closet door is closed.</p> <p>Write the expression and draw the logic circuit using only minimal NAND Gate for the burglar alarm that produces a logic-1 (rings a bell) when the safe is moved and the control switch is closed, or when the closet is opened after banking hours, or when the closet is opened with the control switch open.</p>	<p>6</p> <p>(P.T.O)</p>

	<p>II. Identify what type of gate is represented by each of the following phrases:</p> <ul style="list-style-type: none"> • Any low input guarantees a high output. • Any high input guarantees a low output. • Any high input guarantees a high output. • Any difference in the inputs guarantees a high output. • Any difference in the inputs guarantees a low output. 	4
3.	<p>I. Simplify the following Boolean functions using Boolean properties into a minimum number of literals and draw the logic circuit for the minimized expression using basic gates</p> $F(A,B,C) = [AB + A'D' + BD' + A'B + CD'A + A'D + CD + A'B'D']'$ <p>II. Find the combinational circuit and design an adder which adds two 2-bit binary numbers to give a 3-bit binary sum.</p> <p>III. Convert the expression $F = x' + x(x+y')(y+z')$ into Standard Form (SOP, POS), Canonical Form (SOM and POM).</p>	4 4 2
4.	<p>Simplify the following Boolean function into minimum SOP expression using Karnaugh map</p> $F(A,B,C,D,E) = \prod (0,2,6,7,8,9,10,13,15,17,18,19,22,23,24,25,26,27,28,29,31)$	10
5.	<p>Reduce the following Boolean expression using Quine-McCluskey tabular method and find the prime and essential implicants</p> $F(A,B,C,D,E) = \prod (2,3,7,10,12,15,27) + d(5,18,19,21,23)$	10

AND	AND	OR	NOT	NAND	NOR
0 0	0	0		1	1
0 1	0	1		0	0
1 0	0	1		0	0
1 1	1	1		0	0

2 3 4 5