Uva Wellassa University, Sri Lanka
End Semester Examination –March/April 2013
SCT 361-2 Digital and Analog Electronics & Repeat

Time: Two (02) Hours

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Total 03 Questions
Answer all questions

1)

I. Explain how an OPAMP can be used as an amplifier.

(10 marks)

II.

a. Draw basic schematic diagrams of both inverting and non-inverting amplifiers.

b. Derive expressions for closed loop gain (G) of both inverting and non-inverting amplifiers.

(20 marks)

III. Identify the circuit given in Fig. Q1-1.

a. Derive an equation for its output in terms of inputs and component values.

(15 marks)

b. Describe functionality and its' practical applications.

(25 marks)

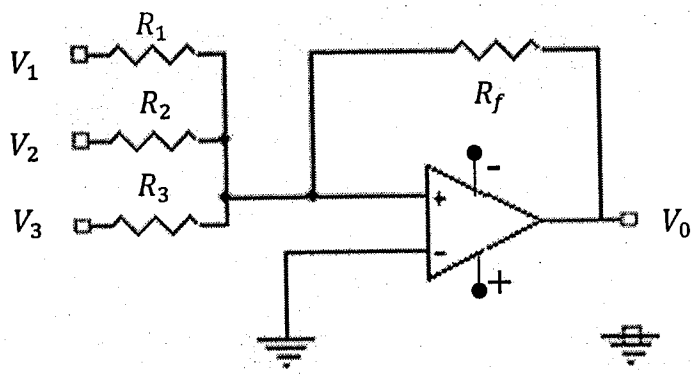


Fig. Q1-1

IV. Explain the basic differential circuit using ideal OPAMPs.

(30 marks)

2)

I. Draw the truth table for BCD to 7 Segment display and implement only one circuit to display "1" at the 7 segment display.

(10 marks)

II. Simplify the following expressions using Boolean Algebra:

a. $X = (A + B + A.B) . (A + B) .A.B$
b. $Y = (A + B + A.B) .C$

(20 marks)

III. Minimize the following problems using the Karnaugh maps method

a. $Z = f(A,B,C) = \overline{A}\,\overline{B}\,\overline{C} + \overline{A}\,B + AB\,\overline{C} + AC$
b. $Z = f(A,B,C) = \overline{A}\,B + B\,\overline{C} + BC + A\,\overline{B}\,\overline{C}$

(30 marks)

IV. A light bulb to be controlled by 3 switches. The bulb glows whenever switches A and C are in the same position. When A and C are in different position, the bulb glows depending upon the position of switch B. Assume the positions of the switches as ON=1 and OFF=0

a. Draw a truth table for the situation.
b. Represent the light function f as a function of A, B and C.
c. Simplify the function and design a practical switching circuit.

(40 marks)

3)

I. Discuss the differences between latches and flip flops.

(15 marks)

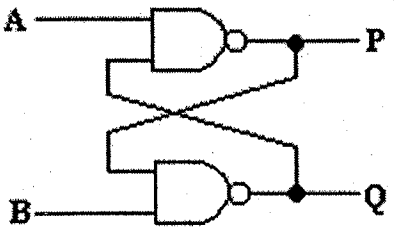
II. Draw a block diagram of a D type flip flop and draw the timing diagram.

(20 marks)

III. Show how two 2-input NOR gates can be connected together to implement an RS latch. Describe its operation and write down its truth table.

(30 marks)

IV. Using the diagram given below complete the following state sequence.



A	B	P	Q
0	1		
1	1		
1	0		
1	1		
0	1		
0	0		
1	0		
0	0		

(35 marks)

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