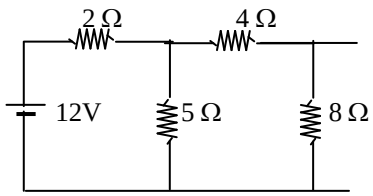
Electronics for Biology students
(PCU 1170/PSU 1143)
The Open University of Sri Lanka- Department of Physics
B.Sc. Degree Programme -2010/2011

Assignment

Answers should be submitted on or before your last practical day

(1). (a)A resistor immersed in a water bath is maintained at different temperatures; room temperature, higher than the room temperature, lower than the room temperature.
Sketch the current variation across the resistor in the voltage range of 0-5V on the same graph. Briefly explain your answer.
(b) What would be the situation for a semiconductor material in the above case.

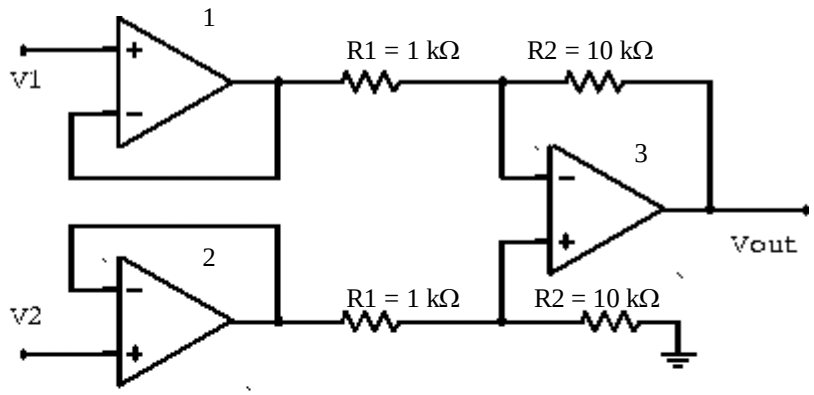
(2) (a) Write down the Thevenin's equivalent circuit theorem.
(b) Find the equivalent circuit for the following resistor and voltage network.



(3) An ac voltage signal is represented by V = 75 cos(2500 t) in mV and is applied to a series combination of a resistor (275 ohms), capacitor (10 μf), and an inductor (0.03H).
(a) What is the resonant frequency of this circuit?
(b) What is the rms current(I_{rms})?
(c) The 10 μf capacitor is now replaced by a 5 μf and the 0.03 H inductor is replaced by a 0.3 H . What is I_{rms} in this case?
(d) Draw a phasor diagram of the voltages across each element.
(e) Is this circuit mainly capacitive or inductive?

(4). (a)Give three applications of low voltage power suppliers used in your home.
(b)Draw the diagram of a stabilized low voltage power supply circuit.
(c)Quantitatively compare the repple voltage at the out put of a bridge rectifier circuit t for 100μF and 2200μF capacitors.
(d) Write short notes on primary cells and secondary cells.

(5) Following figure shows the diagram of an instrumental amplifier circuit.



(a) Stating formula, explain the purpose of differential amplifier between the input and output signals.

(b) What is the output voltage if the input voltages are V1 = 15 mV ,

(c) Obtain the relationship between V1 and V2 to get zero output voltage.

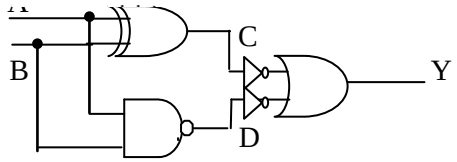
(d) Calculate the output voltage if V1 = 0.

(e) Explain why differential amplifier is more suitable for noisy environment compared to differential amplifier.

(6) a) Give the installed and OR gate and exclusive OR gate by NAND gate.

(b) Explain why distributed lines are more suitable for high frequency signals.

(c) Write the Boolean expression for the output of the given circuit



A	B	Y
0	0	
0	1	
1	0	
1	1	

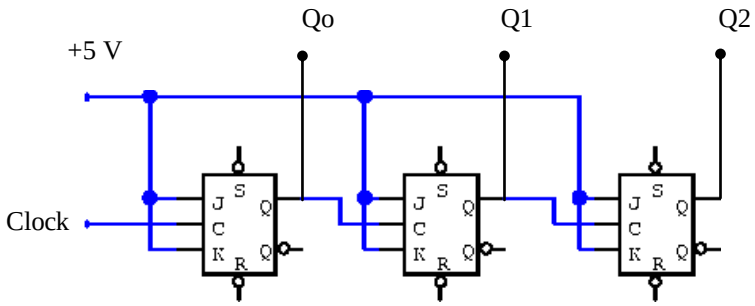
(d)Complete the above truth table according to the circuit.

(e) Draw the circuit diagram of half adder and explain its operation, taking one bit two numbers.

(7) (a) What is the main difference between combinational and sequential logic circuits.

(b) Write down the truth table of a J-K Flip flop activated with up going edge clock pulse .

(c) The following diagram shows a three bit ripple counter



(d) Draw the waveform at each binary output ; Qo, Q1 and Q2 for ten clock pulses.

(e) Modify the above ripple counter to reset just after the decimal number 5 appears at the output .

(f) Extend the given circuit to display the output on seven segment display

----------//END//----------