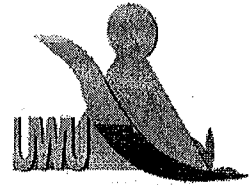


Uva Wellassa University, Sri Lanka  
 End Semester Examination – August 2011  
 SCT 162-1 Basic Electricity & Electronics



Time: One (01) hour

Total 03 Questions  
 Answer All questions.

- 1) a. State the Thevenin's theorem for a complex network circuit.
- b. Write down the relationship between the Thevenin voltage and the Norton current.
- c. Find the Thevenin equivalent circuit across  $R_L$  of the Wheatstone bridge network given in Figure Q1.

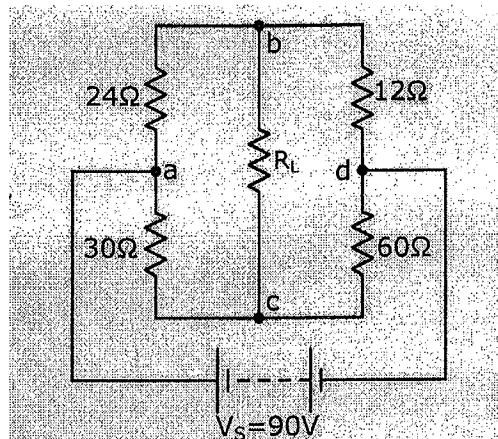


Figure Q1

(30 Marks)

- 2) a. What is the functionality of the commutator in a DC generator?
- b. Write down the EMF equation for a DC generator. State the terms denoted by the symbols of your equation.
- c. A DC generator develops an e.m.f. of 220V when driven at 1100 rpm with a flux per pole of 0.02 Wb. It is desired that this e.m.f. be increased to 240V at 1200 rpm. What should be the value of the flux per pole under the new circumstances?

(30 Marks)

- 3) a. Explain the switching characteristics of a common emitter configured NPN transistor.
- b. Consider the BJT circuit as shown in Figure Q3(a). Draw the output wave form for the given input wave form.  
Assume that the transistor is saturated when  $V_i = 5\text{ V}$  and  $V_{CE}(\text{sat}) = 0.2\text{ V}$ .

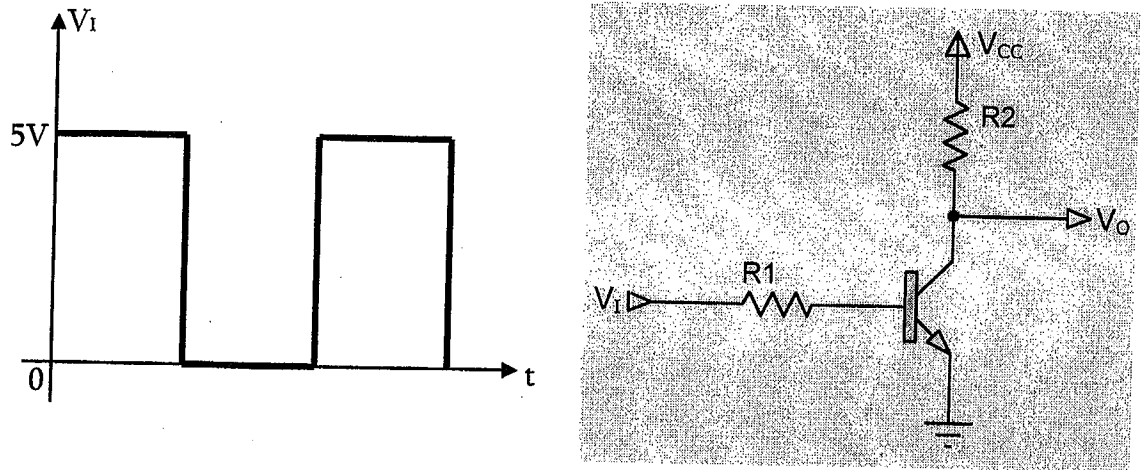


Figure Q3(a)

- c. In the circuit of Figure Q3(b) a Zener diode (Z) having a break down voltage of  $2\text{ V}$  and a diode ( $D_1$ ) having a cut-in voltage of  $0.7\text{ V}$  are connected to the base of the transistor.
- For the transistor to be in saturation, find  $I_B$  (min),  $V_i$  (min),  $I_C$  and  $V_o$ .  
Assume  $V_{CE}(\text{sat}) = 0\text{ V}$ ,  $V_{BE} = 0.7\text{ V}$  and  $\beta = 50$
  - For  $V_i = 3\text{ V}$ , find  $I_C$  and  $V_o$ .

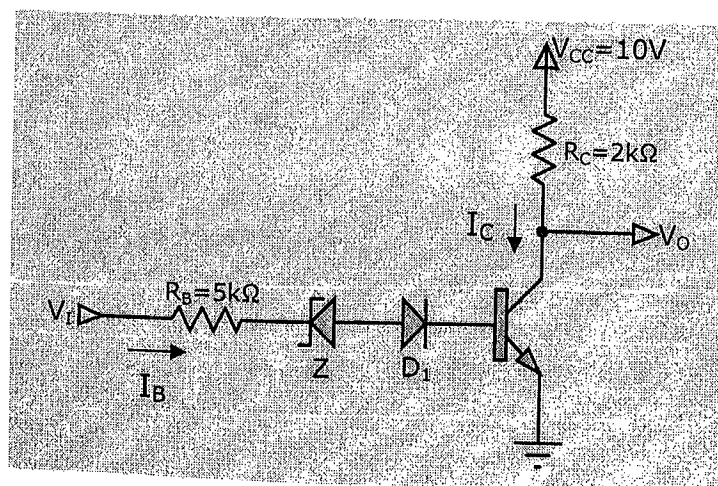


Figure Q3(b)

(40 Marks)