Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Computer Science and Technology
100 level 1st Semester Examination – July/August 2016

Uva Wellassa University

CST 101-3 Basic Electricity and Electronics (Repeat)

Instructions to candidates
Duration: 03 Hours.
Number of questions: 06
Answer **all** questions.
Mark allocation: 180

1.

a) State Kirchhoff's current law and Kirchhoff's voltage law.

(10 marks)

b) Calculate the current through the resistors R_1, R_2, and R_3 in the circuit diagram shown in Figure 01 below using Kirchhoff's laws.

Clearly illustrate the steps.

(25 marks)

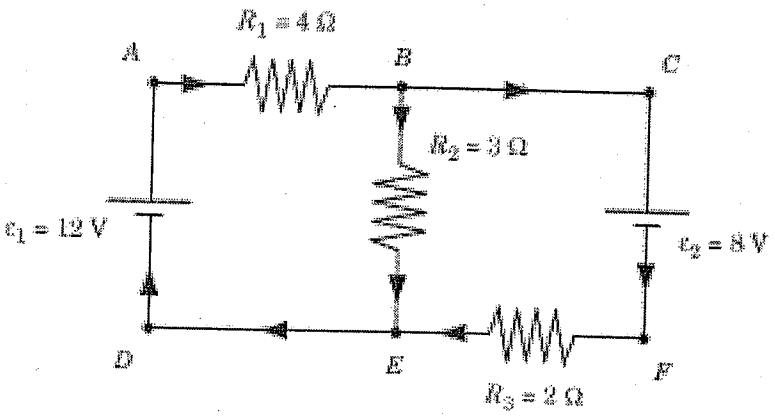


Figure 01

33

2.

a. State the thevenin's theorem.

(10 marks)

b. Calculate the current through the 1.25 kΩ resistor in the following circuit in Figure 02 using Thevenin's theorem. Clearly illustrate the steps. Also calculate the power dissipated in the 1.25 kΩ resistor.

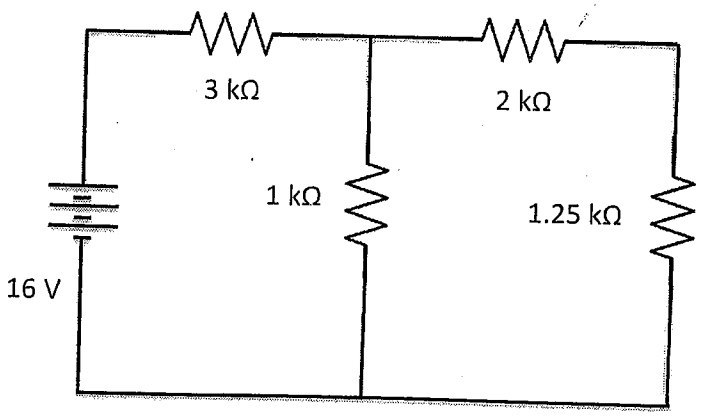


Figure 02

(30 marks)

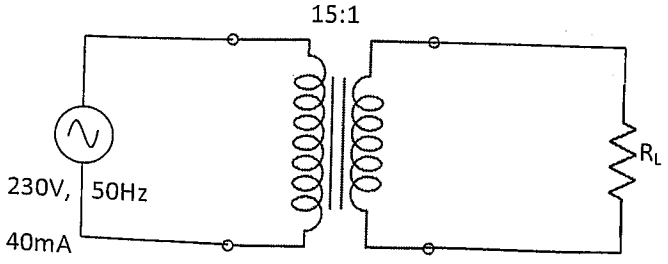
3.

a. Write a relationship between turns ratio, voltage ratio, and current ratio of an ideal transformer.

(06 marks)

b. Assuming the circuit diagram shown in Figure 03 is an ideal transformer, calculate current and voltage in the secondary coil.

(06 marks)



c. Draw the detailed output waveform through R_L of the above circuit.

(03 marks)

4.

a. An *npn* transistor is biased in the forward-active mode. The base current (I_B) is 7.50 μA and the collector current (I_C) is 1.50 mA. Determine current gain (β) and emitter current (I_E).

(12 marks)

b. Calculate I_B, I_C, I_E and V_{CE} for the following circuit shown in Figure 04, given that β = 100 and V_{BE} = 0.7 V.

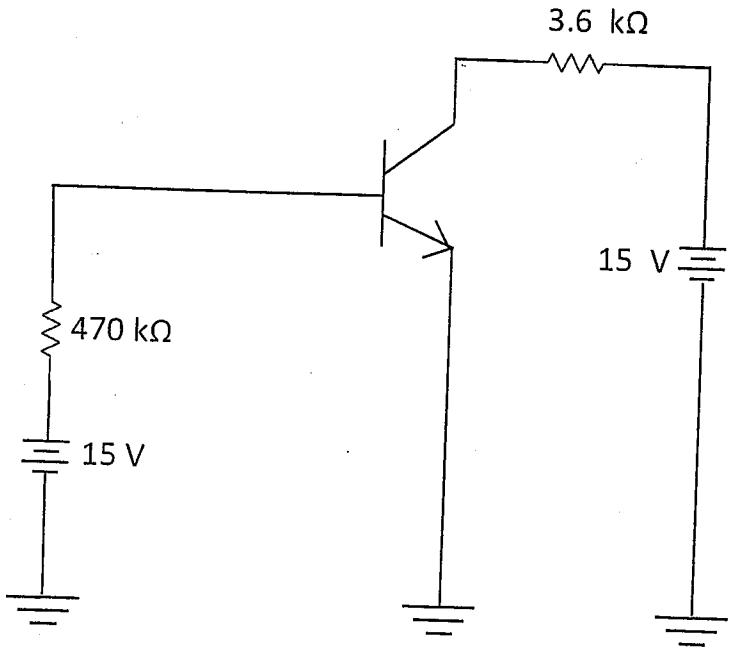


Figure 04

(18 marks)

5.

a. Draw a detailed circuit diagram of a ceter tapped full wave rectifier.

(07 marks)

b. For a center tapped transformer the primary rms voltage value is 230 V. The primary winding to secondary winding turn ratio is 20 : 1. Note that $V_{rms} = 0.707\ V_{peak}$

I. What is the peak primary voltage ?

II. What is the peak secondary voltage ?

(04 marks)

(04 marks)

c. A center tapped full wave rectifier is connectetd to the transformer.

I. What is the peak input voltage ?

II. What is the peak output voltage ?

(05 marks)

III. Draw the input and output wave forms for the rectifier.

(05 marks)

(10 marks)

6.

a. What is the main function of a DC motor ?

(04 marks)

b. Write down the four major parts of a DC motor.

(04 marks)

c. Write short notes about the above mentioned four parts.

(12 marks)

d. What is the unique characteristic of a zener diode ?

(05 marks)