Comilla University
Faculty of Engineering
Department of Computer Science and Engineering

Final Examination - 2015

Course Code: CSE 114 **Course Title: Electricals Circuits and Devices**

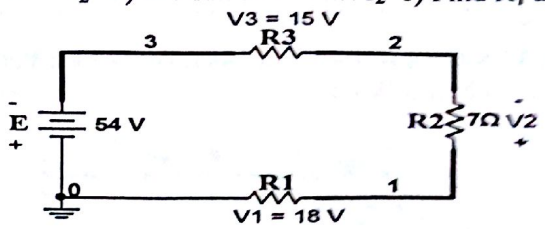
Session: 2014 - 2015 **Semester: 1st Year 1st Semester**

[Answer any Five of the following questions. Figures in the right-hand margin indicate full marks.]

Time: 3 Hours **Full Marks: 60**

Writing anything on the question paper is strictly prohibited.

1. a. Demonstrate Kirchhoff's Voltage Law (KVL). Using KVL from the given circuit a) determine V_2 b) determine current I_2 c) Find R_1 and R_3. 6



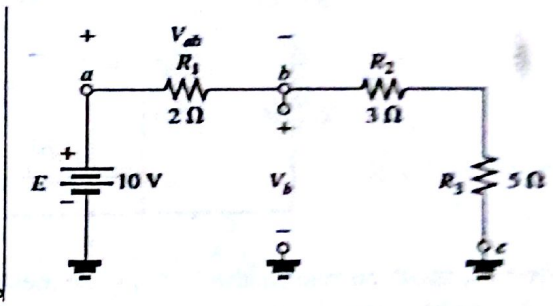
   b. If an ammeters reads 2.5 A for a period of 4 minute, determine the charge that has passed through the meter. 2

   c. How long can a 1.5 V flashlight battery provide a current of 250 mA to light the bulb if the ampere-hour rating is 16Ah? 2

   d. What is the effect of temperature on the resistance of conductor, semiconductor and insulator? 2

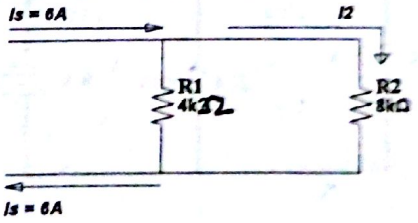
2. a. Define semiconductor. Classify semiconductor and give example of each type. 3

   b. State Voltage Divider Rule (VDR). For the network below: 6

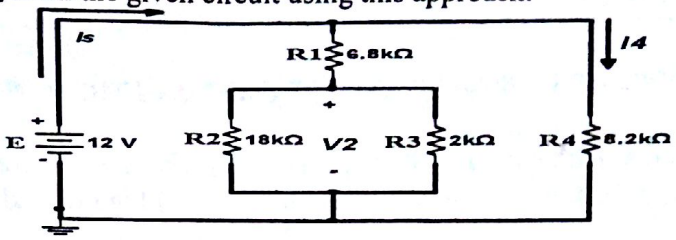


   i) Calculate V_{ab}
   ii) Determine V_b
   iii) Calculate V_c

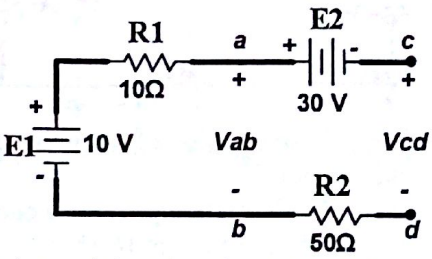
   c. State Current Divider Rule (CDR). Determine current I_2 for the given network using CDR. 3



3. a. Briefly explain reduce and return approach. Determine currents I_4 and voltage V_2 from the given circuit using this approach. 6

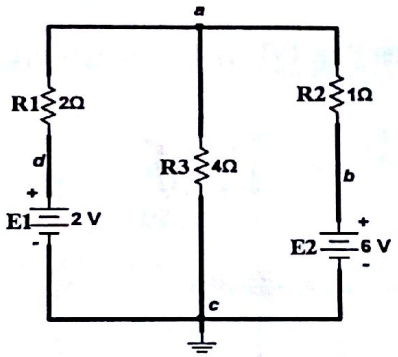


b. Briefly explain the open and short circuits. Determine voltages V_{ab} and V_{cd} for the given circuit as follows. 4

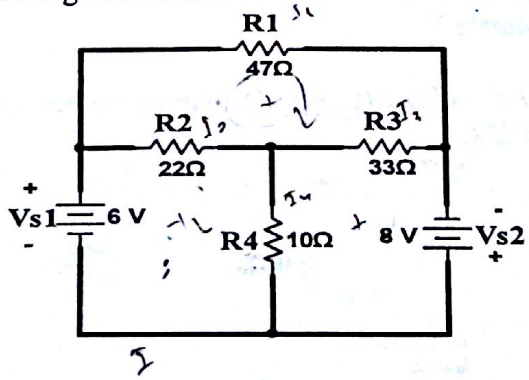


c. Explain single subscript and double subscript notation. 2

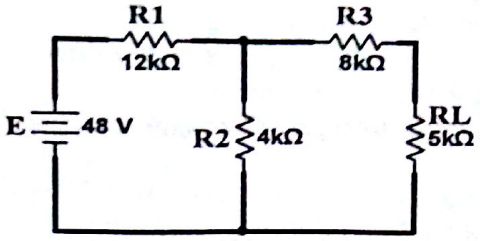
4. a. Describe the procedure of Branch-Current method. Find the magnitude and direction of the current through each resistor for the given network. 6



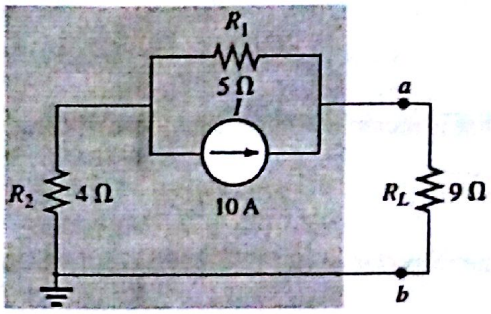
b. Explain the mesh current method. Using the mesh current method, find the branch current in the given circuit. 6



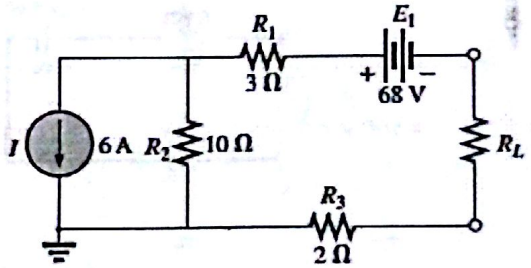
5. a. Demonstrate Thevenin's theorem. Find E_{th}, R_{th}, and load current flowing through and load voltage across the load resistor from the given circuit. 6



b. Find the Norton equivalent circuit for the network external to the 9Ω resistor. 6



6. a. Given the following network, find the value of R_L for maximum power to the load and find the maximum power to the load. 5

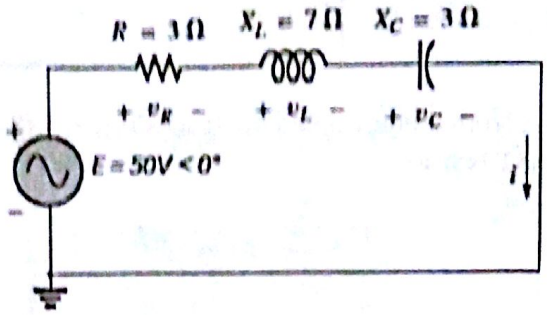


b. State and explain superposition theorem with example. 4

c. What is meant by Quantity factor and Selectivity of a series resonant circuit? 3

7. a. For the following circuit: 10

i) Calculate total impedance.
ii) Draw the impedance diagram.
iii) Calculate I, V_R, V_L, V_c in phasor form.
iv) Draw the phasor diagram.
v) Calculate total power and power factor.



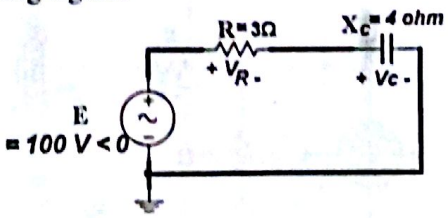
b. Explain what is meant by phase and phase difference of alternating quantities. 2

8. a. Describe the response of basic R and C elements to a sinusoidal voltage or current. 6

b. The voltage across a 0.5 H coil is provided below. What is the sinusoidal expression for the current? 3

$$V = 100 \sin 20t$$

c. Using the voltage divider rule, find the voltage across each element of the circuit in the following figure. 3



Good Luck