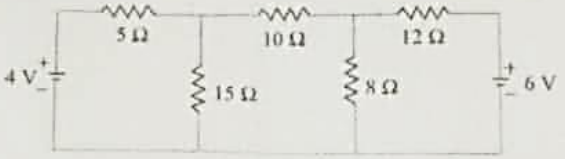
University of Rajshahi
Department of Computer Science and Engineering
B.Sc. Engineering Part-I Odd Semester Examination 2020
Course: EEE-1131 (Electrical Circuits and Electronics) (2018-2019)
Course: APEE-1131 (Electrical Circuits and Electronics) (2017-2018)
Time: 03 Hours Full Marks: 52.5

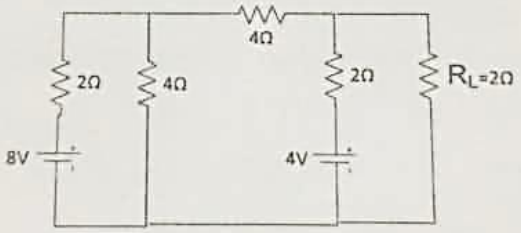
[N.B. Answer 06 (Six) questions taking any 03 (Three) questions from each section. The figures in the right margin indicate full marks.]

Section-A

1. (a) Why domestic appliances are connected in parallel? Give comparison with series circuit. 3
   (b) State and explain Kirchoff's voltage law. 2
   (c) A network is arranged as shown in the following figure. Determine the value of currents in each resistor. 3.75



2. (a) State and explain superposition theorem. 4.75
   (b) Using Thevenin's theorem, find the current through the R_L=2Ω as in the following figure: 4

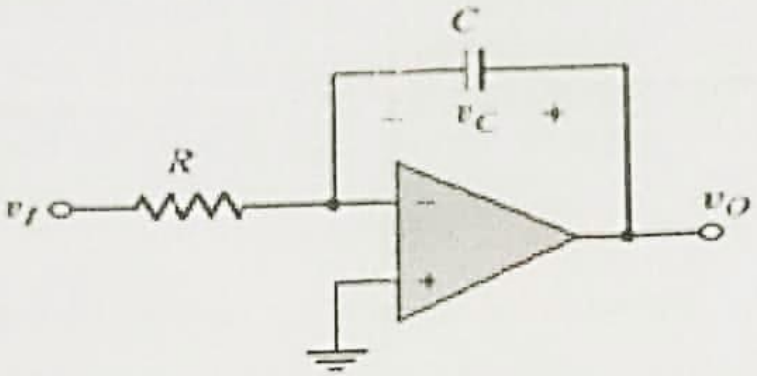


3. (a) What is a rectifier? Show the circuit diagram of a full wave rectifier.
   (b) Define voltage regulation (VR) and Peak Inverse Voltage (PIV).
   (c) A half wave rectifier using Ge diode has secondary emf of 20 V_{p-p}. Diode forward resistance is 0.25 Ohm and load resistance is 1000 Ohm. Find i) Maximum load voltage ii) DC load voltage and iii) efficiency 2.7

4. (a) Why transistor biasing is necessary? Discuss any one method used for transistor biasing.
   (b) For a certain transistor, I_c= 5.505 mA, I_B=50 μA, I_{co}= 5μA. Determine 2
      i) The value of α, β and I_E.
      ii) The new level of I_B required to make I_c = 10mA.
   (c) Show the relationship between α and β for a transistor.

Section-B

5. (a) What is an OP-AMP? What are the basic characteristics of an ideal OP-AMP? 3
   (b) What do you mean by virtual ground of an OP-AMP? Explain. 1.75
   (c) A 10mV, 5KHz sinusoidal signal is applied to the input of an OP-AMP integrator as shown below for which R= 50K and C= 2μF. Find the output voltage. 4



6. (a) How is an oscillator different from an amplifier? Mention some of the applications of an oscillator. 4.75
   (b) Design a Hartley oscillator which has to be tunable over 500 kHz to 1000 kHz. The values of the two inductors are 50 μH each. Neglect the effect of mutual inductance. 4

7. (a) What is LCD? Describe the working principle of LCD. 3.75
   (b) What are the advantages of LCD? 2
   (c) What is P-N photodiode? Why it works in reverse biased condition? 3

8. (a) What is a Zener diode? 1
   (b) Explain the V-I characteristics of a Zener diode. 3
   (c) Show that Zener diode can be used as voltage regulator. 4.75