University of Rajshahi

Department of Computer Science and Engineering

B.Sc. in Engineering 1st Year 1st Semester Examination-2019

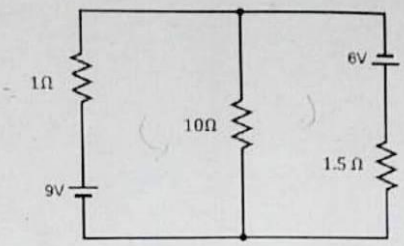
Course: **EEE 1131/APEE 1131 [Electrical Circuit and Electronics]**

Marks: 52½ [Answer any six (06) questions taking three (03) from each section.] Time: 3 Hours

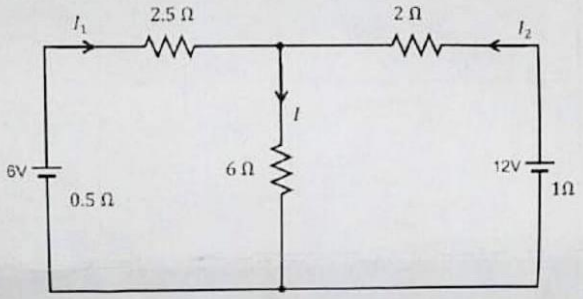
Section-A

1.a) Show that in any electrical network the incoming current is equal to outgoing current. 3

b) From the circuit shown below determine the current through 10 Ohm resistor using i) Thevenin's theorem and ii) Norton's theorem. 5¾

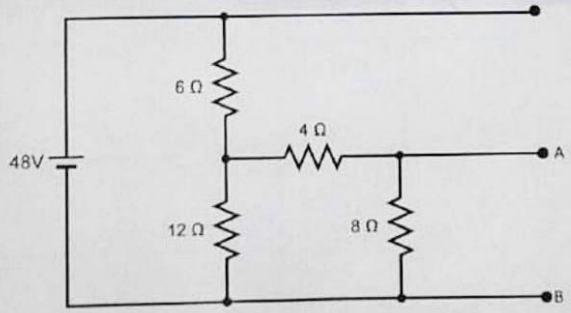


2.a) Determine the number of branches and nodes in the figure given below. Find out the current I_1 and I_2. 2



b) Define Thevenin's voltage and Thevenin's resistance with an example. 3

c) Calculate the value of V_{TH} and R_{TH} between terminal A and B of the following figure: 3¾



3.a) Why *Si* or *Ge* is not used to fabricate LEDs? 2¾

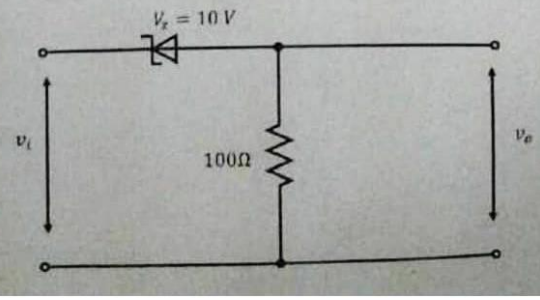
b) What is LCD? Why does it require extremely low power to operate LCDs? 3

c) Why P-N photodiode is known as one of the fastest photo-detector? What are the other uses of P-N photodiode except photo-detector? 3

4.a) What is a Zener diode? 1

b) Show the V-I characteristics of a Zener diode. 2¾

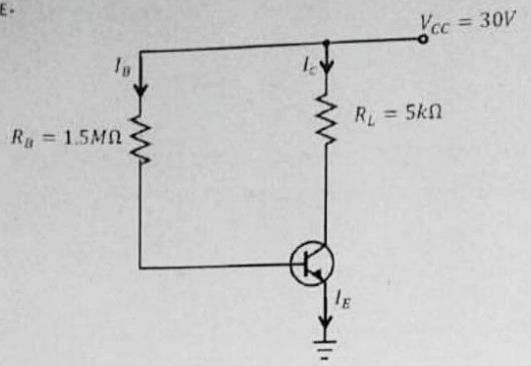
c) Calculate the value of v_0 for the given circuit for i) $v_i = 5V$ ii) $v_i = 10\ V$ and iii) $v_i = 15\ V$ 5



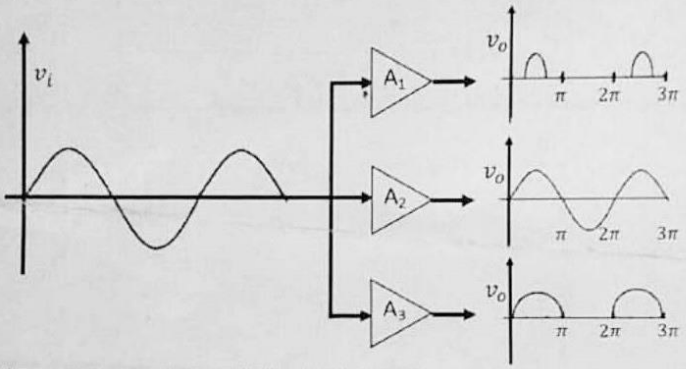
Section-B

5.a) What will happen if a transistor is not biased properly? 2

b) For the amplifier drawn below i) draw the load line and ii) mark the Q point. Assume ß=100 and neglect V_{BE}. 5



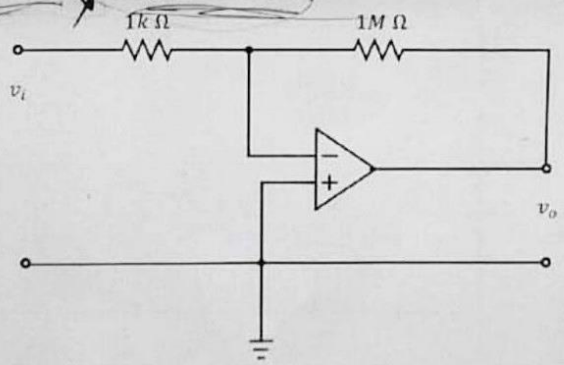
c) The inputs and outputs of three amplifiers A_1, A_2 and A_3 are shown below. Classify the amplifiers depending on their outputs. 1¾



6.a) What is an OP-AMP? What are the uses of OP-AMP? 2

b) Discuss the basic characteristics of an ideal OP-AMP. 1¾

c) For the following amplifier (assume the OP-AMP is ideal) determine the following - i) voltage gain ii) input resistance iii) output resistance 5



7.a) What is an oscillator? 1

b) Discuss the conditions for oscillation. 2

c) 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. 5¾

8.a) What do you mean by Zener breakdown and avalanche breakdown? 2

b) Draw the circuit diagram of a full-wave bridge rectifier. 2¾

c) Consider R_L is the load resistance in the half-wave rectifier shown below, determine i) rms value of load voltage ii) power absorbed by the load and iii) efficiency of the rectifier. 4