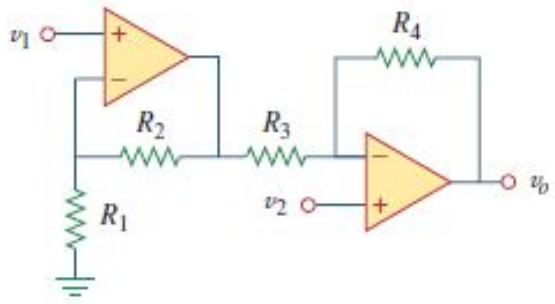
Issue Date: 30^{th} March, 2020 Due by: 9^{th} April, 2020 5:00 PM

ECE113 Basic Electronics
Assignment 3

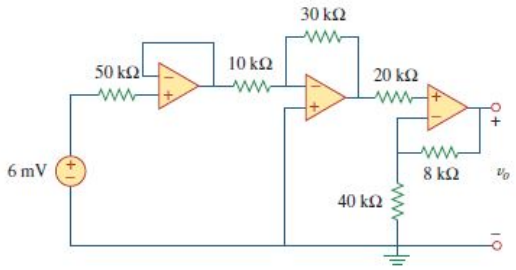
1) All Questions are compulsory.
2) Please use notations appropriately.
3) Maximum Marks:20 (2.5 marks each)
4) All the students are requested to submit soft copies of their assignments as per the deadline.
5) Please prepare a PDF and upload it over classroom.Mention your Name, Roll no, Section and Group(in the similar manner as you are attending the tutorial) clearly on each sheet of the assignment. Specify sheet number on the top of each sheet.

———-Questions———

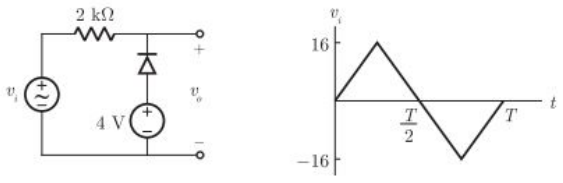
1. Figure displays a two-op-amp instrumentation amplifier. Derive an expression for v_o in terms of v_1 and v_2. How can this amplifier be used as a subtractor?



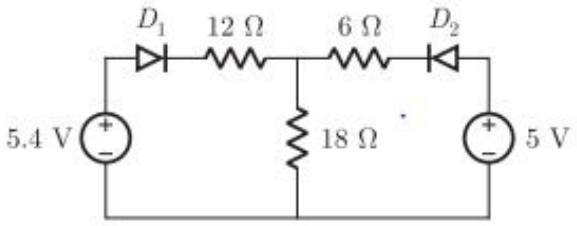
2. Find v_o in the op-amp circuit shown below.



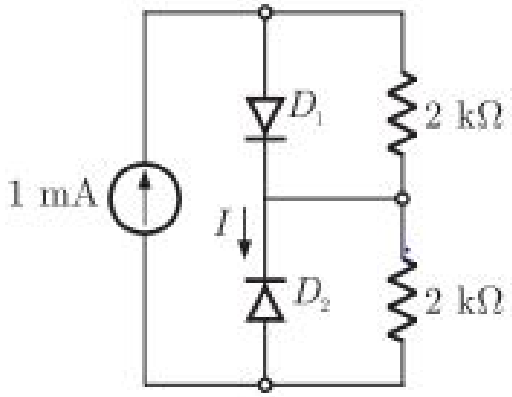
3. Waveform for input signal and a circuit is shown below.Explain the working of circuit and draw the output waveform



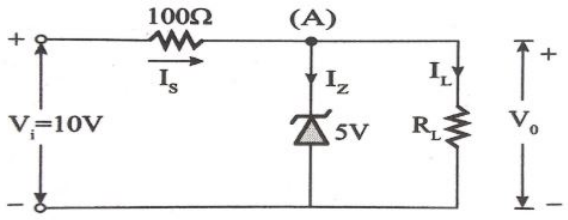
4. In the circuit shown below diodes has cutin voltage of 0.6 V. Identify the diode/s which is in/are ON state. Explain in detail.



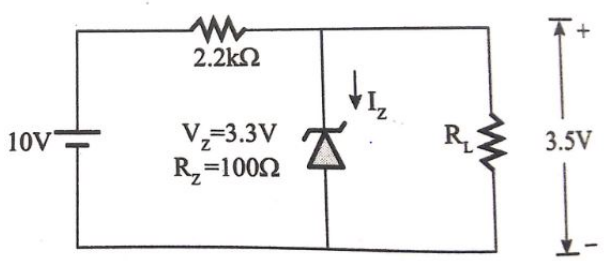
5. Assuming both the diodes to be ideal determine the current I in the circuit shown below.



6. In the circuit given below the 5V Zener diode requires a minimum current of 10 mA. For obtaining a regulated output of 5V,find the maximum permissible load current I_L and the minimum power rating of Zener diode.



7. Find the current through the zener diode in the circuit given below.



8. The Zener diode in the circuit shown has a working range of current for proper regulation:

$$5mA \leq I_z \leq 50mA \tag{1}$$

and a Zener voltage $V_z = 50$ V:

(a) If the input voltage, Vs, varies from 150 and 250 V and $R_L = 2.2$ k, determine the range of values for the resistor, R, to maintain regulation.

(b) If R is chosen as the midpoint of the range determined in part (a), how much variation in the load resistance, R_L, is now possible without losing regulation?