

TUTORIAL-1

EE 101: Basic Electronics

DEPARTMENT OF ELECTRONICS & ELECTRICAL ENGINEERING

INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI

*(First two questions (1 and 2) are the **Pre-Tutorial Assignment problems** to be solved in the space provided.)*

Name:

Roll No.

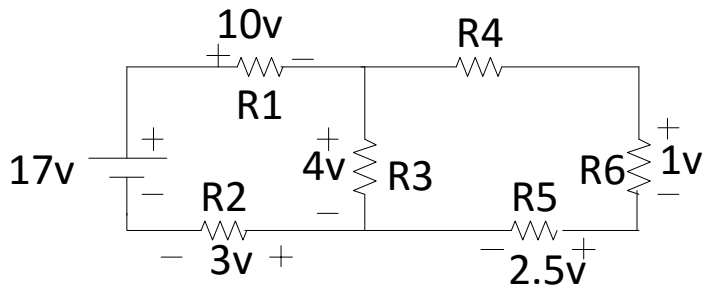
Tutorial Group:

1: Determine the voltage V_D that must be applied across a diode having reverse saturation current $I_s = 0.01 \mu\text{A}$ at 25°C , to establish a diode current $I_D = 10 \text{ mA}$.

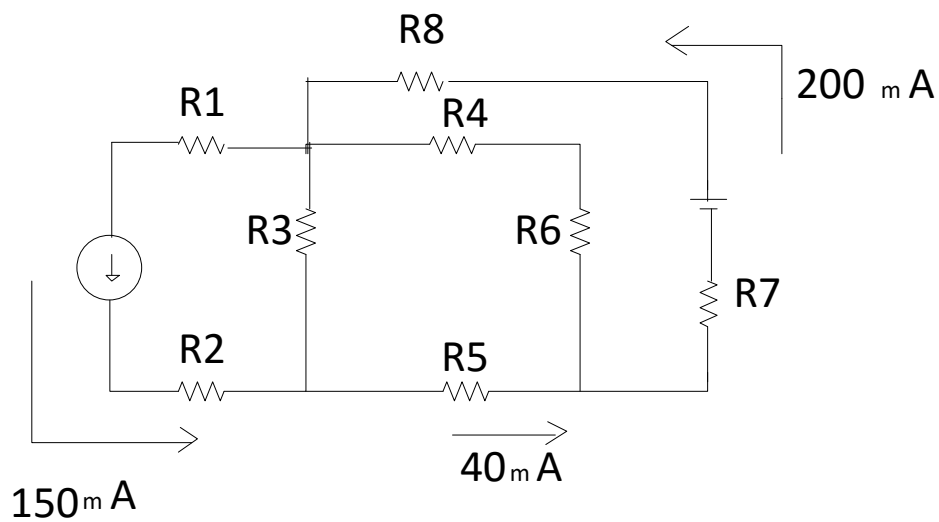
If the temperature of the diode now changes to 30°C , by what percentage should the diode voltage V_D be changed to maintain I_D at 10 mA ?

(Assume ideality factor $n=2$)

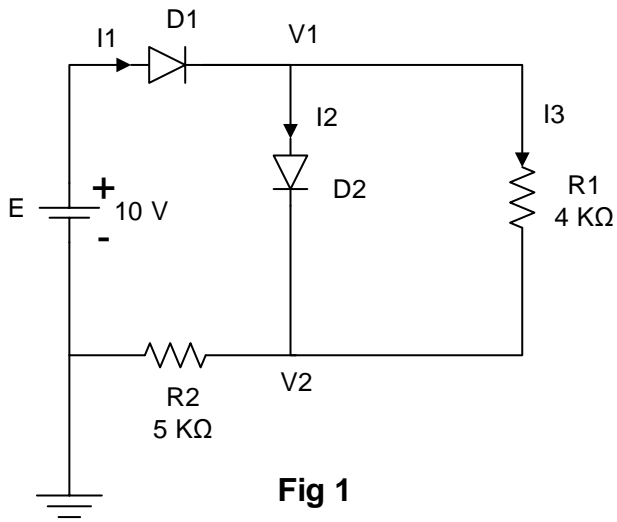
2-a: Use Kirchhoff's Voltage Law to calculate the magnitude and polarity of the voltage across resistor R4 in this resistor network:



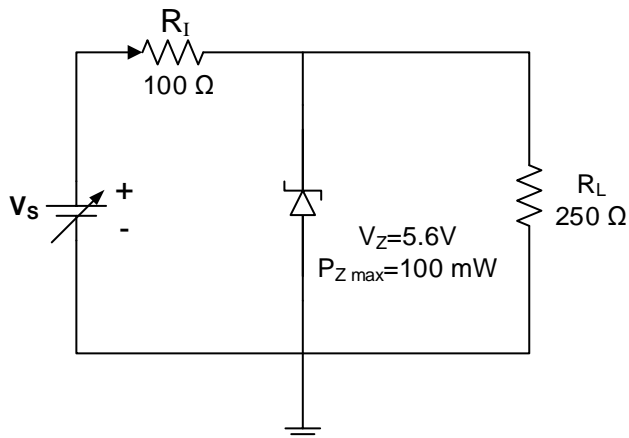
2-b: Use Kirchhoff's Current Law to calculate the magnitudes and directions of currents through all resistors in this circuit.



3: In the circuit shown below, calculate the voltages V_1 and V_2 and the currents I_1 , I_2 and I_3 . Assume the forward voltage drop across the diodes to be 0.7 volts.

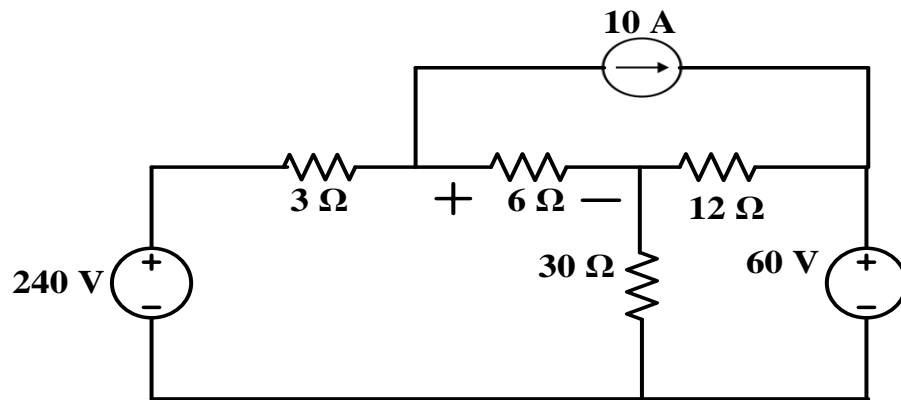


4-a: For the circuit shown below, what is the maximum value of the source voltage V_S for which the voltage across the load resistance R_L can be maintained at 5.6V?



4-b: If the Zener diode is such that a minimum current of 1 mA is required for the Zener action to take place, what is the minimum source voltage V_S that can be used?

5: Using nodal analysis, compute voltage across the 6Ω resistor.



6: Using nodal analysis, find v_x and i_x in the circuit.

