Roll No.									

National Institute of Technology Goa

Programme Name: B.Tech., I Sem

Mid Semester Examinations, February 2021

Course Name: Basic Electrical Science | Course Code: EE151

Date: 03rd February 2021 | Time: 9:30 – 11:00 A.M

Duration: 1.5 Hours | Max. Marks: 50 Marks

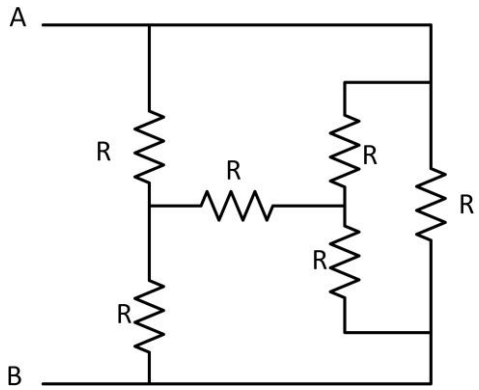
ANSWER ALL THE QUESTIONS TO THE POINT

Section-A

1. Find the equivalent resistance across A and B. Consider the Value of Resistance **as your last digit of Roll No?** [4M]

   Note: If your Roll No has last digit 0, consider the value of Resistance as 1Ω

   Example: Your Roll No is xxxxx2011.Take R = 1Ω



2. -5 C of Charge Contains_____ Electrons. [1 M]

3. What will be energy used by battery has to drive 6.28 x 10^{18} electrons with the potential difference of 20V across the terminals. [1 M]

4. The conductor material used for House Wiring is _____ [1 M]

5. Superconductivity Temperature is _____ [1 M]

6. A 60W bulb is kept on for 12 hours. How many units of energy is Consumed by it? What is the bulbs resistance if it is connected across 230 V Supply? [2 M]

7. For a given 80 Hz AC System frequency, what is the time duration of each cycle? [1 M]

Section-B

8. Calculate the resistance between A and B points in the network. Fig.2.7. [6 M]

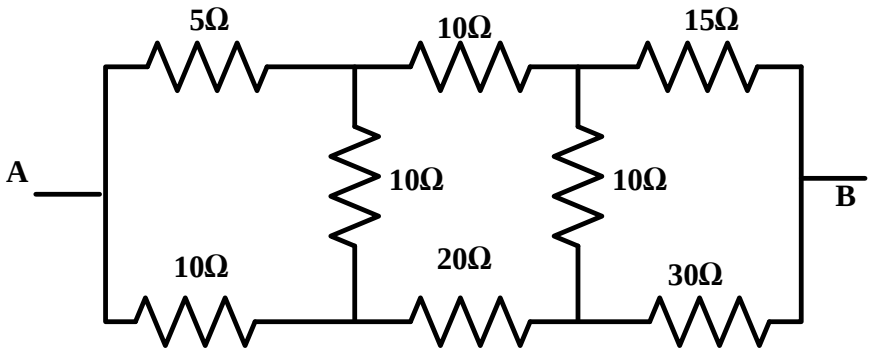
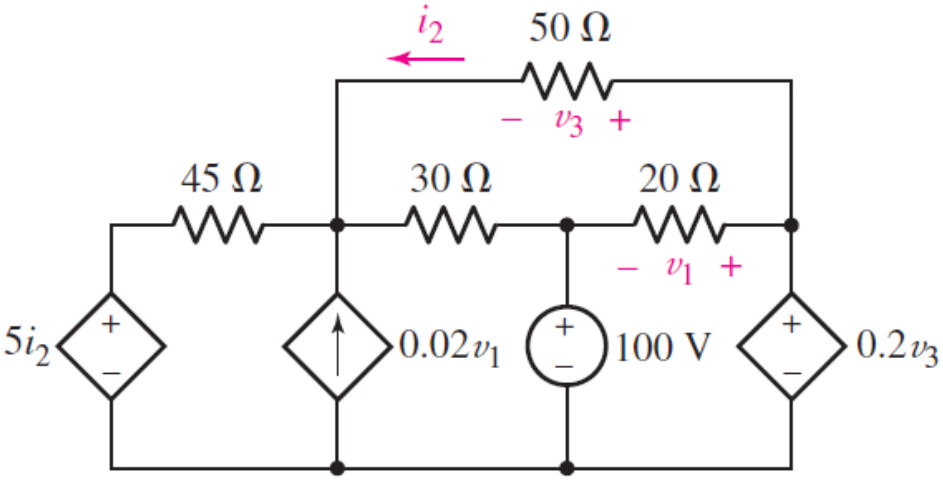


Fig.2.7.

9. For the Figure below, write only the simultaneous equations that must be solved to determine voltages *v1* and *v3* using (*a*) nodal analysis; (*b*) mesh analysis. [4M X 2]



10. Find the Thevenins equivalent of the following circuit across AB in Fig.3 [6 M]

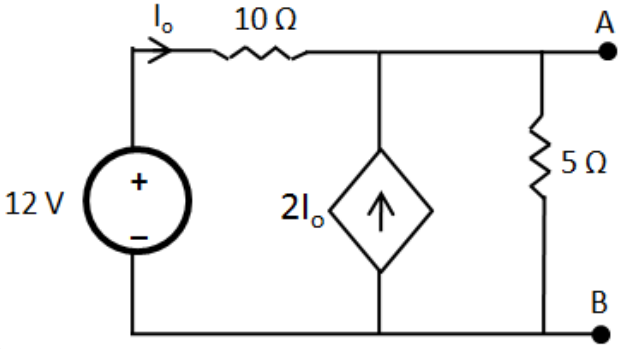


Fig. 3

11. Using nodal analysis, find the voltages V_A, V_B and V_x, in which $I_1 = 0.4$ A [7 M]

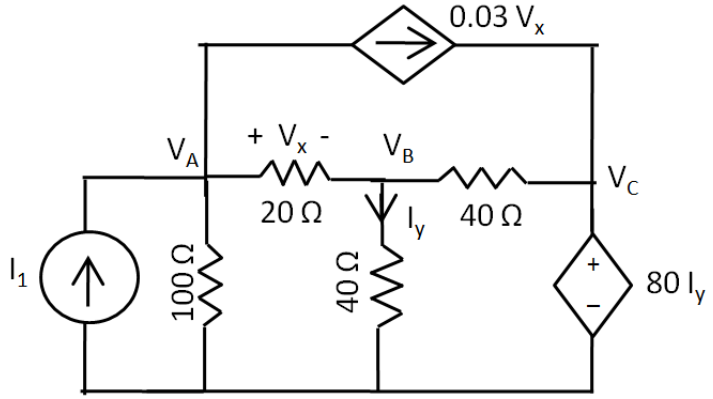


Fig. 4.

12. For the RC circuit shown below switch is closed at t = 0 sec. Find

i. The current expression in the circuit and its value at t = 0+? [2 M]

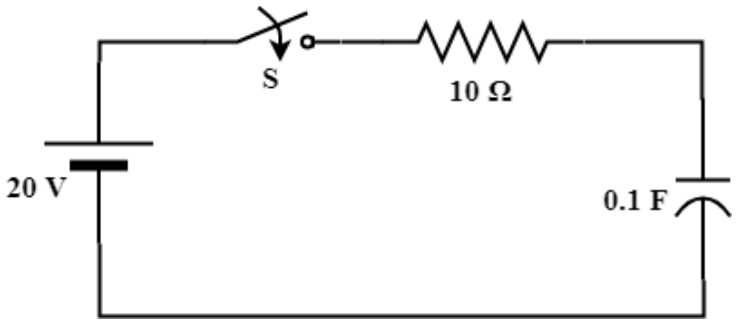
ii. Value of current after 2 time constants? [2 M]

iii. The voltage expression across capacitor and resistor? (Initial charge in storage elements is zero) [2 M]

iv. Value of Voltage across capacitor and resistor after 3 time constants? [2 M]

v. The power expression across capacitor and resistor? [2 M]

vi. Plot the Voltage and Current variation across time with free hand. [2 M]



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