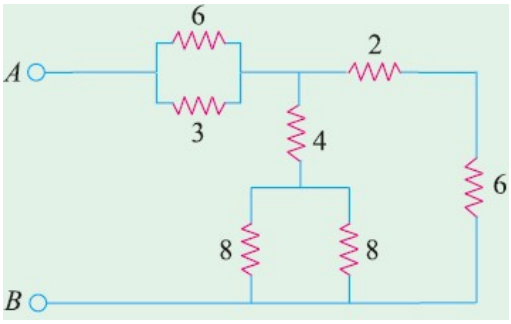
Assignment Problems #1

Subject: Basic Electrical Engineering

1. Explain the importance of electricity for the development of Nepal.

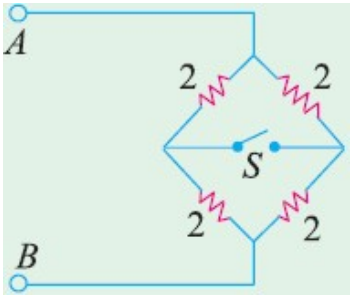
2. What are the different four stages of electrical energy?

3. Calculate the equivalent resistance of the network between terminals A and B.



[6 Ω]

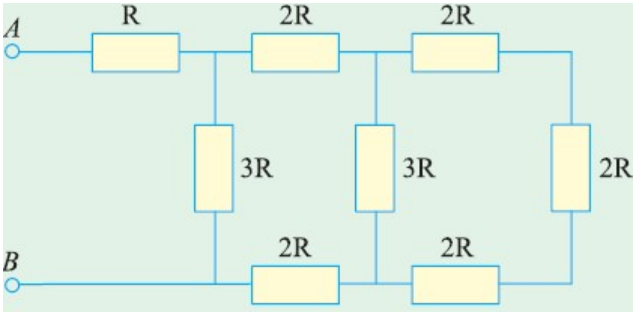
4. In the circuit, find the resistance between terminals *A* and *B* when switch is (*a*) open and (*b*) closed. Why are the two values equal?



[(a) 2 Ω (b) 2 Ω]

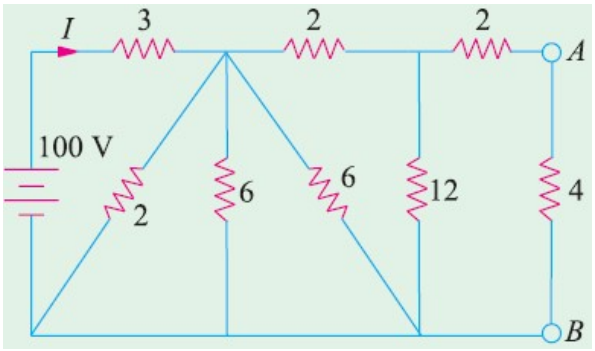
5. Three parallel connected resistors when connected across a d.c. voltage source dissipate a total power of 72 W. The total current drawn is 6 A, the current flowing through the first resistor is 3 A and the second and third resistors have equal value. What are the resistances of the three resistors? **[4 Ω; 8 Ω; 8 Ω]**

6. Find the resistance between the terminals A and B.



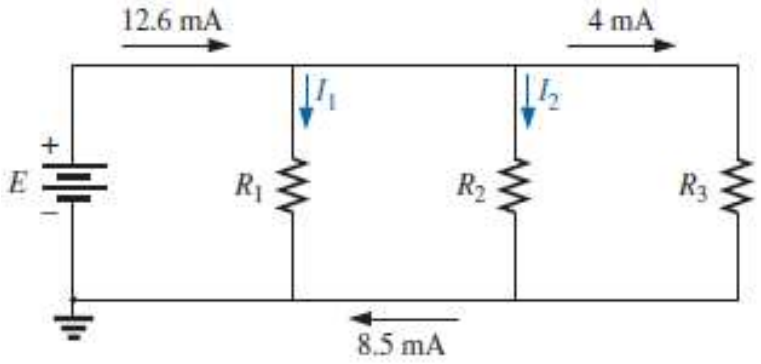
[4R]

7. Calculate the circuit current ***I*** of the following network. All the resistances are in Ohms.



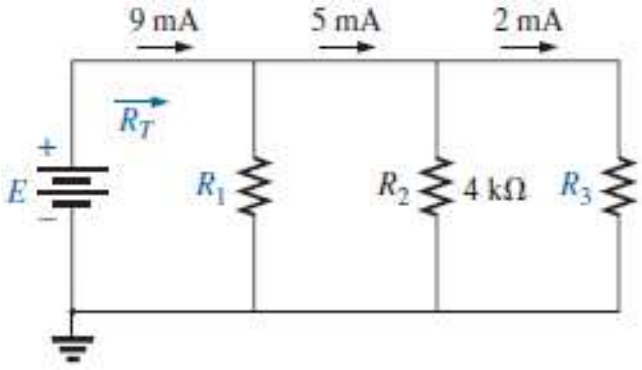
[25 A]

8. Using Kirchhoff's current law, determine the unknown currents for the parallel network in figure.



[I_1 = 4.1 mA, I_2 = 4.5 mA]

9. Using the information provided in the figure, find the branch resistors R_1 and R_3, the total resistance R_T, and the voltage source E.



[I_{R2} = 3 mA, E = 12 V, R_1 = 3 kΩ, R_3 = 6 kΩ, R_T = 1.33 kΩ]

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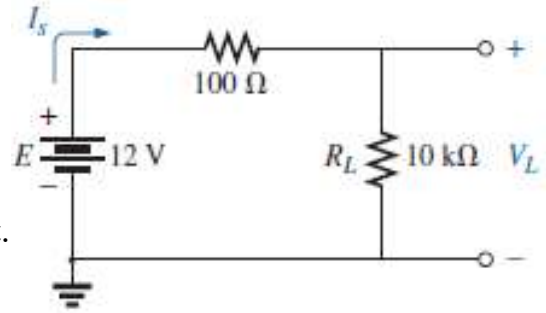
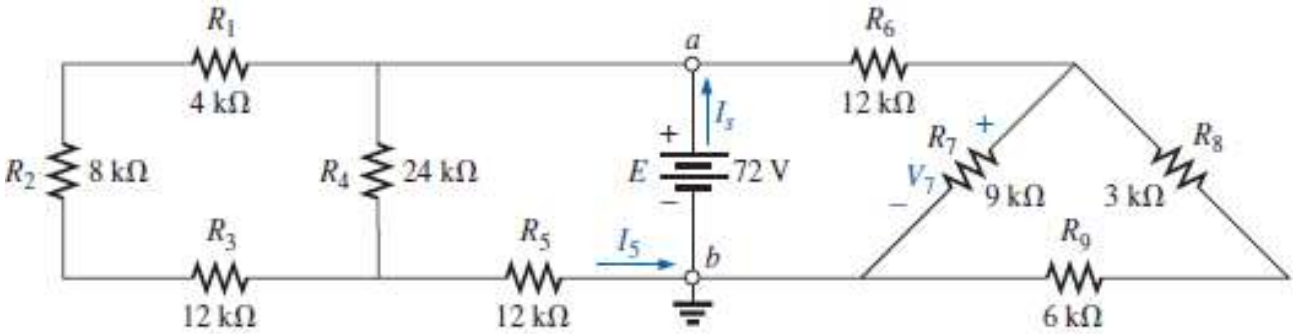
10. For the network in the given figure;
a. Determine I_s and V_L.
b. Determine I_s if R_L is shorted out.
c. Determine V_L if R_L is replaced by an open circuit.



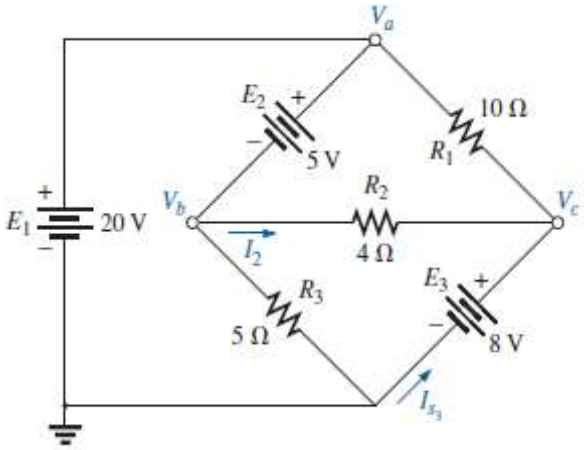
[(a) 1.188 mA, 11.90 V, (b) 120 mA, (c) 12 V]

11. Calculate the indicated currents and voltage in the following figure.



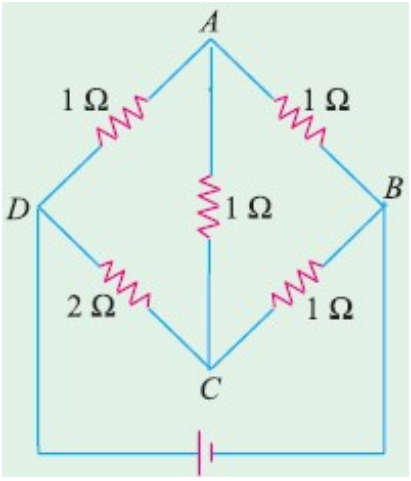
[I_5 = 3 mA, V_7 = 19.6 V, I_6 = 4.35 mA, I_s = 7.35 mA]

12. For the network shown in figure:
a. Determine voltages V_a, V_b , and V_c .
b. Find voltages V_{ac} and V_{bc} .
c. Find current I_2.
d. Find the source current I_{s3}



[(a) 20 V, 15 V, 8 V (b) 12 V (c) 1.75 A (d) – 2.95 A]

13. Determine by star/delta transformation, the network resistance as viewed from the battery terminals.



[13/11 Ω]

14. Determine the total resistance RT of the following network;
    (a) by converting the outer delta into star.
    (b) by converting the inner star into delta.

Compare the results.