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**National Institute of Technology Goa**  
Programme Name: B.Tech., I Sem  
Mid Semester Examinations, September 2018

Course Name: Basic Electrical Science  
Date: 25 September 2019  
Duration: 1.5 Hours

Course Code: EE151  
Time: 4:00 -5:30 P.M  
Max. Marks: 50

**ANSWER ALL THE QUESTIONS TO THE POINT**

1. How many electrons have a combined charge of  $-4 \text{ nC}$ ? [2 M]
2. What are the three important circuit properties on which network theorems can be applied? [2M]
3. Upon increase of conductor temperature, its resistance .....Typically, a conductor material becomes a superconductor at ..... temperature. [2M]
4. Power delivered to the load given in the Fig. 1 is ..... [2M]

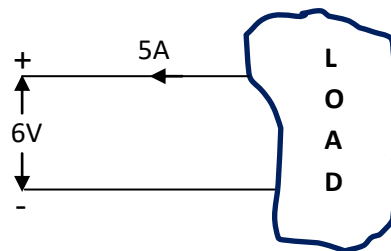


Fig.1

5. Fig.2., given below is a plug point in an Indian house. If the voltage between points 1 and 2, i.e.,  $V_{12}=0\text{V}$ ,  $V_{23} = \dots\dots\dots \text{V}$ ,  $V_{13} = \dots\dots\dots \text{V}$ . [2 M]

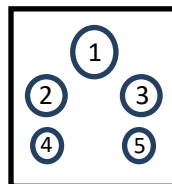


Fig. 2.

6. Determine the value of 'R' in the circuit shown in Fig.3? [5 M]

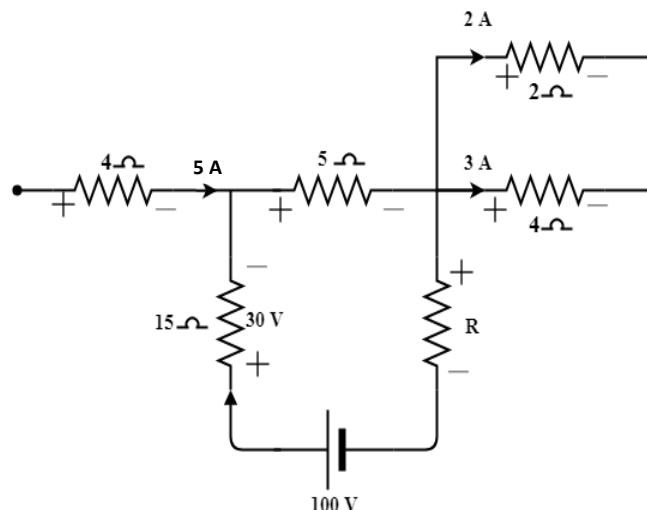


Fig.3

7. Find the current ' $i$ ' in the circuit given in Fig. 4.?

[5 M]

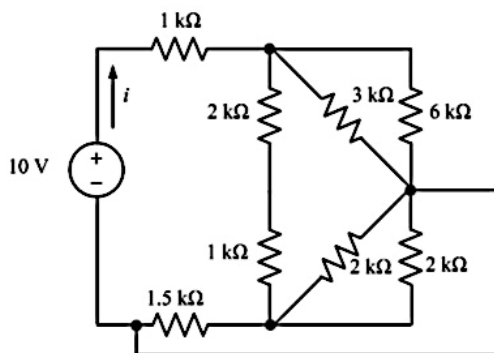


Fig.4.

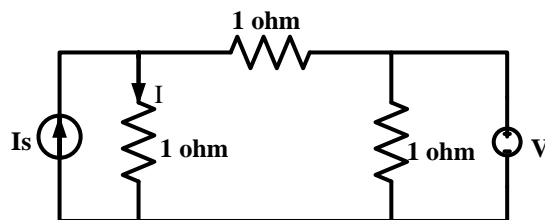


Fig. 5.

8. In the Fig. 5. Given: ' $I$ '=1 A for  $I_s=0$ . What is the value of ' $I$ ' if  $I_s=2A$ ?

[6 M]

9. Determine Norton's equivalent circuit between A and B for the circuit shown in Fig.6.?

[10 M]

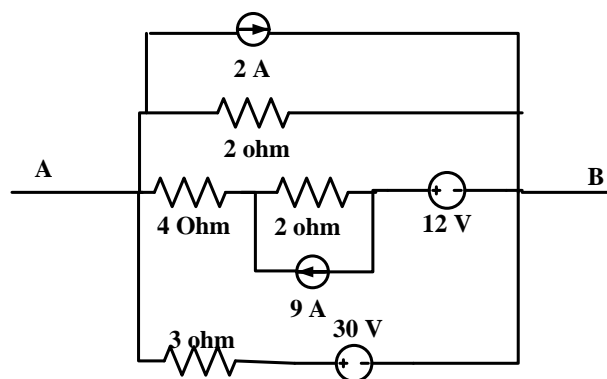


Fig. 6.

10. For the RC circuit shown in Fig. 7, switch ' $S$ ' is closed at  $t = 0$ . The initial charge in storage elements is zero. Find the following:

a) The current expression in the circuit and its  $I$  vs  $t$  graph

[3 M]

b) Value of current at  $t = 0$  ?

[1 M]

c) The voltage expression across capacitor and its  $V$  vs  $t$  graph

[3 M]

d) The voltage expression across resistor

[1.5 M]

e) Value of time constant

[1.5 M]

f) Value of current after One time constant

[2 M]

g) Value of voltage after Five time constants

[2 M]

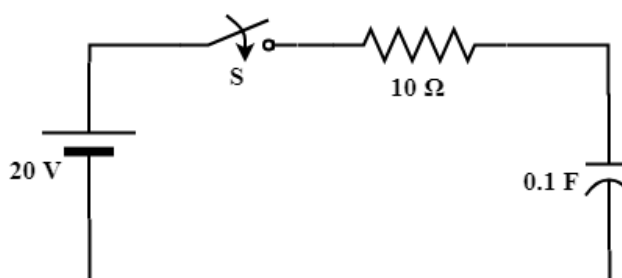


Fig. 7.

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