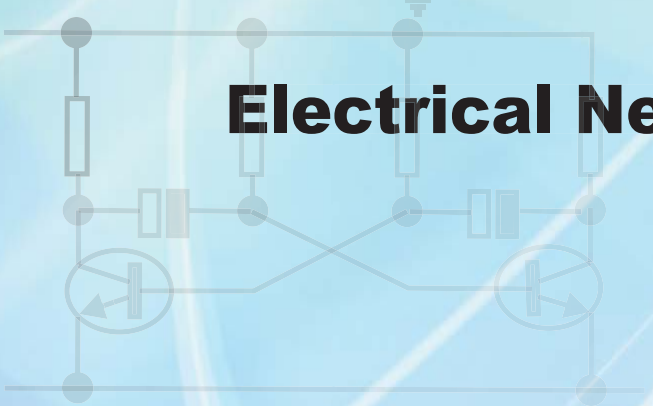
Pro-One

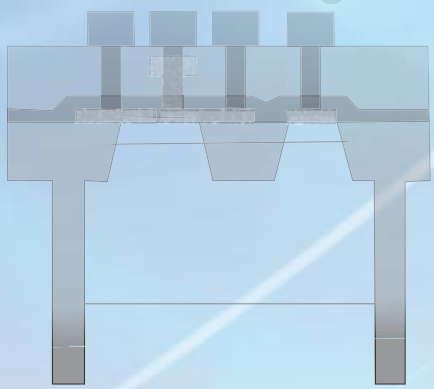
GATE

Graduate Aptitude Test in Engineering

Electronics and Communication Engineering



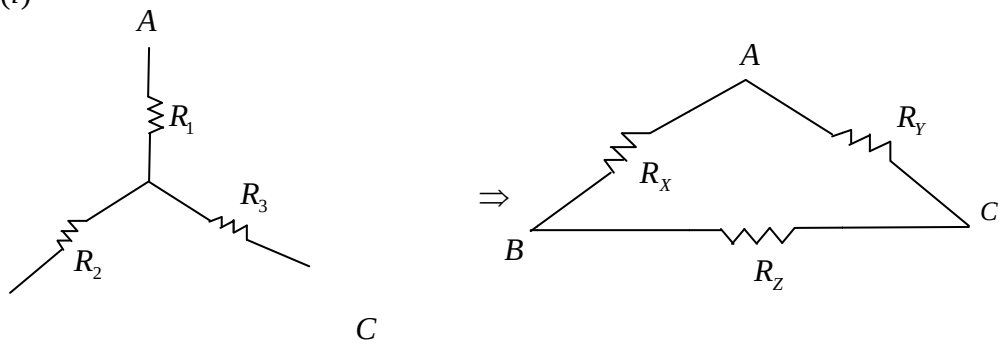
Electrical Networks



ELECTRICAL CIRCUITS THEORY

Star- delta conversion:

(i)

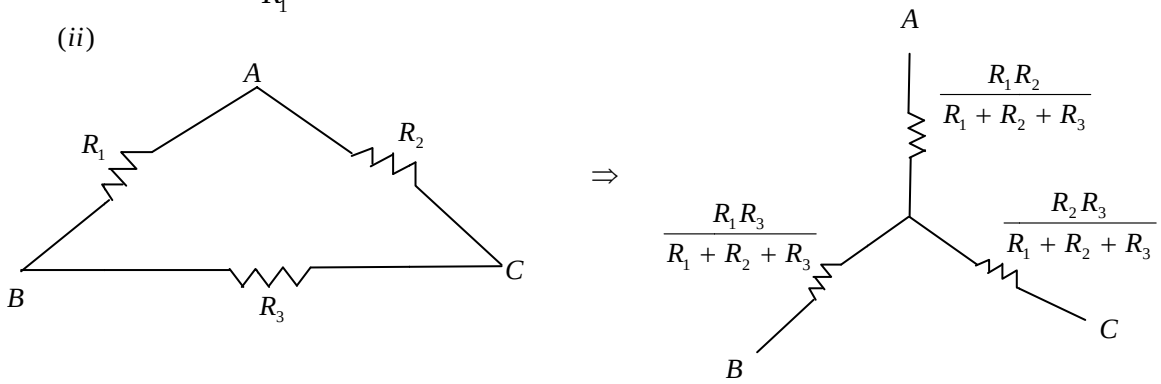


$$R_X = \frac{R_1R_2 + R_2R_3 + R_1R_3}{R_3}$$

$$R_Y = \frac{R_1R_2 + R_2R_3 + R_1R_3}{R_2}$$

$$R_Z = \frac{R_1R_2 + R_2R_3 + R_1R_3}{R_1}$$

(ii)



Thevenin's equivalent ckt:

This phenomenon is used for calculation of equivalent ckt across two point of interest. Equivalent ckt consist of voltage source in series with resistance.

Step 1:

1st decide which equivalent ckt you want (end point of interest)

Step 2:

Calculate voltage across point of interest using basic techniques of circuit analysis (mesh analysis, node analysis, super mesh etc...).It will give Thevenin's voltage.

Step 3:

Deactivate all active sources (short ckt voltage source, open ckt current source) which are independent (If any dependent source is there, it will deactivate only if it is having value which multiple of dependent source) and calculate equivalent resistance. Which is nothing but Thevenin's resistance.

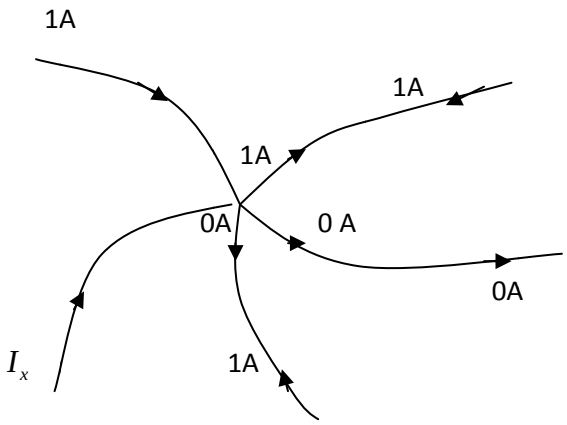
Step 4:

Final equivalent ckt will be series combination of Thevenins voltage and Thevenin's resistance.

QUESTIONS

1. Consider a fig shown below

Gate keyword→ 1



What is value of current I_x ?

(a) 2A (b) -2A (c) 3A (d) 4A

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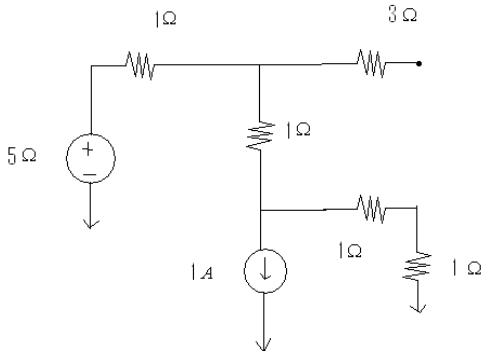
2. Consider a ckt shown below

Gate keyword→ 1,2



What is value of voltage across 3Ω resistance?

(a) 2V (b) 3V (c)6V (d) 0V

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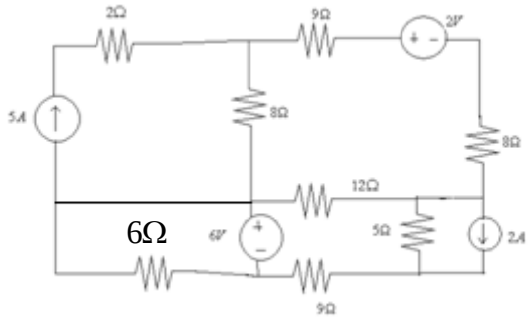
3. Consider a ckt shown below

Gate keyword→ 1,2

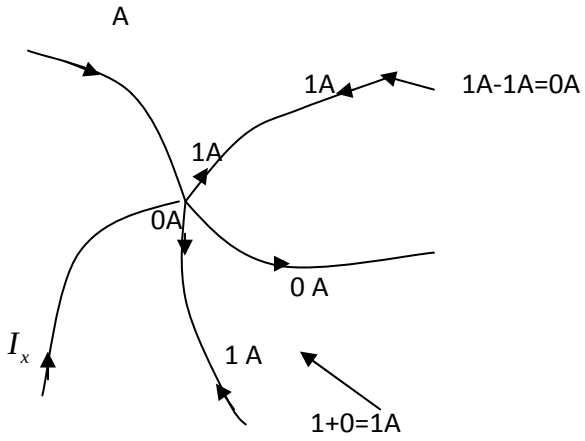


What will be current flow through 6 Ω ?

a.5A b.3A c.0A d.∞

SOLUTIONS

1. Sol: (b)



Apply KCL, 1+1+ I_x =0; I_x =-2A

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2. **Sol: (d)**

As 3 Ω resistance is not in any loop, current through it is zero hence zero voltage will be appearing across it.

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3. **Sol: (c)**

As 6 Ω is across 0 Ω (short circuit) current 5A will follow low resistance path and will flow through o Ω branch.
