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Final TERM PAPER

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Section: C
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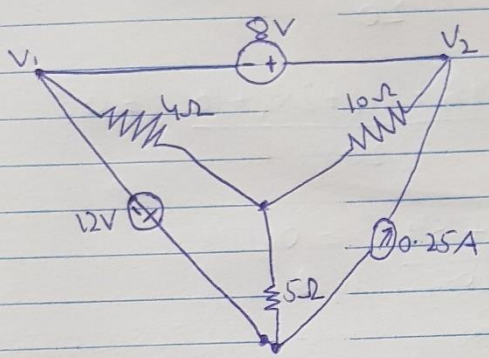
Q3) Pipelines are ..... circuit shown in fig 2.

Solution:-



Consider 12V and 8V part a supernode, so it is clear that,

$$V_2 - V_1 = 8V$$

$$\Rightarrow V_2 = V_1 + 8V \quad -(i)$$

Also,

$$V_3 - V_1 = 12V$$

$$\Rightarrow V_3 = V_1 + 12V \quad -(ii)$$

Now, Applying KCL at Supernode which gives,

$$\frac{V_3}{5} + \frac{V_1}{4} + \frac{V_2}{10} = 0 \quad -(iii)$$

Substituting Eq (i) and Eq (ii) in Eq (iii) we get,

$$\frac{V_1 + 12V}{5} + \frac{V_1}{4} + \frac{V_1 + 8V}{10} = 0$$

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Taking L.C.M

$$\frac{4(V_1+12)+5V_1+2(V_1+8)}{20} = 0$$

$$\frac{4V_1+48+5V_1+2V_1+16}{20} = 0$$

$$\frac{11V_1+64}{20} = 0$$

$$64+11V_1 = 0$$

$$\frac{11V_1}{11} = \frac{-64}{11}$$

$$V_1 = \frac{-64}{11}$$

$$\boxed{V_1 = -5.818V}$$

To find V_2 put $V_1 = -5.818$ in eq (i)

$$V_2 = V_1 + 8V$$

$$V_2 = -5.818 + 8$$

$$\boxed{V_2 = 2.180V}$$

To find V_3 put $V_1 = -5.818$ in eq (ii)

$$V_3 = V_1 + 12V$$

$$V_3 = -5.818 + 12$$

$$\boxed{V_3 = 6.182V}$$

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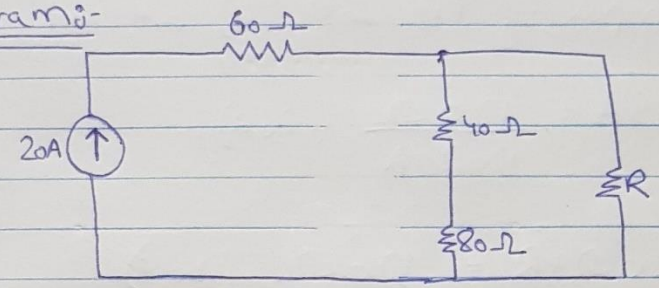
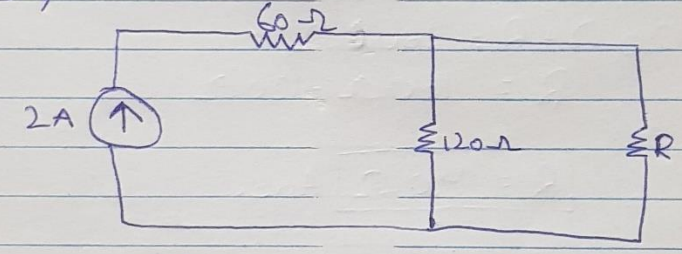
Q1) Ans) Diagram:-



Since 80Ω and 40Ω are connected in series, some amount of current will flow, so,



The parallel equavelent of 120Ω and R is;

$$\frac{120R}{120+R}$$

Also, 60Ω is in series, all 20A will flow through it, Now current flow through A is, as follows,

$$I_R = \frac{120\,\Omega}{120\,\Omega + R}\,(20A) \quad -(i)$$

Since, given in Question that 5A current must flow through 80Ω, so we need R to draw 15A,

So,

$$I_R = 15A \quad -(ii)$$

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comparing (i) and (ii) we get;

$$15A = \frac{120\Omega}{120\Omega + R} (20A)$$

$$120\Omega + R = \frac{120\Omega}{15A} (20A)$$

$$120\Omega + R = 8 (20A)$$

$$120\Omega + R = 160\Omega$$

$$R = 160\Omega - 120\Omega$$

$$\boxed{R = 40\Omega}$$ Ans.

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Q2) The growth of cell phones ..... cell phone in your circuit.

Anst

The circuit for the charger cannot be made due to available components values not matching with required values.

For example

The required voltage (5V) does not match with the available components of voltage source (1.5 x 2 = 3OV).