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1) Mesh-1

$$-135 + 25I_1 - 3I_2 - 20I_3 = 0$$

Mesh-2

$$12I_2 - 3I_1 - 4I_3 = 0$$

Mesh-3

$$10i_0 + 25I_3 - 20I_1 - 4I_2 = 0$$

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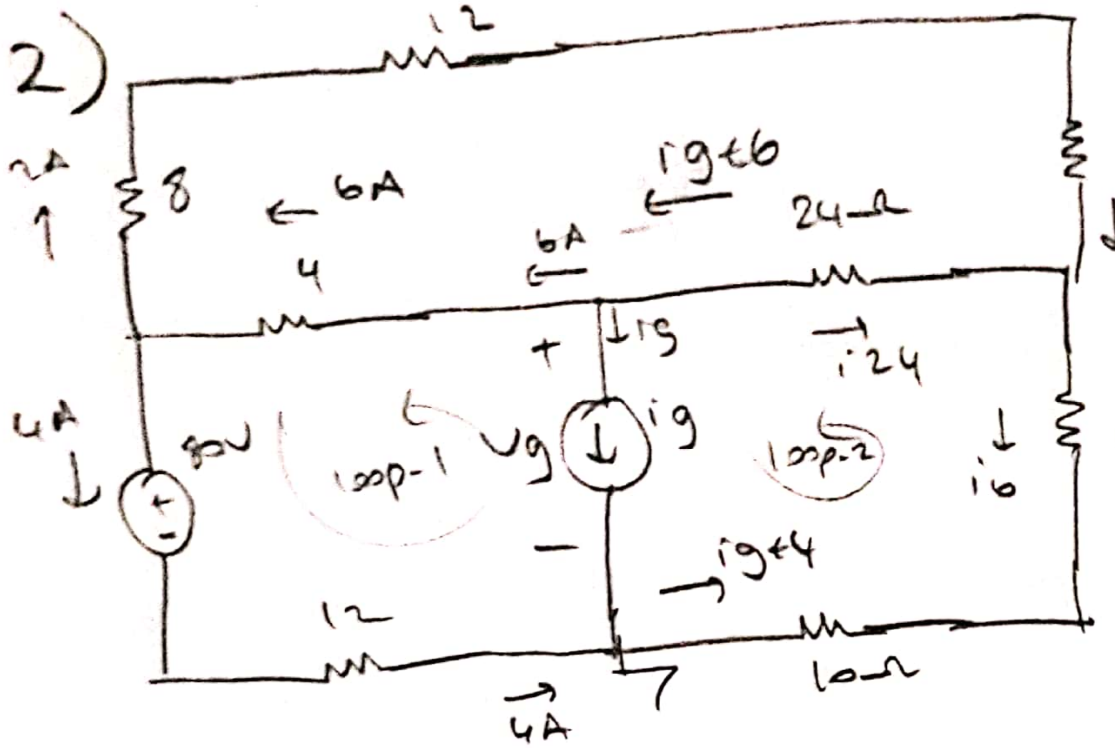
2)



$i_6 = -(i_g + 4)$

$i_{24} = -(i_g + 6)$

loop-1

$80 + 48 - V_g + 24 = 0$

$\Rightarrow V_g = 152\,V$

$i_{24} = -(-9 + 6) = 3A$

loop-2

$152 + 16(i_g + 4) + 24(i_g + 6) = 0$

$152 + 40 i_g + 208 = 0$

$360 = -40 i_g$

$i_g = -9A$

$6 + \frac{V_1 - V_2}{4} = 0 \quad (V_1)$

$\frac{V_2 - V_1}{4} + i_g + \frac{V_2 - V_3}{24} = 0 \quad (V_2)$

$-2 + \frac{V_3 - V_2}{24} + \frac{V_3}{16} = 0 \quad (V_3)$

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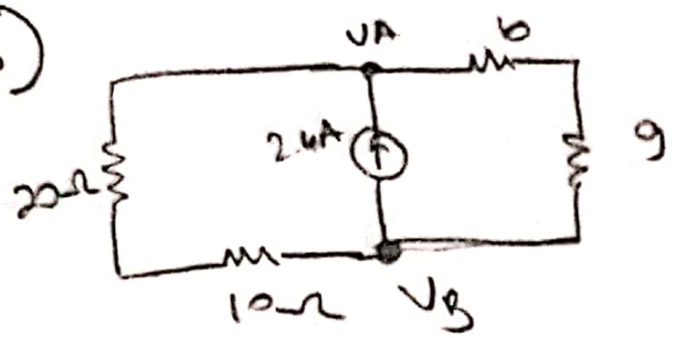
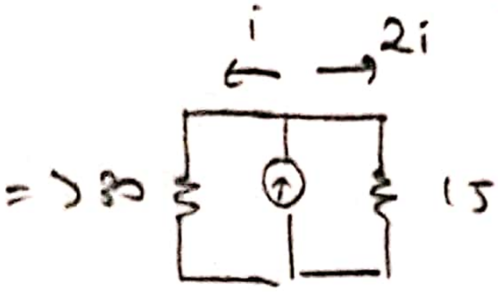
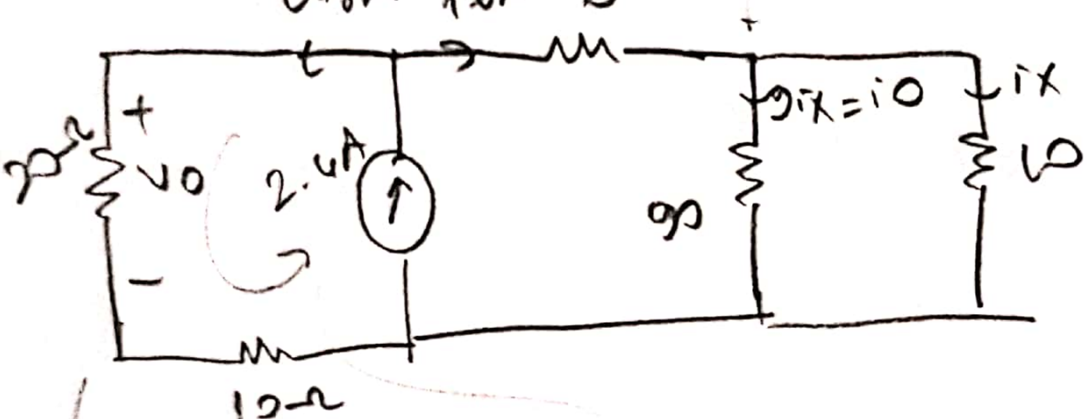
3)





$3i = 2.4A$

$i = 0.8A$



$10ix = 1.6A$

$ix = 0.16A$

$io = 9ix = 9.(0.16A)$

$io = 1.44A$

$Vo = 20(0.8)$

$Vo = 16V$

$P_{6\Omega} = i^2 R = (1.6)^2 . 6$

$P_{6\Omega} = 15.36W$

in this loop

$V_{2.4A} = (20+10).0.8$

$V_{2.4A} = 24V$

$P_{2.4A} = IV = (2.4)(24) = 57.6W$

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4) $\frac{v_1}{24} + \frac{v_1 - v_3}{6} + (v_1 - 125 - v_2) = 0$

for v_1

for v_3 $\frac{v_3 - v_2}{2} + \frac{v_3 - v_1}{6} + \frac{v_3}{12} = 0$

for v_2 $\frac{v_2 - v_3}{2} + (v_2 + 125 - v_1) + (v_2 - 125) = 0$

$\Rightarrow \frac{v_2 - v_3}{2} + 2v_2 - v_1 = 0$

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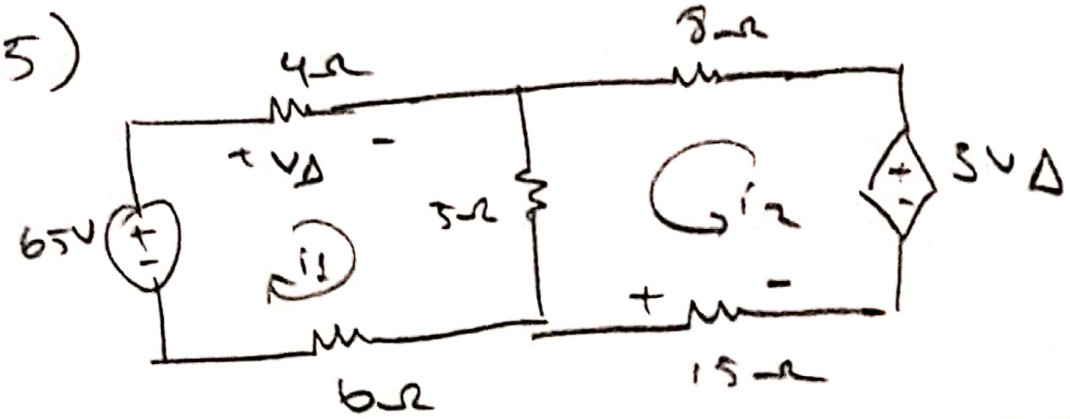
3. Ayg...

5)



$$v_\Delta = 4i_1$$

$$-65 + 15i_2 + 5i_2 = 0$$

$$\Rightarrow \boxed{3i_1 + i_2 = 13}$$

$$-3v_\Delta + 28i_2 + 5i_1 = 0$$

$$-3(4i_1) + 28i_2 + 5i_1 = 0$$

$$\Rightarrow -7i_1 + 28i_2 = 0$$

$$\Rightarrow \boxed{i_1 = 4i_2}$$

$$13i_2 = 13$$

$$\boxed{i_2 = 1A}$$

$$\boxed{i_1 = 4A}$$

$$P_{15\Omega} = i^2 R$$

$$P_{15\Omega} = 1^2 \cdot 15 = 15W$$