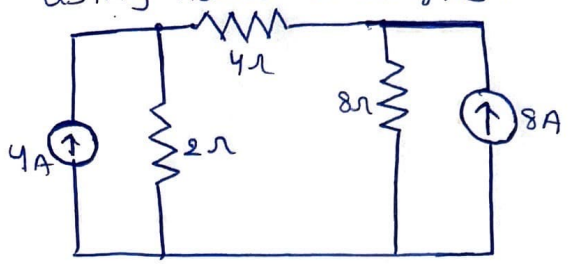
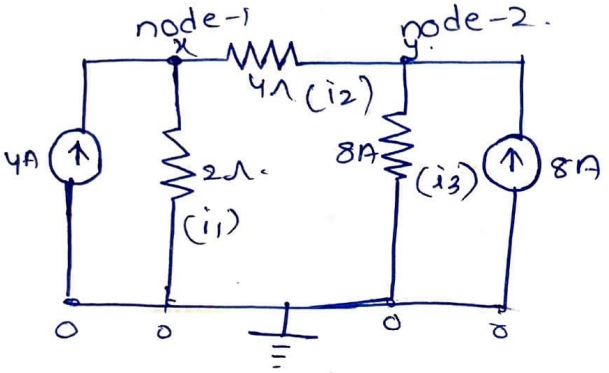
(1) Find the current flowing through various resistors using nodal analysis.



Sol:-

1st lets consider nodes and assume node voltages.



Applying nodal analysis at node-1

$$\frac{x-0}{2} + \frac{x-y}{4} = 4.$$

$$2x + x - y = 4 \times 4$$

$$3x - y = 16 \quad -(1).$$

Applying nodal analysis at node-2.

$$\frac{y-0}{8} + \frac{y-x}{4} = 8.$$

$$2y - 2x + y = 64$$

$$3y - 2x = 64 \quad -(2).$$

on solving equation (1) and eqn (2) we get.

$$x = 16V.$$

$$y = 32V.$$

current through resistors

$$i_1 = \frac{x-0}{2} = \frac{16}{2} = 8A.$$

$$i_2 = x - y/4 = 16 - 32/4 = -4A.$$

$$i_3 = y - 0/8 = 32/8 = 4A.$$