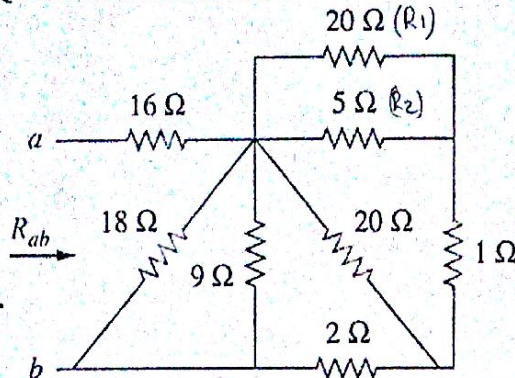


EE281 - QUIZ #1 09/10/2014

Name:

Student No:

Q-1 Find R_{ab} for the circuit below.



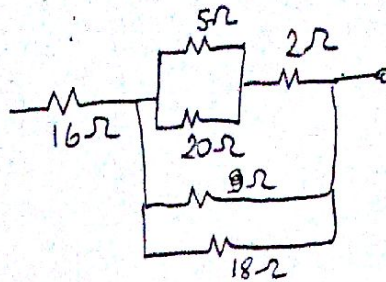
I) R_1, R_2 are parallel

$$R_{eq} = \frac{R_1 R_2}{R_1 + R_2} = \frac{20 \cdot 5}{20 + 5} = 4 \Omega$$

II) $R_{eq}(4 \Omega)$ and 1Ω are in series

$$R = 4 + 1 = 5 \Omega$$

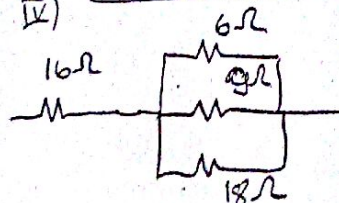
III) Equivalent circuit becomes.



$$5 \Omega // 20 \Omega \Rightarrow 4 \Omega$$

$$4 \Omega - 2 \Omega \text{ series} \Rightarrow 6 \Omega$$

IV)



$18 \Omega - 9 \Omega$ are in parallel

$$R_{eq} = \frac{18 \cdot 9}{18 + 9} = 6 \Omega$$

Two 6Ω resistors are in parallel

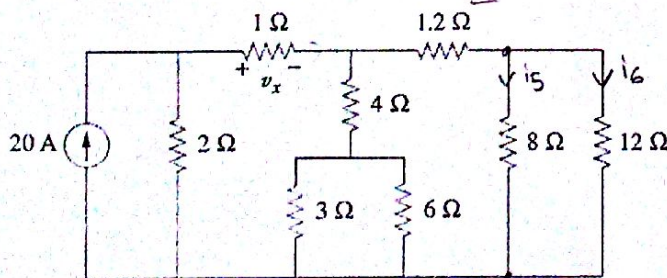
$$R_{eq} = \frac{6 \cdot 6}{6 + 6} = 3 \Omega$$

V)

$$16 \Omega \text{ } 3 \Omega$$

$$R_{ab} = 16 + 3 = 19 \Omega$$

Q-2 In the circuit below, determine V_x and the power absorbed by the 12Ω resistor.



I) 8Ω and 12Ω are in parallel

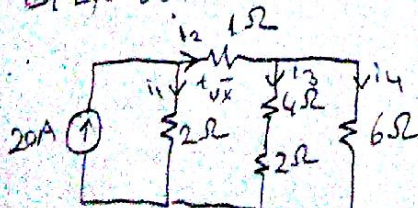
$$R_{eq} = \frac{8 \cdot 12}{8 + 12} = 4.8 \Omega$$

$$II) 3 \Omega // 6 \Omega \Rightarrow R_{eq} = \frac{3 \cdot 6}{3 + 6} = 2 \Omega$$

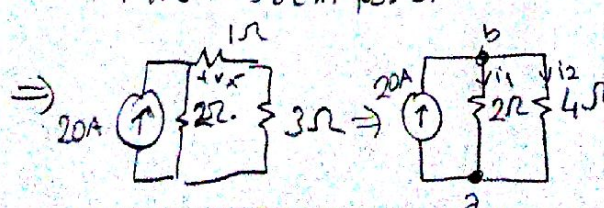
III) 4.8Ω and 1.2Ω are in series

$$4.8 + 1.2 \Omega = 6 \Omega$$

IV) Equivalent circuit becomes



V) Two 6Ω 's are in parallel



$$20 = i_1 + i_2$$

$$V_{b0} = 2 i_1 = 4 i_2$$

$$i_1 = \frac{40}{3} A \quad i_2 = \frac{20}{3} A$$

$$V_x = 1 \Omega \cdot i_2$$

$$V_x = \frac{20}{3} V$$

$$i_2 = i_3 + i_4$$

$$i_3 = i_4 \text{ (Same resistance)}$$

$$i_3 = i_4 = \frac{10}{3} A$$

$$i_4 = i_5 + i_6$$

$$8 \cdot i_5 = 12 \cdot i_6$$

$$i_6 = \frac{4}{3} A$$

$$P_{12\Omega} = I^2 R = \left(\frac{4}{3}\right)^2 \cdot 12 = \frac{64}{3} W$$