

Department of Electrical Engineering

Assignment


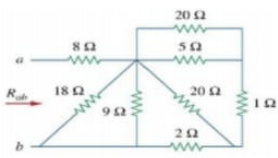
Date: 22/08/2020

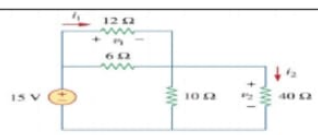
Course Details

Course Title: Network Analysis-I Module: 4rth
 Instructor: Engr. Aamir aman Total Marks: 30

Student Details

Name: Khalid khan Student ID: 13880

Q1	(a)	For the circuit shown below, calculate the voltage V , the conductance G , and the power P .	Marks 05 CLO 1
			
Q2	(b)	A resistor absorbs an instantaneous power of $20 \cos^2(t) \text{ mW}$ when connected to a voltage source $V = 10 \cos(t) \text{ v}$. Find I and R ?	Marks 05 CLO 1
	(a)	Find R_{ab} for the circuit given below.	Marks 10 CLO 1
			
Q3	(a)	Find V_1 and V_2 for the circuit shown below. Also calculate i_1 and i_2 and the power dissipated in the 12Ω and 40Ω resistors.	Marks 05 CLO 2

			
	(b)	The essential component of a toaster is an electrical element (a resistor) that converts electrical energy to heat energy. How much current is drawn by a toaster with resistance 10Ω at 110V ?	Marks 05 CLO 2

$\cos(t)$ Solution \Rightarrow

$$P = 20 \cos^2(t) \text{ mw}$$

$$V = 10 \cos(t) \text{ v}$$

$$I = ?$$

$$R = ?$$

Formula \Rightarrow

$$P = VI$$

$$I = \frac{P}{V}$$

$$I = \frac{20^2 \cos^2 \text{ mw}}{10 \cos t}$$

$$I = 2 \cos \text{ mw}$$

Now for find "R"

P.T.O

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$$\frac{V}{I} = \frac{IR}{I}$$

$$R = \frac{V}{I}$$

$$R = \frac{V \cos \phi}{I \cos \phi} = \frac{5}{10^{-3}} = 5 \times 10^3 = 5 \text{ k}\Omega$$

$$\boxed{R = 5 \text{ k}\Omega}$$

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Q1

(b)

Solves Formula for voltage

$$V = IR$$

$$2 \text{ mA} \times 10 \text{ k}\Omega = 20 \text{ V} \rightarrow (1)$$

Now for G

$$G = \frac{1}{R}$$

Putting the value

$$\frac{1}{10 \text{ k}\Omega} = 100 \mu\text{s} \rightarrow (2)$$

$$P = VI = 20 \text{ volt} \times 2 \text{ mA} = 40 \text{ mW} \rightarrow (3)$$

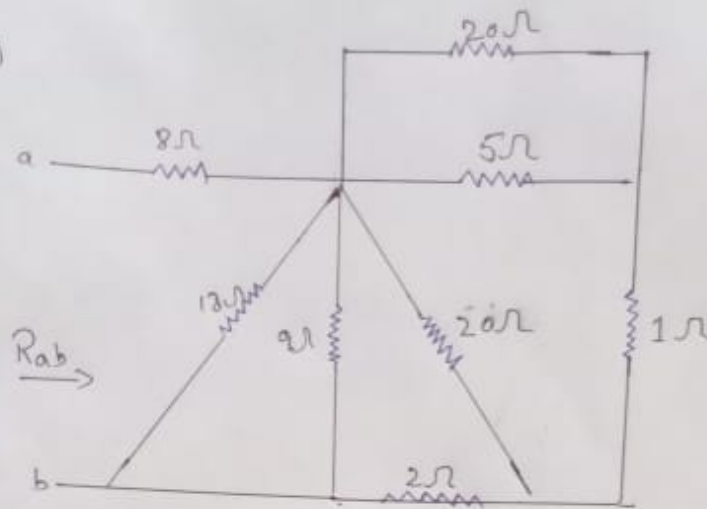
~~P = 40~~

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(9)



Solution =>

Combining $18\Omega // 9\Omega$ gives

$$\frac{9 \times 18}{9 + 18} = 6\Omega$$

Then, $5\Omega // 20\Omega$ gives

$$\frac{5 \times 20}{5 + 20} = \frac{100}{25} = 4\Omega$$

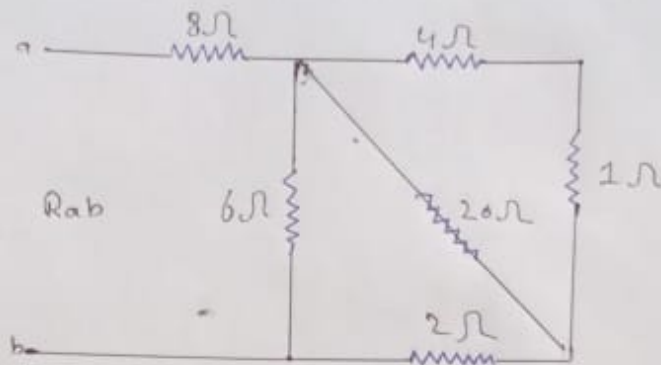
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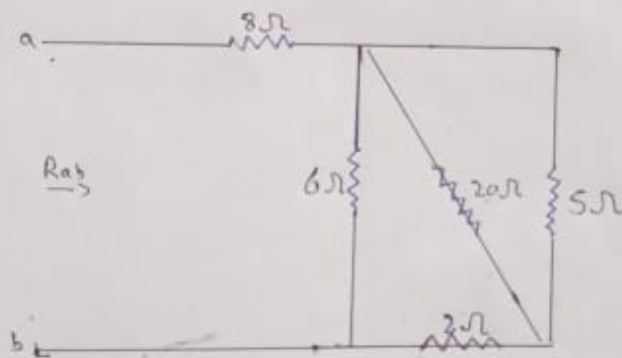
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∴ Equivalent circuit



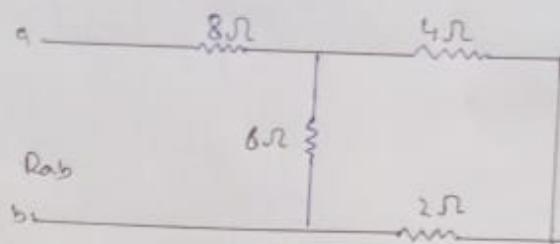
Combine 4Ω and 1Ω get 5Ω



Then $5/20$ gives 4Ω

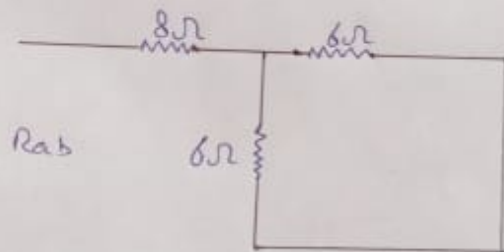
$$\frac{5 \times 20}{5 + 20} = \frac{100}{25} = 4\Omega$$

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$$4 + 2 = 6$$

by combining 4Ω & 2Ω get 6



$$\frac{6 \times 6}{6 + 6} = \frac{36}{12} = 3$$

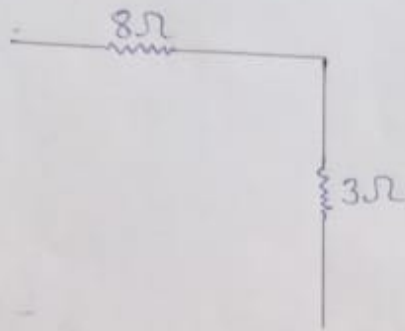
Then $6/6$ gives 3Ω

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Thus, $R_{eq} = 8 + 3 = 11\Omega$

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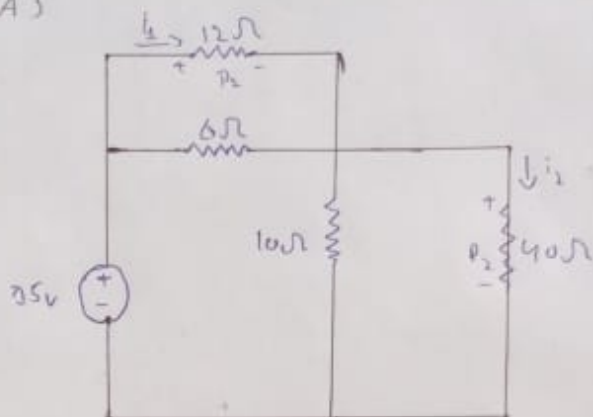
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Q3)

6A)



$$12/6 = 2$$

$$\frac{6 \times 12}{6 + 12} = \frac{72}{18} = 4\Omega$$

$$10/40 =$$

$$\frac{10 \times 40}{10 + 40} = \frac{400}{50} = 8\Omega$$

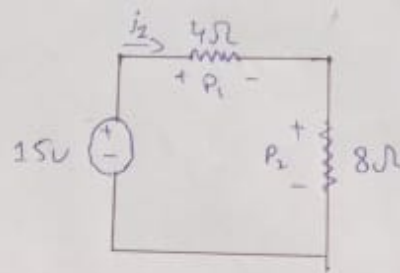
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∴

Equivalent circuit



Now we use voltage division
for circuit.

$$V_1 = [4 / (4 + 8)] (15) = 5V$$

$$V_2 = [8 / (4 + 8)] (15) = 10V$$

$$i_1 = V_1 / 12 = 5 / 12 = 416.7 \text{ mA}$$

$$i_2 = V_2 / 40 = 10 / 40 = 250 \text{ mA}$$

$$P_1 = V_1 i_1 = 5 \times (5 / 12) = 2.083 \text{ W}$$

$$P_2 = V_2 i_2 = 10 \times (0.25) = 2.5 \text{ W}$$

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Q No 3

(B)

Solution => Given data

$$R = 10 \Omega$$

$$V = 110 \text{V}$$

$$I = ?$$

Solution =>

$$I = \frac{V}{R}$$

$$I = \frac{110 \text{V}}{10 \Omega}$$

$$I = 11 \text{A}$$