

④ Why are registers considered the fastest form of memory in a computer and how does their speed impact overall system performance.

\* Registers are temporary memory units that store data and are located in the processor, instead of in RAM, so data can be accessed and stored faster.

Tutorials ⑤

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$$V = IR$$

$$P = VI$$

①  $R = 10 \Omega$

$$I = 2 \text{ A}$$

$$V = ?$$

$$V = IR$$

$$= 2 \times 10$$

$$= \underline{\underline{20 \text{ V}}}$$

②  $V = 12 \text{ V}$

$$R = 4 \Omega$$

$$I = ?$$

$$V = IR$$

$$I = \frac{V}{R} = \frac{12}{4} = \underline{\underline{3 \text{ A}}}$$

③  $R = 50 \Omega$

$$V = 120 \text{ V}$$

$$I = ?$$

$$V = IR$$

$$I = \frac{V}{R} = \frac{120 \text{ V}}{50 \Omega} = \frac{12}{5} = \underline{\underline{2.4 \text{ A}}}$$

④  $I = 5 \text{ A}$

$$V = 20 \text{ V}$$

$$R = ?$$

$$V = IR$$

$$20 = 5 \times R$$

$$R = \frac{20}{5} = \underline{\underline{4 \Omega}}$$

5

$$P = 12 \text{ W}$$

$$I = 2 \text{ A}$$

$$R = ?$$

$$P = VI$$

$$V = IR$$

$$P = I^2 R$$

$$12 = 2^2 \times R$$

$$R = \frac{12}{4} = \underline{\underline{3 \Omega}}$$

6

$$R = 8 \Omega$$

$$I = 3 \text{ A}$$

$$P = ?$$

$$P = VI$$

$$= I^2 R$$

$$= 3^2 \times 8$$

$$= 9 \times 8$$

$$= \underline{\underline{72 \text{ W}}}$$

7

$$I = 2 \text{ A}$$

$$R = 15 \Omega$$

$$P = ?$$

$$P = I^2 R$$

$$= 2^2 \times 15$$

$$= 4 \times 15$$

$$= \underline{\underline{60 \text{ W}}}$$

8

$$P = 60 \text{ W}$$

$$V = 120 \text{ V}$$

$$I = ?$$

$$P = VI$$

$$I = \frac{P}{V} = \frac{60}{120} = \frac{6}{12} = \frac{1}{2}$$

$$I = 0.5 \text{ A}$$

9

$$V = 24 \text{ V}$$

$$P = 48 \text{ W}$$

$$I = ?$$

$$P = VI$$

$$I = \frac{P}{V} = \frac{48}{24} = 2 \text{ A}$$

10

$$R = 100 \Omega$$

$$P = 2 \text{ W}$$

$$I = ?$$

$$P = I^2 R$$

$$I^2 = \frac{P}{R} = \frac{2}{100}$$

$$P = VI$$

$$I = \sqrt{\frac{P}{R}} \text{ A} = \sqrt{\frac{1}{30}} \text{ A} = \sqrt{0.02} \text{ A}$$

$$I = 0.1414 \text{ A}$$

(11)  $R = 20 \Omega$   
 $V = 120 \text{ V}$

$$I = ?$$

$$V = IR$$

$$I = \frac{V}{R} = \frac{120}{20} = \underline{\underline{6 \text{ A}}}$$

(12)  $I = 5 \text{ A}$   
 $R = 10 \Omega$

$$V = ?$$

$$V = IR = 5 \times 10 = \underline{\underline{50 \text{ V}}}$$

(13)  $P = 75 \text{ W}$   
 $I = 2 \text{ A}$

$$V = ?$$

$$P = VI$$

$$V = \frac{P}{I} = \frac{75}{2} = \underline{\underline{37.5 \text{ V}}}$$

(14)  $I = 0.5 \text{ A}$   
 $R = 30 \Omega$

$$V = ?$$

$$V = IR$$

$$= 0.5 \times 30$$

$$= \frac{5}{10} \times 30$$

$$= \underline{\underline{15 \text{ V}}}$$

(15)  $P = 8 \text{ W}$   
 $R = 4 \Omega$   
 $I = ?$

$$P = VI$$

$$V = IR$$

$$P = I^2 R$$

$$I^2 = \frac{P}{R}$$

$$I = \sqrt{\frac{P}{R}}$$

$$I = \sqrt{\frac{8}{4}}$$

$$I = \sqrt{2} \text{ A}$$

$$I = \underline{\underline{1.414 \text{ A}}}$$



(16)  $V = 36 \text{ V}$

$R = 6 \Omega$

$P = ?$

$P = VI$

$V = IR$

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

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

$P = V \times \frac{V}{R} = \frac{V^2}{R}$

$P = \frac{(36)^2}{6} = \frac{36 \times 36}{6}$

$P = 216 \text{ W}$

(17)

$V = 240 \text{ V}$

$R = 20 \Omega$

$I = ?$

$V = IR$

$I = \frac{V}{R} = \frac{240}{20} = \underline{\underline{12 \text{ A}}}$

(18)

$V = 12 \text{ V}$

$I = 3 \text{ A}$

$P = ?$

$P = VI$

$= 12 \times 3$

$P = 36 \text{ W}$

(19)

$R = 25 \Omega$

$P = 100 \text{ W}$

$I = ?$

$P = VI = I^2 R$

$I^2 = \frac{P}{R} \quad I = \sqrt{\frac{P}{R}}$

$I = \sqrt{\frac{100}{25}} = \frac{10}{5}$

$I = 2 \text{ A}$

Q10

$$R = 5 \Omega$$

$$I = 2 A$$

$$P = ?$$

$$P = I^2 R$$

$$= (2)^2 \times 5$$

$$P = 4 \times 5$$

$$\underline{\underline{P = 20 W}}$$

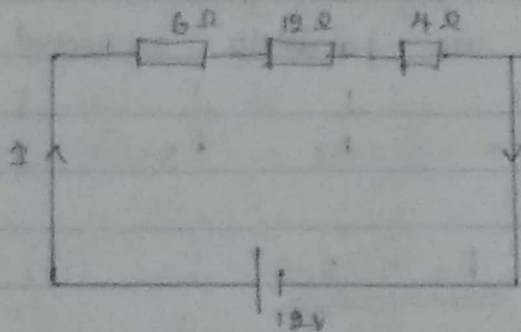
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### Tutorial 6

Question 1 is in the SAD tutorial section.

- Q Three resistors  $6 \Omega$ ,  $12 \Omega$ , and  $4 \Omega$  are connected in series to an electric supply of  $12V$ .

- (i) Calculate the total resistance of these three resistors.



$$R_T = 6 + 12 + 4 = 22 \Omega //$$

- (ii) What is the current from the electric supply?

$$V = IR$$

$$I = \frac{V}{R} = \frac{12}{22} = \frac{6}{11} A = \underline{\underline{0.55 A}}$$