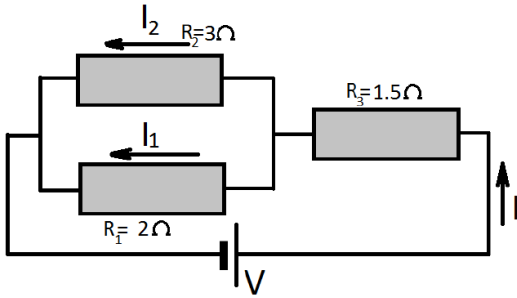


Answer on Question #51847-Physics-Optics

9 Two resistances 2Ω and 3Ω are in parallel. The combination is in series with 1.5Ω resistance and a power supply of voltage V . There is a current of $3A$ through the 2Ω resistance. What are the values of the current I delivered by, and the voltage V across the power supply?

- (a) $3A$ and $10.5V$ (b) $4A$ and $9V$ (c) $4A$ and $12V$ (d) $12A$ and $18V$

Solution



The voltage across the resistor with resistance 2Ω from the Ohm's law:

$$I_1 = \frac{U_1}{R_1}; U_1 = R_1 I_1 = 2\Omega \cdot 3A = 6V.$$

Because the resistance connected in parallel, they have the same voltage:

$$U_1 = U_2 = 6V,$$

$$I_2 = \frac{U_2}{R_2} = \frac{6V}{3\Omega} = 2A.$$

The total current in the circuit is the sum of the currents through the two resistances R_1 and R_2 is

$$I = I_1 + I_2 = 2A + 3A = 5A.$$

$$U_3 = IR_3 = 5A \cdot 1.5\Omega = 7.5V.$$

The voltage across the power supply:

$$U_{power} = U_3 + U_1 = 7.5V + 6V = 13.5V.$$

Answer: $5A$ and $13.5V$.

11 A current of $0.5A$ flowing through a wire produces $21J$ of heat in $1/2$ min. The resistance of the wire is ----- ohms to 1 place of decimal?

- (a) 2.8Ω (b) 3.2Ω (c) 1.4Ω (d) 4.6Ω

Solution

By the Joule's law:

$$Q = I^2 R t$$

Where Q – heat, t – time in seconds, R – wire resistance

$$R = \frac{Q}{I^2 t} = \frac{21\text{J}}{(0.5\text{A})^2 \cdot 30\text{s}} = 2.8\Omega.$$

Answer: (a)2.8Ω.

14 The physical phenomenon which accounts for apparent depth of a pool of water is called?

(a)waves (b) polariztion (c) diffraction (d) refraction

Solution

The physical phenomenon which accounts for apparent depth of a pool of water is called refraction.

Answer: (d) refraction.

15 The ----- of the eye plays an equivalent role of the screen in optical experiments?

(a) lens (b) iris (c) optic nerve (d) retina

Solution

The retina of the eye plays an equivalent role of the screen in optical experiments.

The optics of the eye create an image of the visual world on the retina (through the cornea and lens), which serves much the same function as the film in a camera.

Answer: (d) retina.