

# O P JINDAL SCHOOL, SAVITRINAGAR

## PRACTICE PAPER – 05 SOLUTION

CLASS X PHYSICS

TOPIC : ELECTRICITY

Date : 19/04/20

MM :15

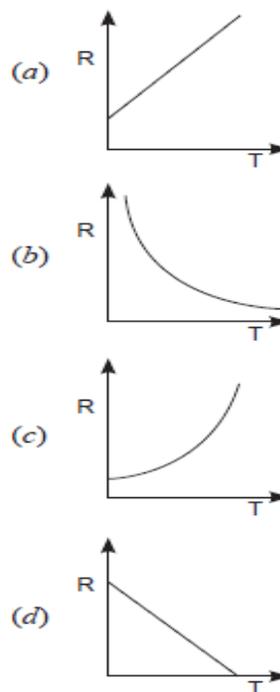
1 A wire of length  $l$ , made of material resistivity  $\rho$  is cut into two equal parts. The resistivity of the two parts are equal to,

- (a)  $\rho$                       (b)  $\frac{\rho}{2}$   
(c)  $2\rho$                     (d)  $4\rho$

1

ANS: (a) Resistivity of the material depends only on the nature of material not dimensions.

2 The temperature of a conductor is increased. The graph best showing the variation of its resistance is



1

ANS: (a) Resistance is directly proportional to temperature of the conductor.

- 3 Two wires of same length and area made of two materials of resistivity  $\rho_1$  and  $\rho_2$  are connected in series to a source of potential V. The equivalent resistivity for the same area is

(a)  $\rho_1 + \rho_2$       (b)  $\frac{\rho_1 \rho_2}{\rho_1 + \rho_2}$   
 (c)  $\frac{(\rho_1 + \rho_2)}{\rho_1 \rho_2}$       (d)  $\left(\frac{|\rho_1 + \rho_2|}{2}\right)$

1

(c) For same length and area of cross-section  $R \propto \rho$ .

For series combination, equivalent resistance is

$$R_s = R_1 + R_2$$

ANS:  $\Rightarrow P_s = \rho_1 + \rho_2$ .

- 4 The least resistance obtained by using 2  $\Omega$ , 4  $\Omega$ , 1  $\Omega$  and 100  $\Omega$  is  
 (a) < 100  $\Omega$  (b) < 4  $\Omega$   
 (c) < 1  $\Omega$  (d) > 2  $\Omega$

1

ANS: (c) In parallel combination, the equivalent resistance is smaller than the least resistance used in the circuit.

- 5 If P and V are the power and potential of device, the power consumed with a supply potential  $V_1$  is

(a)  $\frac{V_1^2}{V^2} P$       (b)  $\frac{V^2}{V_1^2} P$   
 (c)  $\frac{V}{V_1} P$       (d)  $\frac{V_1}{V} P$

1

ANS: (c)  $R = \frac{V}{P}$  and  $P_1 = \frac{V_1^2}{R} = \frac{V_1^2}{V^2} P$

- 6 A coil in the heater consume power P on passing current. If it is cut into halves and joined in parallel, it will consume power (a)  $\frac{P}{2}$  (b) P (c) 2 P (d) 4 P

1

(d) Original power consumed,  $P = \frac{V^2}{R}$

When used in parallel

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{\frac{R}{2}} + \frac{1}{\frac{R}{2}} = \frac{4}{R}$$

$$R_p = \frac{R}{4}$$

∴ New power consumed when two halves in parallel

$$P' = \frac{V^2}{R_p} = \frac{V^2}{\frac{R}{4}} = 4 \frac{V^2}{R} = 4P$$

ANS:

7 A cooler of 1500 W, 200 volt and a fan of 500 W, 200 volt are to be used from a household supply. The rating of fuse to be used is

- (a) 2.5 A (b) 5.0 A  
(c) 7.5 A (d) 10 A

1

ANS: (d) Total power used,  $P = P_1 + P_2 = 1500 + 500 = 2000$  W. Current drawn from the supply,

$$I = \frac{P}{V} = \frac{2000}{200} = 10 \text{ A}$$

8 A current of 1 A is drawn by a filament of an electric bulb. Number of electrons passing through a cross-section of the filament in 16 seconds would be roughly

- (a)  $10^{20}$  (b)  $10^{16}$   
(c)  $10^{18}$  (d)  $10^{23}$

1

(a)  $Q = ne$  and  $Q = It$

$$\therefore ne = It$$

$$\text{or } n = \frac{It}{e} = \frac{1 \times 16}{1.6 \times 10^{-19}} = 10^{20} \text{ electrons}$$

ANS:

9 What is the maximum resistance which can be made using five resistors each of 1/5 W?

1

- (a)  $1/5 \Omega$  (b)  $10 \Omega$   
 (c)  $5 \Omega$  (d)  $1 \Omega$

ANS: (d) Series combination provide the maximum resistance.

Hence,  $R = R_1 + R_2 + R_3 + R_4 + R_5 = \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} = \frac{5}{5} = 1 \Omega$

10 The resistivity does not change if

- (a) the material is changed  
 (b) the temperature is changed  
 (c) the shape of the resistor is changed  
 (d) both material and temperature are changed

1

ANS: (c) The resistivity does not change if the shape of resistor is changed because nature of material will remain same.

11 In an electrical circuit two resistors of  $2 \Omega$  and  $4 \Omega$  respectively are connected in series to a  $6 \text{ V}$  battery. The heat dissipated by the  $4 \Omega$  resistor in  $5 \text{ s}$  will be

1

- (a)  $5 \text{ J}$  (b)  $10 \text{ J}$  (c)  $20 \text{ J}$  (d)  $30 \text{ J}$

ANS: (c) Total resistance of the combination

$R_s = 2 + 4 = 6 \Omega$  Current,  $I = \frac{V}{R_s} = \frac{6}{6} = 1$

Heat dissipation in  $4 \Omega$  resistor,

$H = I^2 R t = 1^2 \times 4 \times 5 = 20 \text{ J}$

12 In the following questions, the Assertion and Reason have been put forward. Read the statements carefully and choose the correct alternative from the following:

- (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion.  
 (b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.  
 (c) Assertion is true but the Reason is false.  
 (d) The statement of the Assertion is false but the Reason is true. Assertion: When a battery is short circuited, the terminal voltage is zero.

1

Reason: In short circuit, the current is zero.

ANS: (c) Assertion is true but the Reason is false.

- 13 In the following questions, the Assertion and Reason have been put forward. Read the statements carefully and choose the correct alternative from the following:
- (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion.
  - (b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.
  - (c) Assertion is true but the Reason is false.
  - (d) The statement of the Assertion is false but the Reason is true. Assertion: Conductors allow the current to flow through themselves.  
Reason: They have free charge carriers.

1

ANS: (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion.

- 14 In the following questions, the Assertion and Reason have been put forward. Read the statements carefully and choose the correct alternative from the following:
- (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion.
  - (b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.
  - (c) Assertion is true but the Reason is false.
  - (d) The statement of the Assertion is false but the Reason is true. Assertion: In an open circuit, the current passes from one terminal of the electric cell to another.  
Reason: Generally, the metal disc of a cell acts as a positive terminal.

1

ANS: (d) The statement of the Assertion is false but the Reason is true.

- 15 In the following questions, the Assertion and Reason have been put forward. Read the statements carefully and choose the correct alternative from the following:
- (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion.
  - (b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.
  - (c) Assertion is true but the Reason is false.
  - (d) The statement of the Assertion is false but the Reason is true. Assertion: The statement of Ohm's law is  $V = IR$   
Reason:  $V = IR$  is the equation which defines resistance.

1

ANS: (c) Assertion is true but the Reason is false.