



SHIKSHA CLASSES

Sub. : Science
Std. : Xth - CBSE

Question Paper 12. Electricity.

Marks : 30
Time : 1 Hour.

SECTION (A)

(Each - 1 Mark)

Q.1 : When a current I flows through a resistance R for time ' t ' the electrical energy spent is given by
a) IRt b) I^2Rt c) IR^2t d) I^2R/t

OR

If the current flowing through a fixed resistor is halved, the heat produced in it will become :

a) One-fourth b) One-half c) Double (d) Four times

Q.2 : A wire of resistance R_1 , is cut into five equal pieces. These five pieces of wire are then connected in parallel. If the resultant resistance of this combination be R_2 , then the ratio R_1/R_2 is:
a) $1/25$ b) $1/5$ c) 5 d) 25

OR

Two electric bulbs have resistances in the ratio $1:2$. If they are joined in series. the energy consumed in them is in the ratio.

a) $2:1$ b) $1:2$ c) $4:1$ d) $1:1$

For question number 3 two statement are given one labeled Assertion (A) and other labeled Reason (R) select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below

- a) Both A and R are true and R is correct explanation of the assertion.
- b) Both A and R are true but R is not the correct explanatoin of the assertion.
- c) A is true but R is false.
- d) A is false but R is true.

Q.3 : **Assertion (A)** : The current flowing through each resistor is the same when connected in series.

Reason (R) : The voltage drop across each resistor remains the same when connected in parallel.

Q.4: **Assertion (A)** : Alloys are commonly used in electrical heating devices like electric iron and heater.

Reason (R): Resistivity of an alloy is generally higher than that of its constituent metals but the alloys have low melting points then their constituent metals.

Q.5: **Assertion (A)** : The metals and alloys are good conductors of electricity.

Reason (R) : Bronze is an alloy of copper and tin and it is not a good conductor of electricity.

Q.6 : You are given four ammeters A, B, C and D having least counts mentioned below:

- I. Ammeter A with least count 0.25 A
- II. Ammeter B with least count 0.5 A
- III. Ammeter C with least count 0.05 A
- IV. Ammeter D with least count 0.1 A

Which of the ammeters would you prefer for doing an experiment to determine the equivalent resistance or two resistances most accurately, when connected in parallel?

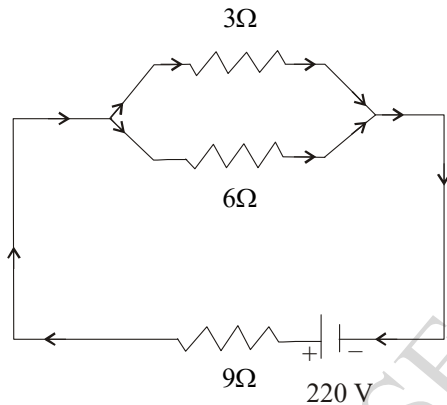
- a) Ammeter A b) Ammeter B c) Ammeter C d) Ammeter D

OR

Two appliances of rating 200 watt-250 volts and 100 watt-250 volts are joined in series to a 250 volts supply. Total power consumed in the circuit is

- a) 46 watt b) 67 watt c) 10 watt d) 30 watt

Q.7 : Observe the following figure and answer any two question from 5(i) to 5(iii). (2)



- i) In the given figure, the resistors
 - a) $6\ \Omega$, $3\ \Omega$ and $9\ \Omega$ are in series
 - b) $9\ \Omega$ and $6\ \Omega$ are in parallel and the combination is in series with $3\ \Omega$
 - c) $3\ \Omega$, $6\ \Omega$ and $9\ \Omega$ are in parallel
 - d) $3\ \Omega$ and $6\ \Omega$ are in parallel and the combination is in series with $9\ \Omega$
- ii) The equivalent resistance of the figure is.
 - a) $11\ \Omega$ b) $9.5\ \Omega$ c) $10\ \Omega$ d) None of these
- iii) Find the value of current flowing through the circuit.
 - a) 20 A b) 19.5 A c) 2.31 A d) 0.05 A.

Q.8: An electrical appliance has a resistance of $25\ \Omega$. When this electrical appliance is connected to a 230 V supply line, the current passing through it will be:

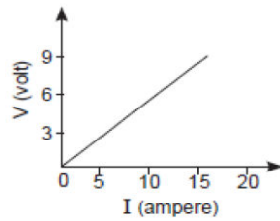
- a) 0.92 A b) 2.9 A c) 9.2 A d) 92 A

Q.9: How is the resistivity of alloys compared with those of pure metals from which they may have been formed?

Q.10: Electrical resistivity of a given metallic wire depends upon

- (a) Its length (b) Its thickness (c) Its shape (d) Nature of the material

Q.11: The resistance whose V – I graph is given below is



- (a) $5/3 \Omega$ (b) $3/5 \Omega$ (c) $5/2 \Omega$ (d) $2/5 \Omega$

Q.12: What is the S.I. unit of resistivity?

Q.13: Two wires of same length and area made of two materials of resistivity ρ_1 and ρ_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) $\left(\frac{|\rho_1 + \rho_2|}{2}\right)$

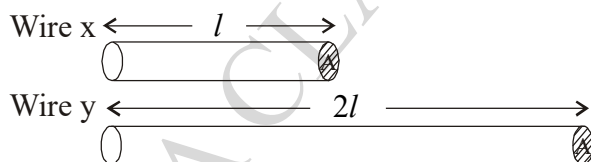
Q.14: If R_1 and R_2 be the resistance of the filament of 40 W and 60 W respectively operating 220 V, then

- a) $R_1 < R_2$ (b) $R_2 < R_1$ (c) $R_1 = R_2$ (d) $R_1 = R_2$

SECTION (B)

(Each - 2 Mark)

Q.15: Out of two wires x and y shown below, which one has greater resistance? Justify your answer.



Q.16: State ohm's law.

OR

: a) What do the following circuit symbols represent?



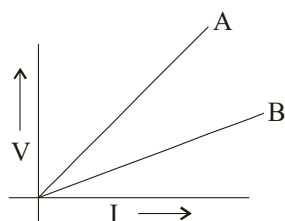
b) The potential difference between the terminals of an electric heater is 60V when it draws a current of 4A from the source find the resistance of heater when in use.

SECTION (C)**(Each - 3 Mark)**

- Q.17: a) Define the term 'Coulomb'
- b) State the relationship between the electric current, the charge moving through a conductor and the time of flow. Calculate the charge passing through an electric bulb in 20 minutes if that value of current is 200 mA.

OR

- : V-I graph for two wires A and B are shown in the figure. If both wires are of same length and same thickness, which of the two is made of a material of high resistivity? Give justification for your answer.



- Q.18: a) Write an expression for the amount of heat produced in a wire of resistance of R and carrying a current of I for time t.
- b) An electric heater of resistance 10Ω draws 15A from the service main for 2 hours calculate:
- The heat developed in the heater and
 - The power of the heater.

SECTION (D)**(5 Mark)**

- Q.19: Derive the expression to find the equivalent resistance when the resistors are connected in parallel combination.

OR

- : Three 250 watt heaters are connected in parallel to a 100 volt supply. Calculate :
- the total current taken from the supply.
 - the resistance of each heater.
 - the energy supplied in kwh to the three heaters in 5 hours.

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