

Time : 1 Hour 30 Minute

STD 10 Science  
Chapter Based Test

Total Marks : 50

SECTION A

\* Select and write one most appropriate option out of the four options given for each of the questions [7]

- When three identical bulb of 60 W- 220V rating are connected in series to a 220V supply, the power drawn by them will be.  
(A) 20W (B) 40W (C) 180W (D) 60W
- If the resistance of a certain copper wire is  $1\Omega$ , then the resistance of a similar nichrome wire will be about:  
(A)  $25\Omega$  (B)  $30\Omega$  (C)  $60\Omega$  (D)  $45\Omega$
- The resistance of a wire of length 300m and cross-section area  $1.0\text{mm}^2$  made of material of resistivity  $1.0 \times 10^{-7}\Omega \text{ m}$  is:  
(A)  $2\Omega$  (B)  $3\Omega$  (C)  $20\Omega$  (D)  $30\Omega$
- Two conducting wires of the same material and of equal lengths and equal diameters are first connected in series and then parallel in a circuit across the same potential difference. The ratio of heat produced in series and parallel combinations would be-  
(A) 1:2 (B) 2:1 (C) 1:4 (D) 4:1
- An electric heater is rated at 2kW. Electrical energy costs Rs 4 per kWh. What is the cost of using the heater for 3 hours?
  - Rs 12.
  - Rs 24.
  - Rs 36.
  - Rs 48.
- The resistivity of copper metal depends on only one of the following factors. This factor is:
  - Length.
  - Thickness.
  - Temperature.
  - Area of cross-section.
- Keeping the p.d. constant, the resistance of a circuit is halved. The current will become:
  - One-fourth.
  - Four time.
  - Half.
  - Double.

\* Assertion - Reasoning based questions.

[3]

8.

For two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

- Both A and R are true, and R is correct explanation of the assertion.
- Both A and R are true, but R is not the correct explanation of the assertion.
- A is true, but R is false.
- A is false, but R is true.

**Assertion:** The wires supplying current to an electric heater are not heated appreciably.

**Reason:** Resistance of connecting wires is very small and  $H \propto R$ .

9. For two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

- Both A and R are true, and R is correct explanation of the assertion.
- Both A and R are true, but R is not the correct explanation of the assertion.
- A is true, but R is false.
- A is false, but R is true.

**Assertion:** A current carrying wire should be charged.

**Reason:** The current in a wire is due to flow of free electrons in a definite direction.

10. For two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

- Both A and R are true, and R is correct explanation of the assertion.
- Both A and R are true, but R is not the correct explanation of the assertion.
- A is true, but R is false.
- A is false, but R is true.

**Assertion:** A bird perches on a high-power line and nothing happens to the bird.

**Reason:** The circuit is incomplete for the bird sitting on high-power line.

\* **Fill in the blank with correct answer.[1 Mark each]** [2]

11. Tungsten is used for filaments in incandescent lamps as they do not \_\_\_\_\_ at high temperatures.

12. Fill in the following blanks with suitable words:

A current is a flow of \_\_\_\_\_ For this to happen there must be a \_\_\_\_\_.

\* **Answer the questions.[1 Mark each]** [2]

13. If the potential difference between the end of a wire of fixed resistance is doubled, by how much does the electric power increase?

14. By what name is the physical quantity coulomb/ second called?

### SECTION B

\* **Answer the following question. :** [10]

- State difference between the wire used in the element of an electric heater and in a fuse wire.
- A current of 200mA flows through a  $4k \Omega$  resistor. What is the p.d. across the resistor?
- Classify the following into good conductors, resistors and insulators:

Rubber, Mercury, Nichrome, Polythene, Aluminium, Wood, Manganin, Bakelite, Iron, Paper, Thermocol, Metal coin.

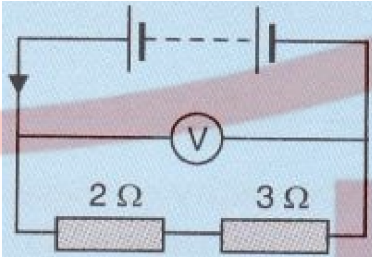
- Four resistances of 16 ohms each are connected in parallel. Four such combinations are connected in series. What is the total resistance?
- An electric bulb is connected to a 220V power supply line. If the bulb draws a current of 0.5A, calculate the power of the bulb.

### SECTION C

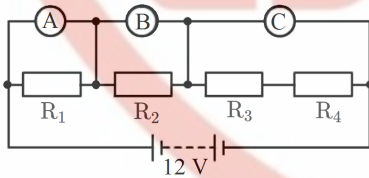
\* Answer short answer questions. [3 Mark each]

[12]

- In the circuit shown below, the voltmeter reads 10V.



- What is the combined resistance?
  - What current flows?
  - What is the p.d. across  $2\Omega$  resistor?
  - What is the p.d. across  $3\Omega$  resistor?
- State the factors on which the heat produced in a current conductor depends. Give one practical application of this effect.
  - The resistors  $R_1$ ,  $R_2$ ,  $R_3$  and  $R_4$  in the figure given below are all equal in value.



What would you expect the voltmeters A, B and C to read assuming that the connecting wires in the circuit have negligible resistance?

- An electric iron is connected to the mains power supply of 220V. When the electric iron is adjusted at 'minimum heating' it consumes a power of 360W but at 'maximum heating' it takes a power of 840W. Calculate the current and resistance in each case.

### SECTION D

\* Long answer questions [5 Mark each]

[10]

- The p.d. across a lamp is 12V. How many joules of electrical energy are changed into heat and light when:
  - A charge of 1C passes through it?
  - A charge of 5C passes through it?
  - A current of 2A flows through it for 10s?
- How will you conclude that the same potential difference (voltage) exists across three resistors connected in a parallel arrangement to a battery?

### SECTION E

\* case - based/data -based questions

[4]

1. Use the data in Table 12.2 to answer the following-
- Which among iron and mercury is a better conductor?
  - Which material is the best conductor?

Electrical resistivity of some substances at 20°C

-	Material	Resistivity ( $\Omega$ m)
Conductors	Silver	$1.60 \times 10^{-8}$
	Copper	$1.60 \times 10^{-8}$
	Aluminium	$2.63 \times 10^{-8}$
	Tungsten	$5.20 \times 10^{-8}$
	Nickel	$6.84 \times 10^{-8}$
	Iron	$10.0 \times 10^{-8}$
	Chromium	$12.9 \times 10^{-8}$
	Mercury	$94.0 \times 10^{-8}$
	Manganese	$1.84 \times 10^{-6}$
	Constant (alloy of Cu, Mn and Ni)	$49 \times 10^{-6}$
Alloys	Manganin (alloy of Cu, Mn and Ni)	$44 \times 10^{-6}$
	Nichrome (alloy of Ni, Cr, MN and Fe)	$100 \times 10^{-6}$
	Glass	$10^{10} - 10^{14}$
Insulators	Hard rubber	$10^{13} - 10^{16}$
	Ebonite	$10^{15} - 10^{17}$
	Diamond	$10^{12} - 10^{13}$
	Paper (dry)	$10^{12}$

