

KIRAN TUTORIALS

Seat No.

--	--	--	--	--	--	--	--

Std 10 (English)**Science And Technology - I****Date 27-09-20****Time 1HRS****Chapter 4.00****Marks 20****Q.1 Multiple Choice Questions****1**

- 1 reverses the direction of current in the rectangular coil of the electric motor.
 a. Battery b. Brushes c. Magnet d. Split rings

Ans Option d.**Q.2 Find the odd one out****1**

- 1 Fuse, Bad conductor, Rubber shoes, Generator

Ans Generator - is the odd one out as it used to generate current while rests are the safety measures in using electricity.

Q.3 Find co-related terms**1**

- 1 Current: Ampere:: Power:

Ans Current: Ampere:: Power: **Watt****Q.4 State True or False****1**

- 1 Short circuiting occurs when live wire and earth wire come in direct contact.

Ans False - Short circuiting occurs when live wire and neutral wire come in direct contact.

Q.5 Name the following**1**

- 1 Constituents of the alloy used to make a fuse wire.

Ans Lead and tin**Q.6 Distinguish between(Any One)****2**

- 1 Bar magnet and Solenoid

Ans	Bar Magnet	Solenoid
i.	Bar magnets are permanent magnets	Solenoids are temporary magnets.
ii.	The poles of the bar magnet are fixed.	The poles of the solenoid can be altered.
iii.	It is always magnetised.	It acts like magnet only when an electric current passed through it.

- 2 AC generator and DC generator.

Ans	AC generator	DC generator
i.	AC generator converts mechanical energy into electrical energy in the form of alternating current.	DC generator converts mechanical energy into electrical energy in the form of direct current.

ii.	The current flows out in different directions.	The current flows out in the same direction.
-----	--	--

Q.7 Give examples**2**

1 What is an electromagnet ? Name any four appliances working on electromagnetism ?

Ans i. The magnet produced by inducing magnetism in a disc with the help of electricity is called electromagnet.

ii. The appliances such as speaker, generator, radio, television, etc. are working on electromagnetism.

Q.8 Give explanation using the given statements**3**

1 Statement 1 :Electric current (flow of electrons) creates heat in the resistor.

Statement 2 :Heat in the resistor is created according to the rule of energy conservation.

Explain Statement 1 with the help of Statement 2.

Ans i. When electrons flows through the resistor (during flowing electric current) electron possesses kinetic energy.

ii. During the flow of electron there is decrease in kinetic energy of electrons due to collision on atoms, ions and molecules.

iii. According to the law of conservation of energy decrease in kinetic energy gets converted into heat.

Q.9 Answer the following(Any One)**3**

1 What is electromagnetic induction ? How does it generate electric current in the circuit ?

Ans i. The process, by which a changing magnetic field in a conductor induces a current in another conductor, is called electromagnetic induction.

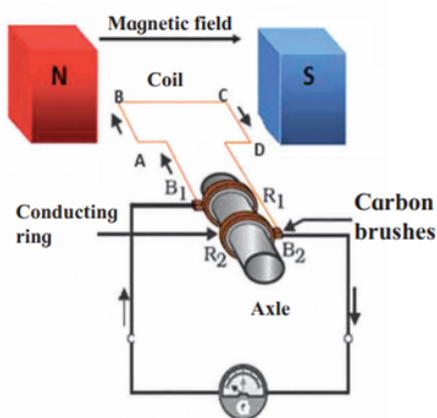
ii. When the electrical current is flowing through the solenoid coil and the solenoid coil is displaced with respect to the coil, the current is produced in the coil.

iii. Even if the solenoid is kept stationary, a change in current in the solenoid coil produces a current in the coil.

iv. If the solenoid coil is moved towards or away from the coil, a deflection is seen in the galvanometer. Also, the faster is the displacement of the solenoid, larger is the deflection of the galvanometer pointer.

v. If the current in the solenoid coil is changed, a current is produced in the coil or if the solenoid coil is moved towards the coil, then also a current is produced in the coil.

2 Identify the below diagram and explain the construction of it.



Ans The given diagram is an electric generator. Electric generator is a device that converts mechanical energy into electrical energy.

Construction : The main components of the electric generator are:

i. **Coil and strong magnets :**

A rectangular loop of copper wire ABCD placed between the two pole pieces of a magnet.

ii. Conducting rings :

The two ends of the coil are connected to the conducting rings R_1 and R_2 via carbon brushes. Both the rings are fixed to the axle, but there is a resistive coating in between the ring and the axle. The axle is rotated with the help of a machine from outside. Because of this, the coil ABCD starts rotating.

iii. Brushes :

The stationary carbon brushes B_1 and B_2 are connected to a galvanometer, which shows the direction of current in the circuit.

Q.10 Answer the following in detail (Any One)**5**

1 Which device is used to produce electricity ? Describe with a neat diagram ?

- i. Electric motor
- ii. Galvanometer
- iii. Electric Generator(DC)
- iv. Voltmeter

Ans i. Electric motor :

Electric motor does not produce electricity but converts electrical energy into mechanical energy. Ex: Working of an electric fan.

ii. Galvanometer :

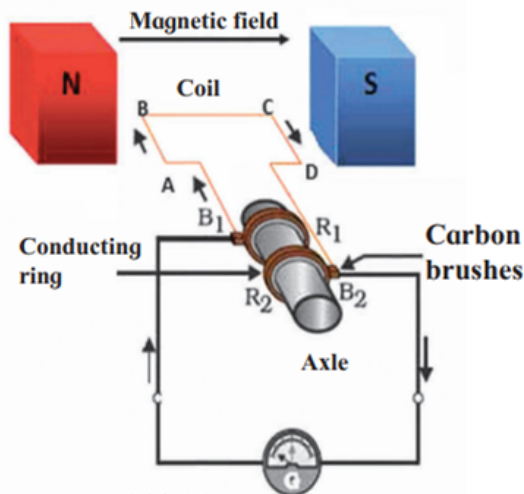
Galvanometer is used to know the direction and the presence of current in the circuit.

iii. Electric Generator(DC) :

Electric generator is used to produce electricity. Electric generators are devices that convert mechanical energy into electrical energy.

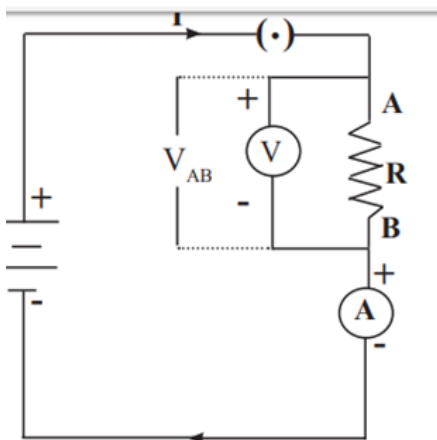
iv. Voltmeter :

Voltmeter is used to measure the potential difference between two points of a conductor.



2 Complete the mathematical form of Joule's law.

Ans



- i. Let V be the **potential difference** applied between two terminals of a conductor of resistance R .
 - ii. If a charge Q flows from **A to B**, work $V_{AB} \cdot Q$, has been done on Q while going from A to B.
 - iii. The cell gives the energy through the charge Q to the resistance where work $V_{AB} \cdot Q$ is performed.
 - iv. If the charge Q flows from A to B in time t , i.e. the work is performed in time t , then during that time the energy $V_{AB} \cdot Q$ is given to the **resistor**.
 - v. The energy received by the resistor is converted into **heat energy** and the temperature of the resistor is increased.
 - vi. $P = \text{Electric power} = \frac{\text{Energy}}{\text{Time required}} = \frac{V_{AB} \cdot Q}{t} = V_{AB} \cdot I \quad \dots (1) \left\{ \frac{Q}{t} = I \right\}$
 - vii. The source of energy, the cell, gives in time t , the energy $P \times t$ to the resistor.
 - viii. If I is the current flowing continuously through the circuit, the heat produced in the resistor in time t will be.
 - ix. $H = P \times t = V_{AB} \times I \times t \quad \dots (2)$
 - x. According to Ohm's law,
 - xi. $V_{AB} = I \times R$
 - xii. $I = \frac{V_{AB}}{R} \quad \dots (3)$
 - xiii. $H = V_{AB}^2 \times \frac{t}{R} \quad \dots (4)$
 - xiv. Similarly, $H = I \times I \times R \times t = I^2 R t \quad \dots (5)$
- $H = I^2 R t$ is called Joules law of heating.