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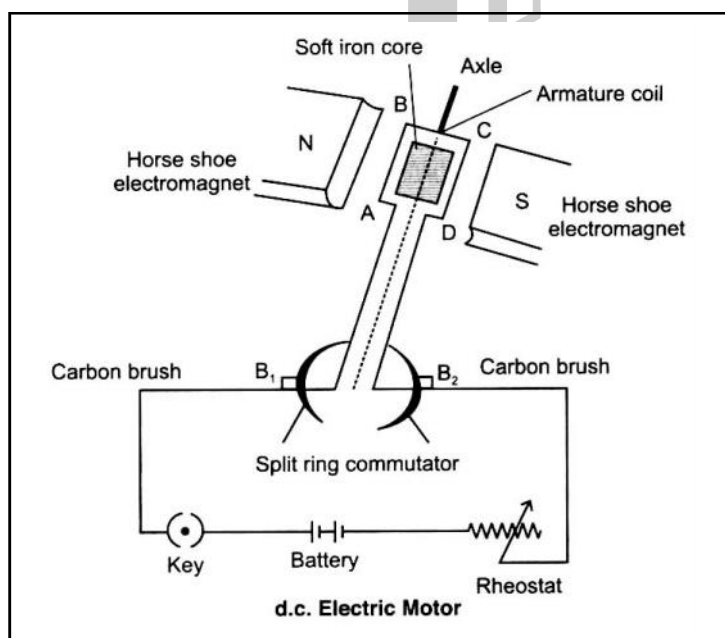
ICSE X

SUBJECT : **PHYSICS**

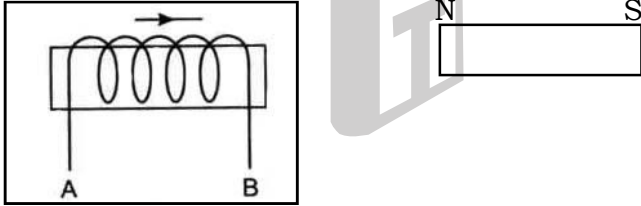
Current Electricity, Household Circuits, Electro Magnetism (Board papers) Assignment Sheet STEP UP ANSWERSHEET

55. (i) North pole.
(ii) The strength of the magnetic field of an electromagnet can be changed according to its use and it will be a magnet till the time current passes through it whereas the strength of permanent magnet can not be increased and can not be magnetized and demagnetized in an instance. **(ICSE 2013)**
56. (i) Fuse.
(ii) Heating effect of electric current. **(ICSE 2013)**
57. **Ohm's law** : It states that the current flowing in a conductor is directly proportional to the potential difference across its ends provided the physical conditions and the temperature of the conductor remains constant i.e., $V \propto I$ or $V = IR$ where R is a constant called resistance of conductor. **(ICSE 2013)**
58. (1) When the live wire comes in contact with the wet hand of the user.
(2) Due to short circuit in the electrical gadget. **(ICSE 2013)**
59. Earthing can prevent a person from electric shock. **(ICSE 2013)**

60. (i)



- (ii) The split ring acts as a commutator in a d.c. motor. With the split ring, the direction of current through the coil is reversed after every half rotation of the coil and thus the direction of couple rotating the coil remains unchanged and the coil continues to rotate in the same direction.
- (iii) Advantage of a.c. over d.c. is that it is able to travel long distance without much power loss. **(ICSE 2013)**

61. (i) Electrical energy in kWh which is commercially known as unit.
 $1 \text{ kWh} = 1 \text{ kW} \times 1 \text{ hr} = 1 \text{ unit of electricity}$
 (ii) Electromagnets are used in electric bell, door alarm, electric motor, etc. **(ICSE 2014)**
62. (i) An ohmic resistor is a resistor which obeys ohm's law. Examples are all metallic conductors such as silver, aluminium, copper etc.
 (ii) (1) Thinner wire will have more resistance because the resistance is inversely proportional to the area of cross-section.
 (2) Specific resistance of both wire is same because specific resistance depends on the nature of the material which is same in both cases. **(ICSE 2014)**
63. (i) In set A, bulbs are in series so if one gets fused others are also affected. In set B, bulbs are in parallel so if one goes off others continue to glow.
 (ii) For house circuiting we use the set B arrangement i.e., all the appliances are connected in parallel because in this arrangement each appliance operates at the same voltage and works independently without being affected whether the other appliance is switched on or off. **(ICSE 2014)**
64. (i) Magnitude of induced e.m.f. depends on
 (1) the magnitude of e.m.f. applied in the primary coil.
 (2) the number of turns in the coil.
 (ii) (1)  **(ICSE 2014)**
- A Current flows from B to A as the coil moves towards the magnet an induced e.m.f. always opposes the motion.
 (2) Lenz's law is used. **(ICSE 2014)**
65. (i) The resistivity of semiconductors decreases with increase in temperature.
 (ii) For a fuse, higher the current rating **thicker** is the fuse wire. **(ICSE 2015)**
66. (i) This is because the current carrying freely suspended solenoid behaves like a magnet.
 (ii) It rests in the north-south direction. **(ICSE 2015)**
67. Similarities between A.C. generator D.C. motor are :
 (i) armature coil rotates in a magnetic field.
 (ii) the external circuit is connected to two carbon brushes. **(ICSE 2015)**
68. (i) **Step-up transformer** is used to increase the voltage.
 (ii) 50 hertz.
 (iii) Switch is connected to **live wire** of the circuit. **(ICSE 2015)**

69. (i) Relationship between potential difference and current is given by **Ohm's law**.
 (ii) The slope of the graph represent resistance.
 (iii) The connection wires are made from **copper**. **(ICSE 2015)**
70. The resistance of 4.5Ω and 9Ω are connected in parallel
 \therefore Equivalent resistance,

$$R_1 = \frac{(4.5 \times 9)}{(4.5 + 9)} = \frac{40.5}{13.5} = 3\Omega$$
 Total resistance in the circuit (R) = $1.2 + 0.8 + 3 = 5\Omega$
 (i) Current in the circuit (I) = Reading of the ammeter

$$= \frac{\text{Total e.m.f. (E)}}{\text{Total resistance (R)}}$$

$$= \frac{2}{5} \text{ amperes} = 0.4 \text{ ampere}$$
 (ii) Potential difference across the terminals of the cell (V)
 = total p.d in the external circuit
 = $E - Ir$
 = $2 - (0.4 \times 1.2)$
 = $2 - 0.48$
 = 1.52 volts **(ICSE 2015)**
71. **Reason** : The slope of V-I graph gives the resistance. In the figure, the slope V of straight line A is less than that of B, so resistance of combination A is less than that of the combination B. When two resistors are joined in parallel, the equivalent resistance decreases, but in series it increases. Therefore A represents the parallel combination. **(ICSE 2016)**
72. (i) The melting point must be low.
 (ii) The resistance must be large. **(ICSE 2016)**
73. The primary coil of a step up transformer is made of the thicker wire.
Reason : Current in primary coil is more, so its resistance is made low for less heating loss. (In step up transformer $E_p < E_s \therefore I_p > I_s$). **(ICSE 2016)**
74. (i) Free electrons. (ii) Earth wire. (iii) Live wire. **(ICSE 2016)**
75. (i) Step up transformer.
 (ii) Alternating current (a.c.).
 (iii) 220 volt. **(ICSE 2016)**
76. The specific resistance of a material is the resistance between the two opposite faces of cube of that material of each side 1 metre. Its S.I. unit is ohm \times metre (or Ω m). **(ICSE 2017)**
77. **Free electrons** are responsible for flow of current in conductors **(ICSE 2017)**
78. **Earth wire** (green) is connected to the metal case of a geyser. **(ICSE 2017)**

79. The fuse is connected to the live wire (red or brown). **(ICSE 2017)**
80. Current rating of a fuse is 5 A, implies that if the current in a circuit having this fuse in the live wire exceeds 5 A, it blows off and the circuit becomes incomplete without damaging the appliance connected in that circuit. **(ICSE 2017)**
81. The power generated at the generating station is stepped up from 11 kV to 132 kV before transmission so as to reduce the magnitude of current to $\frac{1}{12}$ th of its value so that the heating loss of power in the line wires used for transmission are reduced [$H \propto I^2$]. **(ICSE 2017)**
82. (1) Heating loss in the wire of primary and secondary coils.
(2) Hysteresis loss in the core of the transformer due to its magnetisation and demagnetisation in each cycle. **(ICSE 2017)**

