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Grade : X	Subject : Physics	Ch.: 12,13,14
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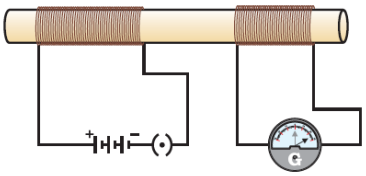
SECTION – A

1. In the arrangement shown in Figure there are two coils wound on a non-conducting cylindrical rod. Initially the key is not inserted. Then the key is inserted and later removed. Then



(a) the deflection in the galvanometer remains zero throughout
(b) there is a momentary deflection in the galvanometer but it dies out shortly and there is no effect when the key is removed
(c) there are momentary galvanometer deflections that die out shortly; the deflections are in the same direction
(d) there are momentary galvanometer deflections that die out shortly; the deflections are in opposite directions

2. The strength of magnetic field inside a long current carrying straight solenoid is
(a) more at the ends than at the centre
(b) minimum in the middle
(c) same at all points
(d) found to increase from one end to the other
3. To convert an AC generator into DC generator
(a) split-ring type commutator must be used
(b) slip rings and brushes must be used
(c) a stronger magnetic field has to be used
(d) a rectangular wire loop has to be used
4. The most important safety method used for protecting home appliances from short circuiting or overloading is
(a) earthing (b) use of fuse (c) use of stabilizers (d) use of electric meter
5. For a current in a long straight solenoid N- and S-poles are created at the two ends. Among the following statements, the incorrect statement is
(a) The field lines inside the solenoid are in the form of straight lines which indicates that the magnetic field is the same at all points inside the solenoid
(b) The strong magnetic field produced inside the solenoid can be used to magnetize a piece of magnetic material like soft iron, when placed inside the coil
(c) The pattern of the magnetic field associated with the solenoid is different from the pattern of the magnetic field around a bar magnet
(d) The N- and S-poles exchange position when the direction of current through the solenoid is reversed
6. Choose the incorrect statement from the following regarding magnetic lines of field
(a) The direction of magnetic field at a point is taken to be the direction in which the north pole of a magnetic compass needle points
(b) Magnetic field lines are closed curves
(c) If magnetic field lines are parallel and equidistant, they represent zero field strength
(d) Relative strength of magnetic field is shown by the degree of closeness of the field lines
7. Choose the incorrect statement regarding wind power
(a) It is expected to harness wind power to minimum in open space

(b) The potential energy content of wind blowing at high altitudes is the source of wind power
(c) Wind hitting at the blades of a windmill causes them to rotate. The rotation thus achieved can be utilized further
(d) One possible method of utilizing the energy of rotational motion of the blades of a windmill is to run the turbine of an electric generator

8. Choose the incorrect statement
(a) We are encouraged to plant more trees so as to ensure clean environment and also provide bio-mass fuel.
(b) Gobar-gas is produced when crops, vegetable wastes etc., decompose in the absence of oxygen
(c) The main ingredient of bio-gas is ethane and it gives a lot of smoke and also produces a lot of residual ash
(d) Bio-mass is a renewable source of energy
9. Ocean thermal energy is due to
(a) energy stored by waves in the ocean
(b) temperature difference at different levels in the ocean
(c) pressure difference at different levels in the ocean
(d) tides arising out in the ocean
10. The major problem in harnessing nuclear energy is how to
(a) split nuclei? (b) sustain the reaction?
(c) dispose off spent fuel safely? (d) convert nuclear energy into electrical energy?
11. Which part of the solar cooker is responsible for green house effect?
(a) Coating with black colour inside the box (b) Mirror
(c) Glass sheet (d) Outer cover of the solar cooker
12. The main constituent of biogas is
(a) methane (b) carbon dioxide (c) hydrogen (d) hydrogen sulphide
13. The power generated in a windmill
(a) is more in rainy season since damp air would mean more air mass hitting the blades
(b) depends on the height of the tower
(c) depends on wind velocity
(d) can be increased by planting tall trees close to the tower
14. Which one of the following forms of energy leads to least environmental pollution in the process of its harnessing and utilization?
(a) Nuclear energy (b) Thermal energy
(c) Solar energy (d) Geothermal energy
15. In a hydro power plant
(a) Potential energy possessed by stored water is converted into electricity
(b) Kinetic energy possessed by stored water is converted into potential energy
(c) Electricity is extracted from water
(d) Water is converted into steam to produce electricity
16. Two resistors of resistance 2 Ω and 4 Ω when connected to a battery will have
(a) same current flowing through them when connected in parallel
(b) same current flowing through them when connected in series
(c) same potential difference across them when connected in series
(d) different potential difference across them when connected in parallel
17. In an electrical circuit three incandescent bulbs A, B and C of rating 40 W, 60 W and 100 W respectively are connected in parallel to an electric source. Which of the following is likely to happen regarding their brightness?
(a) Brightness of all the bulbs will be the same (b) Brightness of bulb A will be the maximum
(c) Brightness of bulb B will be more than that of A (d) Brightness of bulb C will be less than that of B

18. In an electrical circuit two resistors of 2 Ω and 4 Ω respectively are connected in series to a 6 V battery. The heat dissipated by the 4 Ω resistor in 5 s will be
    (a) 5 J (b) 10 J (c) 20 J (d) 30 J
19. An electric kettle consumes 1 kW of electric power when operated at 220 V. A fuse wire of what rating must be used for it?
    (a) 1 A (b) 2 A (c) 4 A (d) 5 A
20. A cylindrical conductor of length l and uniform area of cross section A has resistance R. Another conductor of length 2l and resistance R of the same material has area of cross section
    (a) A/2 (b) 3A/2 (c) 2A (d) 3A
21. Which of the following represents voltage?
    (a) Work done / Current × Time (b) Work done x Charge
    (c) Work done × Time / Current (d) Work done x Charge x Time
22. What is the maximum resistance which can be made using five resistors each of 1/5 Ω?
    (a) 1/5 Ω (b) 10 Ω (c) 5 Ω (d) 1 Ω
23. What is the minimum resistance which can be made using five resistors each of 1/5 Ω?
    (a) 1/5 Ω (b) 1/25 Ω (c) 1/10 Ω (d) 25 Ω
24. Electrical resistivity of a given metallic wire depends upon
    (a) its length (b) its thickness (c) its shape (d) nature of the material
25. 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}

SECTION - B

1. State Ohm's Law with necessary equations.
2. Find the current through a conductor having a resistance of 10 Ω and a potential difference of 2V.
3. If the area of cross section of a copper wire 3 mm^2 and the length is 10 m is needed to get a resistance of 20 Ω, kindly compute the resistivity.
4. Write a note on the magnetic field produced by a straight current carrying conductor.
5. Write a note on the magnetic field produced by a circular current carrying conductor.
6. Write a note on Electromagnetic Induction.
7. Write a note on Electric Motor.
8. Write a note on Electric Generator.
9. Write a note on Solar Energy.
10. Write a note on Geothermal and Nuclear Energy.
11. Define Resistivity. Derive the equation. Show how it is different from resistance.
12. Also if the length of the wire is tripled and the area is reduced to $1/6^{th}$ show the change in the resistance of the wire.
13. If a rectangular wire with resistivity of 1.5 x 10^{22} Ω mm and 100 cm long lets a current of 3 mA pass through it, calculate the resistance of the wire and the voltage across it.
14. What is biomass? What can be done to obtain bio-energy using biomass?
15. What are the environmental consequences of using fossil fuels? Suggest the steps to minimize the pollution caused by various sources of energy including non-conventional sources of energy.
16. Describe the activity that shows that a current-carrying conductor experiences a force perpendicular to its length and the external magnetic field. How does Fleming's left-hand rule help us to find the direction of the force acting on the current carrying conductor?

SECTION - C

1. Draw a circuit diagram of an electric circuit containing a cell, a key, an ammeter, a resistor of 2 Ω in series with a combination of two resistors (4 Ω each) in parallel and a voltmeter across the parallel combination. Will the potential difference across the 2 Ω resistor be the same as that across the parallel combination of 4Ω resistors? Give reason.

2. What is electrical resistivity? In a series electrical circuit comprising a resistor made up of a metallic wire, the ammeter reads 5 A. The reading of the ammeter decreases to half when the length of the wire is doubled. Why?
3. A current of 1 ampere flows in a series circuit containing an electriclamp and a conductor of 5 Ω when connected to a 10 V battery. Calculate the resistance of the electric lamp. Now if a resistance of 10 Ω is connected in parallel with this series combination, what change (if any) in current flowing through 5 Ω conductor and potential difference across the lamp will take place? Give reason.
4. Three incandescent bulbs of 100 W each are connected in series in an electric circuit. In another circuit another set of three bulbs of the same wattage are connected in parallel to the same source. (a) Will the bulb in the two circuits glow with the same brightness? Justify your answer. (b) Now let one bulb in both the circuits get fused. Will the rest of the bulbs continue to glow in each circuit? Give reason.
5. Find out the following in the electric circuit given in Figure
   (a) Effective resistance of two 8 Ω resistors in the combination
   (b) Current flowing through 4 Ω resistor
   (c) Potential difference across 4 Ω resistance
   (d) Power dissipated in 4 Ω resistor
   (e) Difference in ammeter readings, if any.