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Revision Worksheet 1
Class Xth Session: 2021-2022
Chapter: Electricity

1. State Joule's law of heating. list two special characteristics of a heating element wire.
An electronic iron consumed energy at the rate of 880 W when heating is at the maximum rate and 440 W when the heating is at the minimum rate. The applied voltage is 220 V. Calculate the current and resistance in each case
2. Copper and aluminum wires are usually employed for electricity transmission Why?
3. Obtain the expression for the heat developed in a resistor by the passage of electric current through it. 220 J of heat is produced each second in a 8 ohm resistor. Find the potential difference across the resistor.
4. (a) What is heating effect of current? List two electrical appliances which work on this effect.
(b) An electric bulb is connected to a 220 V generator. If the current drawn by the bulb is 0.50 A; find its power.
(c) An electric refrigerator rated 400 W operates eight hours a day. Calculate the energy per day in kWh.
(d) State the difference between kilowatt and kilowatt hour.
(e) Why is the series arrangement of appliances not used for domestic circuits?
5. How much energy is given to each coulomb of charge passing through a 6 V battery?
6. A copper wire has a diameter 0.5 mm and resistivity 1.6 x 10^{-8}ohm m.
(i) What will be the length of this wire to make the resistance of 12 Ohm
(ii) How much will be the resistance of another copper wire of same length but half the diameter?
7. A wire of uniform cross-section and length l has a resistance of 4 ohm. The wire is cut into four equal pieces. each piece is then stretched to length 'l'. Thereafter, the four wires are joined in parallel. Calculate the net resistance
8. Calculate the electrical energy produced in 5 minutes when a current of 2 A is sent through a conductor by a potential difference of 500 volts.
9. An electric heater draws a current of 10 A from a 220 V supply. What is the cost of using the heater 5 hours per day for 30 days if the cost of 1 unit is Rs.2.50?
10. An electric bulb draws a current of 0.2 A when it operates at 220 V. Calculate the amount of electric charge flowing through it in 1 h
11. An electric bulb is rated 220 V and 100 W. when it is operated on 110 V, what will be the power consumed?
12. Resistors are given as R_1 = 10 ohm, R_2 = 20 ohm, and R_3 = 30 ohm. Calculate the effective resistance when they are connected in series. Also calculate the current flowing when the combination is connected to a 6 V battery.
13. The filament of an electric lamp, which draws a current of 0.2 A, is used for 5 hours. Calculate the amount of charge flowing through the circuit.
14. Calculate the number of electrons passing per second through a conductor to produce a current of one ampere.
15. A 5-ohm resistor is connected across a battery of 6 volts. Calculate
(i) The current flowing through the resistor.
(ii) The energy that dissipates as heat in 10 s.
16. You have two electric lamps having rating 40 W; 220 V and 60 W; 220 V. Which of the two has a higher resistance? Give reason for your answer. If these two lamps are connected to a source of 220 V, which will glow brighter?
17. A current of 5 ampere is passed through a conductor of 12 ohms for 2 minutes. Calculate the amount of heat produced.
18. Can you run an electric geyser with power rating 2 kW; 220 V on a 5 A line? Give reason to justify your answer.
19. A domestic electric circuit (220 V) has a 5 A fuse. How many bulbs of 100 W; 220 V rating can be safely used on this line?
20. Two bulbs A and B are rated as 90 W -120V and 60 W -120 V respectively. They are connected in parallel across a 120 V source. Find the current in each bulb. Which bulb will consume more energy?
21. An electric iron is rated 2 kW at 220 V. Calculate the capacity of the fuse that should be used for the electric iron
22. For an electric heater rated 4 kW-220 V. Calculate:
(i) the current required
(ii) the resistance of the heater
(iii) the energy consumed in 1 hour.
23. State Ohm's law. How can it be verified experimentally? Does it hold good in all conditions? Comment
24. Express Joule's law of heating mathematically.
25. What is the resistance of 12 m wire having radius 2×10^{-4} m and resistivity 3.14×10^{-8} Ω-m.
26. A 4Ω resistance wire is doubled on it. Calculate the new resistance of the wire
27. An electric iron consumer's energy at a rate of 840 W when heating is at the maximum rate and 360 W when the heating is at the minimum, the voltage is 220 V. What are the current and the resistance in each case ?
28. a.Define 1 volt. Express it in terms of SI unit of work and charge.
b. Calculate the amount of energy consumed in carrying a charge of 1 coulomb through a battery of 3 volts.
29. Write symbols of the following circuit elements:
(i) Battery
(ii) Ammeter
(iii) Voltmeter
State the role of these elements in an electric circuit.
30. What is meant by electrical resistance of a conductor? State how resistance of a conductor is affected when
(i) a low current passes through it for a short duration
(ii) a heavy current passes through it for about 30 seconds.

31. How do we connect ammeter and voltmeter in an electric circuit? Draw a circuit diagram to justify your answer. What is likely to happen if the positions of these instruments are interchanged? Give reason.
32. A student has a resistance wire of 1 ohm. If the length of this wire is 50 cm, to what length he should stretch it uniformly so as to obtain a wire of 4 Ω resistance? Justify your answer.
33. Calculate the resistivity of the material of a wire of length 1 m, radius 0.01 cm and of resistance 20 ohms.
34. The resistance per meter length of a wire is 10 Ω. If the resistivity of the material of the wire is 50×10^{-8} ohm meters, find the area of cross – section of the wire.
35. The resistance of a wire of 0.01 cm radius is 10 Ω. If the resistivity of the material of the wire is 50×10^{-8} ohm meters, find the length of the wire.
36. Show different ways in which three resistance of R ohm each may be connected in a circuit. In which case is the equivalent resistance of the combination:
(i) maximum
(ii) minimum
37. When a resistor R is connected to a battery of 3 V, it draws a current of 1 ampere. find the value of R. If an identical resistor is connected in parallel with it, find the current that flows through the circuit?
38. Derive an expression for the equivalent resistance of three resistors R_1, R_2 and R_3 connected in parallel.
39. Christmas tree lamps are usually connected in series. What will be if one lamp breaks?
40. With the help of a neat diagram derive the expression for the effective resistance when three resistors R_1, R_2 and R_3 are connected is series.
41. Establish a relationship to determine the equivalent resistance R of a combination of three resistors having resistance R_1, R_2 and R_3 connected in series. Calculate the equivalent resistance of the combination of three resistors of 2 Ω, 3 Ω and 6 Ω joined in parallel.
42. State Joule's law of heating.
43. Derive an expression for electric energy consumed in a device in terms of V, I and t, where V is the potential difference applied to it, I is the current drawn by it and t is the time for which the current flows?
44. a. What is meant by electric current? Name and define its SI unit.
b. In a conductor electrons are flowing from B to A. What is the direction of conventional current? Give justification for your answer
c. A steady current of 1 ampere flows through a conductor. Calculate the number of electrons that flow through any section of the conductor in 1 second. (Charge on electron = 1.6×10−191.6×10−19 coulomb)
45. Is electric potential difference a scalar or vector quantity? What do you mean by a potential difference of 1 volt?
46. a. What does an electric circuit mean?
b. Name a device that helps to maintain a potential difference across a conductor in a circuit.
c. When do we say that the potential difference across a conductor is 1 volt?
d.Calculate the amount of work done in shifting a charge of 2 coulombs from a point A to B having potentials 10 V and 5V respectively.
47. Draw the symbols of commonly used components in electric circuit diagrams for:
(i) An electric cell
(ii) open plug key
(iii) Wires crossing without connection or joining
(iv) Variable resistor
(v) Battery
(vi) Electric bulb
(vii) Resistance
(viii) Wire joint
48. Draw a labeled circuit diagram to study a relationship between the current (I) flowing through a conductor and the potential difference (V) applied across its two ends. State the formula correlating the I in a conductor and the V across it. also show this relationship by drawing a diagram.
49. What would be the resistance of a resistor if the current flowing through it is 0.15 A when the potential difference across it is 1.05 V?
50. (a) Name and state the law that gives relationship between the potential difference (V) across the two ends of a conductor and the current (I) flowing through it.
(b) Represent it (Ohm's law) mathematically.
(c) Draw a circuit diagram for the verification of Ohm's law.
(d) Draw the V - I graph for this (Ohm's) law.
51. State and explain Ohm's law. Define resistance and give its SI unit. What is meant by 1 ohm resistance? Draw V - I graph for an ohmic conductor and list its two important features.
52. What is meant by resistance of a conductor? Name and define its SI unit. List the factors on which the resistance of a conductor depends. How is the resistance of a wire affected if:
(i) its length is doubled
(ii) its radius is doubled?
53. List two distinguishing features between the resistance and resistivity of a conductor. A wire is stretched so that its length becomes 6/5 times of its original length. If its original resistance is 25 Ω find its new resistance. Give justification for your answer in each case.