



Octahedral classes, kharadi
2nd floor, yashwant plaza, near bank of India,

Class 10 - Science
electricity

Maximum Marks: 105

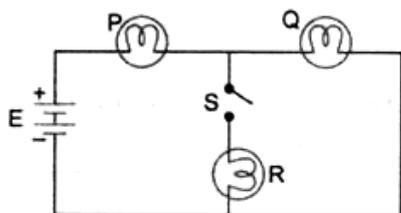
Time Allowed: 2 hours

Section A

1. Why does the connecting cord of an electric heater not glow while the heating element does? **3**
2. What is electrical resistivity? In a series electrical circuit comprising of 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**
3. A hot plate of an electric oven connected to a 220 V line has two resistance coils A and B, each of 24Ω resistance, which may be used separately, in series, or in parallel. What are the currents in the three cases? **3**
4. Why does the cord of an electric heater not glow while the heating element does? **3**
5. A battery of 9 V is connected in series with resistors of 0.2Ω , 0.3Ω , 0.4Ω , 0.5Ω and 12Ω respectively. How much current would flow through the 12Ω resistor? **3**
6. An electric kettle rated at 220 V, 2.2 kW works for 3h. Calculate the energy consumed and the current drawn. **3**
7. n resistors each of resistance R is first connected in series and then in parallel. What is the ratio of the total effective resistance of the circuit in series combination and parallel combination? **3**
8. How will you connect three resistors, each of resistance 6Ω , so that the combination has a resistance of (i) 9Ω , (ii) 4Ω ? **3**
9. What is Joule's heating effect? How can it be demonstrated experimentally? List its four applications in daily life. **3**
10. Compare the power used in the 2Ω resistor in each of the following circuits: **3**
(i) a 6 V battery in series with 1Ω and 2Ω resistors, and
(ii) a 4 V battery in parallel with 12Ω and 2Ω resistors.
11. An electric motor takes 5A from a 220V line. Determine the power of the motor and the energy consumed in 2 h. **3**

12. i. Which is the better way to connect lights and other appliances in domestic circuit, series connection or parallel connection? Justify your answer. 3
- ii. An electrician has made electric circuit of a house in such a way that, if a lamp gets fused in a room of the house, then all the lamps in other rooms of the house stop working. What is the defect in this type of circuit wiring? Give reason.

13. How many 176Ω resistors in parallel are required to carry 5A on a 220V line? 3
14. Calculate the number of electrons consisting one coulomb of charge? 3
15. What is an electric circuit? How are different components represented symbolically? 3
16. What is meant by electric power ? Give its units. How is it related to V and I? 3
17. A metallic wire of resistance R is cut into ten parts of equal length. Two pieces each are joined in series and then five such combinations are joined in parallel. What will be the effective resistance of the combination? 3
18. A battery E is connected to three identical lamps P, Q and R as shown in figure: 3



Initially the switch S is kept open and the lamp P and Q are observed to glow with same brightness. Then switch S is closed. How will the brightness of the glow of bulbs P and Q will change? Justify your answer.

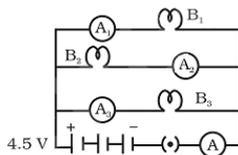
19. Why does resistance of a metallic conductor increase with increase in temperature? 3
20. On what factors does the resistance of a conductor depend. 3
21. Heat is generated continuously in an electric heater, but the temperature of its element becomes constant after some time. Why? 3
22. Two resistors of resistance R and 2R are connected in parallel in an electric circuit. Calculate the ratio of the electric power consumed by R and 2R? 3
23. Alloys are used in electrical heating devices rather than pure metals. Give reason. 3
24. i. Distinguish between the terms electrical resistance and resistivity of conductor. 3
- ii. A copper wire of resistivity $1.63 \times 10^{-8} \pi - m$ has cross-section area of $10.3 \times 10^{-4} \text{ cm}^2$. Calculate the length of the wire required to make a 20Ω coil.

25. Though the same current flows through line wires and the filament of a bulb, yet only the latter glows. Why? 3
26. i. Identify the V-I graphs for ohmic and non-ohmic materials. 3
 ii. Give one example of each.
27. The values of the current I flowing in a given resistor for corresponding values of potential difference V across the resistor are given below: 3

I (amperes)	0.5	1.0	2.0	3.0	4.0
V (volts)	1.6	3.4	6.7	10.2	13.2

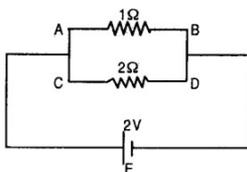
Plot a graph between V and I and calculate the resistance of that resistor.

28. Two conducting wires of the same material and of equal lengths and equal diameters are first connected in series and then in parallel in an electric circuit. The ratio of heat produced in series and parallel combinations would be 3
- (a) 1:2
 (b) 2:1
 (c) 1:4
 (d) 4:1
29. B_1 , B_2 and B_3 are three identical bulbs connected as shown in figure. When all the three bulbs glow, a current of 3A is recorded by the ammeter A. 3



How much power is dissipated in the circuit when all the three bulbs glow together?

30. Calculate the resistance of an electric bulb which allows a 10A current when connected to a 220V power source? 3
31. What is the current through each of the resistances in the following circuit? 3



32. An electric lamp of 100 ohms, a toaster of resistance 50 ohms and a water filter of resistance 500 ohms are connected in parallel to a 220V source. What is the resistance of the electric iron connected to the same source that takes as much current as all the three appliances and what is the current through it? 3

33. What precautions should be taken while performing this experiment? **3**
34. Why is resistance less when resistors are joined in parallel? **3**
35. Calculate the cost of seeing 2 movies on colour T.V. daily for the month of September. **3**
- Given wattage of colour T.V. = 60 W, duration each movie is 2 hours 30 min and 1kWh costs Rs. 4