

28. A student is unable to see clearly the words written on the blackboard placed at a distance of approximately 3 m from him. Name the defect of vision of the boy is suffering from. State the possible causes of this defect and explain the method of correcting it. **[2018] ...[3M]**

29. Write the function of each of the following parts of human eye:

- (i) Cornea (ii) Iris
(iii) Crystalline lens (iv) Ciliary muscles

[2018] ...[2M]

3 : Electricity

1. Out of 60 W and 40 W lamps, which one has a higher electrical resistance when in use? **[2008] ...[1M]**

2. What is the function of a galvanometer in a circuit? **[2019] ...[1M]**

3. At the time of short circuit, the electric current in the circuit : **[2020] ...[1M]**

- (a) vary continuously
(b) does not change
(c) reduces substantially
(d) increases heavily

4. Two bulbs of 100 W and 40 W are connected in series. The current through the 100 W bulb is 1 A. The current through the 40 W bulb will be:

[2020] ...[1M]

- (a) 0.4 A (b) 0.6 A
(c) 0.8 A (d) 1 A

5. Two LED bulbs of 12 W and 6 W are connected in series. If the current through 12 W bulb is 0.06 A the current through 6 W bulb will be :

[2023] ...[1M]

- (a) 0.04 A (b) 0.06 A
(c) 0.08 A (d) 0.12 A

6. The resistance of a resistor is reduced to half of its initial value. If other parameters of the electrical circuit remain unaltered, the amount of heat produced in the resistor will become:

[2023] ...[1M]

- (a) Four times (b) Two times
(c) Half (d) One fourth

7. Why are the coils of electric toasters made of an alloy rather than a pure metal?

[2008] ...[2M]

8. A piece of wire of resistance 20 Ω is drawn out so that its length is increased to twice its original length. Calculate the resistance of the wire in the new situation.

[2009] ...[2M]

9. The values of current (I) flowing through a given resistor of resistance (R), for the corresponding values of potential difference (V) across the resistor are as given below :

V (volts)	0.5	1.0	1.5	2.0	2.5	3.0	4.0	5.0
I (amperes)	0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.0

Plot a graph between current (I) and potential difference (V) and determine the resistance (R) of the resistor. **[2018] ...[2M]**

10. While studying the dependence of potential difference (V) across a resistor on the current (I) passing through it, in order to determine the resistance of the resistor, a student took 5 readings for different values of current and plotted a graph between V and I . He got a straight line graph passing through the origin. What does the straight line signify? Write the method of determining resistance of the resistor using this graph. **[2019] ...[2M]**

11. What would you suggest to a student if while performing an experiment he finds that the pointer/ needle of the ammeter and voltmeter do not coincide with the zero marks on the scales when circuit is open? No extra ammeter/ voltmeter is available in the laboratory.

[2019] ...[2M]

12. Two lamps, one rated 60 W at 220 V and the other 40 W at 220 V, are connected in parallel to the electric supply at 220 V. **[2008] ...[3M]**

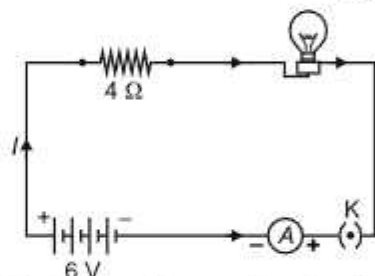
- (a) Draw a circuit diagram to show the connections
(b) Calculate the current drawn from the electric supply.
(c) Calculate the total energy consumed by the two lamps together when they operate for one hour.

13. Two resistor, with resistances 5 Ω and 10 Ω respectively are to be connected to a battery of emf 6 V so as to obtain:

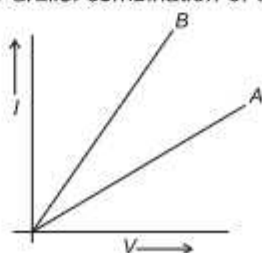
- (a) How will you connect the resistances in each case?
(i) Minimum current flowing
(ii) Maximum current flowing
(b) Calculate the strength of the total current in the circuit in the two cases. **[2009] ...[3M]**

14. (a) Write Joule's law of heating.
 (b) Two lamps, one rated 100 W ; 220 V, and the other 60 W; 220 V, are connected in parallel to electric mains supply. Find the current drawn by two bulbs from the line, if the supply voltage is 220 V. [2018] ...[3M]
15. (a) List the factors on which the resistance of a conductor in the shape of a wire depends.
 (b) Why are metals good conductors of electricity whereas glass is a bad conductor of electricity? Give reason.
 (c) Why are alloys commonly used in electrical heating devices? Give reason. [2018]...[3M]
16. Show how would you join three resistors, each of resistance $9\ \Omega$ so that the equivalent resistance of the combination is [2018]...[3M]
 (i) $13\ \Omega$ (ii) $6\ \Omega$
17. (a) State the relation correlating the electric current flowing in a conductor and the voltage applied across it. Also draw a graph to show this relationship.
 (b) Find the resistance of a conductor if the electric current flowing through it is 0.35 A when the potential difference across it is 1.4 V. [2020] ...[3M]
18. (a) Write the mathematical expression for Joule's law of heating.
 (b) Compute the heat generated while transferring 96000 coulomb of charge in two hours through a potential difference of 40 V. [2020] ...[3M]
19. (a) State Ohm's Law. Represent it mathematically.
 (b) Define 1 ohm.
 (c) What is the resistance of a conductor through which a current of 0.5 A flows when a potential difference of 2 V is applied across its ends? [2022] ...[3M]
20. (a) List the factors on which the resistance of a uniform cylindrical conductor of a given material depends.
 (b) The resistance of a wire of 0.01 cm radius is $10\ \Omega$. If the resistivity of the wire is $50 \times 10^{-8}\ \Omega\ \text{m}$, find the length of this wire. [2022] ...[3M]
21. (a) What is the meaning of electric power of an electrical device? Write its SI unit.
 (b) An electric kettle of 2 kW is used for 2h. Calculate the energy consumed in
 (i) kilowatt hour, and
 (ii) joules. [2022] ...[3M]
22. Derive the expression for the heat produced due to a current ' I ' flowing for a time interval ' t ' through a resistor ' R ' having a potential difference ' V ' across it ends. With which name is the relation known? How much heat will an instrument of 12 W produce in one minute if it is connected to a battery of 12 V? [2010]...[5M]

23. Explain with the help of a labelled circuit diagram how you will find the resistance of a combination of three resistor, of resistance R_1 , R_2 and R_3 joined in parallel. Also mention how you will connect the ammeter and the voltmeter in the circuit when measuring the current in the circuit and the potential difference across one of the three resistors of the combination. [2010] ...[5M]
24. (a) With the help of a suitable circuit diagram prove that the reciprocal of the equivalent resistance of a group of resistances joined in parallel is equal to the sum of the reciprocals of the individual resistances.
 (b) In an electric circuit two resistors of $12\ \Omega$ each are joined in parallel to a 6 V battery. Find the current drawn from the battery. [2019] ...[5M]
25. An electric lamp of resistance $20\ \Omega$ and a conductor of resistance $4\ \Omega$ are connected to a 6 V battery as shown in the circuit. Calculate : [2019] ...[5M]



- (a) The total resistance of the circuit,
 (b) The current through the circuit,
 (c) The potential difference across the
 (i) electric lamp and
 (ii) conductor, and
 (d) Power of the lamp.
26. (i) How is electric current related to the potential difference across the terminals of a conductor? Draw a labelled circuit diagram to verify this relationship.
 (ii) Why should an ammeter have low resistance?
 (iii) Two V - I graphs A and B for series and parallel combinations of two resistors are as shown. Giving reason state which graph shows
 (a) Series,
 (b) Parallel combination of the resistors.



[2023] ...[5M]