

Guess Paper – 2014
Class – X
Subject – Science
Electricity

1 mark questions

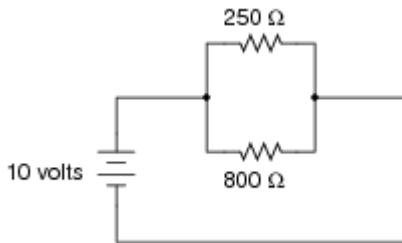
1. Which one has more resistance 100 watt bulb or 60 watt bulb?
2. How much energy is given to each coulomb of charge passing through a 6V battery?
3. What determines the rate at which energy is delivered by a current?
4. Name a device that helps to maintain a potential difference across a conductor.
5. On what factors does the resistance of a conductor depend?
6. What determines the rate at which energy is delivered by a current?
7. An electric motor takes 5 A from a 220 V line. Determine the power of the motor and the energy consumed in 2 h.
8. Which metal offers higher resistance to the passage of electricity than copper?
9. Why is very less quantity of heat energy produced in the connecting wires?
10. A wire of resistance 10 ohm is bent in the form of a closed circle. What is the effective resistance between the two points at the ends of any diameter of this circle?
11. What is meant by saying that the “potential difference between two points is 1 volt”.
12. A wire of resistivity ‘ ρ ’ is stretched to twice its length. What is new resistivity?
13. The potential difference between the terminals of an electrical iron is 240 V and the current is 16A. What is resistance of the electric iron?
14. Name the physical quantity which is (i) same and (ii) different in all the bulbs when three bulbs of different power are connected in series.
15. Why do we use copper wires as connecting wires?
16. How many joules are in one watt-hour?

2mark questions

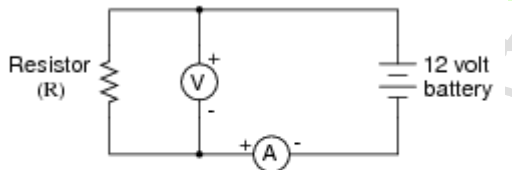
17. Define the term electrostatic potential? What is the S.I. unit for it?
18. What are the advantages of connecting electrical devices in parallel with the battery instead of connecting them in series?
19. What is meant by the statement, potential difference between points A and B in an electric field is 1 volt?

20. Ten bulbs are connected in a series to a power supply line. Ten identical bulbs are connected in parallel circuit to an identical power supply line.
 - a. Which circuit would have the highest voltage across each bulb?
 - b. In which circuit would the bulbs be brighten more?
21. Why coils of electric toasters and electric iron are are made of an-alloy rather than a put metal?
22. State the change in the ammeter reading observed when a resistance wire in a circuit is replaced by a wire of same material and same length but comparatively double cross-sectional area keeping the source of potential difference constant.
23. What is meant by power-rating of an appliance? A bulb is rated as 60 W, 220 V. What does it indicate?
24. Let the resistance of an electrical component remains constant while the potential difference across the two ends of the component decreases to half of its former value. What change will occur in the current through it?
25. A piece of wire is pulled double its length. Compare the new resistance with the original value.
26. Compute the heat generated while transferring 96000 coulomb of charge in one hour through a potential difference of 50 V.
27. When a 12 V battery is connected across an unknown resistor, there is a current of 2.5 mA in the circuit. Find the value of the resistance of the resistor.
28. Two lamps, rated 100 W at 220 V, and 60 W at 220V, are connected in parallel to electrical mains supply. What current is drawn from the line if the supply voltage is 220 V?
29. An electric heater of resistance 8Ω draws 15 A from the service mains 2 hours. Calculate the rate which heat is developed in the heater.
30. An electric iron has a rating of 750 W, 220 V. Calculate the current passing through it, and (ii) its resistance, when in use.
31. An electric lamp is marked 100 W, 220 V. It is used for 5 hour daily. Calculate (i)its resistance while glowing (ii)energy consumed in kWh per day.
32. A bulb is rated at 5.0 volt, 100 mA. Calculated its (i) power (ii) resistance.
33. An electric bulb draws a current of 0.2. A when the voltage is 220 volts. Calculate the electric charge flowing through it in one hour.
34. What is a voltmeter? How is it connected in a circuit?
35. Which of the two has greater resistance: a 1 kW heater or a 100 W tungsten bulb, both marked for 230 V?

36. Will current flow more easily through a thick wire or thin wire of the same material when connected to the same sources? Why?
37. A wire of resistance $10\ \Omega$ is drawn out so that its length is thrice its original length. Calculate its new resistance (resistivity and density of the wire remain unchanged).
38. What are the factors on which the resistance of a conductor depends? Give the corresponding relation.
39. A common saying about electricity is that it always takes the path of least resistance." Explain how this proverb relates to the following circuit, where electric current from the battery encounters two alternate paths, one being less resistive than the other:



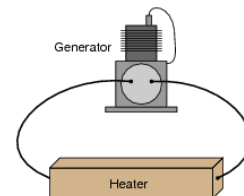
40. What is the value of this resistor, in *ohms* (Ω)?



Voltmeter indication = 12.3 volts
Ammeter indication = 4.556 milliamps

3mark questions

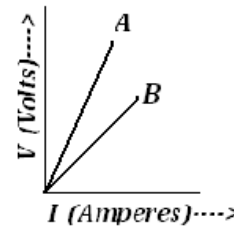
41. Calculate the amount of power dissipated by this electric heating element, if the generator's output voltage is 110 volts and the heater's resistance is 2.5 ohms.
Now, calculate the power dissipated by the same heater if the generator's output voltage is doubled.



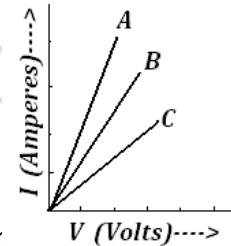
42. What is electric current? What do you understand by the conventional direction of the flow of current? How is the unit ampere defined?

43. a) What is meant by 'Electric Resistance' of a conductor? (b) A wire of length L and resistance R is stretched so that its length is doubled and the area of cross-section is halved. How will its: (i) resistance change (ii) resistivity change?

44. Two wires A and B of same length and diameter have their V-I graph as shown in the figure. Which one of the have higher resistivity? Justify your answer by giving suitable reason.

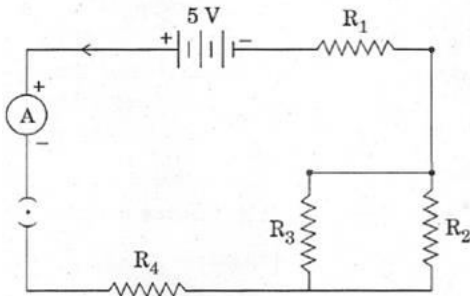


45. Two resistors and their series combination are shown by the following V-I graph. Which one represents the series combination? Give reason for your answer.



46. Two resistors and their parallel combination are shown by in the above question). Which one represents the parallel combination for your answer.

47. Consider the following electric circuit:



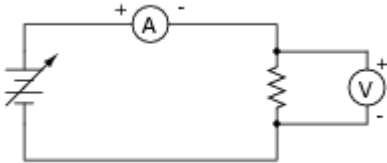
- Which two resistors are connected in series?
- Which two resistors are connected in parallel?
- If every resistor of the circuit is of 2Ω , what will be the ammeter reading?

48. Three resistances R_1 , R_2 and R_3 are connected in parallel/series. Find their equivalent resistance (resultant resistance).

49. Name two factors on which the electric energy consumed by an electrical appliance depends. In which of the following cases more electrical energy is consumed per hour? A current of 2 amperes passed through a resistance of 100 ohms. OR A current of 1 ampere passed through a resistance of 300 ohms

50. In a household 5 tube lights of 40 W each are used for 5 hour and an electric press of 500 W for 4 hours every day. Calculate the total electrical energy consumed by the tube lights and press in a month of 30 days.
51. A torch bulb is rated 2.5 V and 750 mA. Calculate
 (i) Its power (ii) its resistance and (iii) the energy consumed in 4 hours.
52. Two electric lamps of 100 W and 25 W, respectively are connected in parallel to a supply voltage of 200 V. Calculate total current flowing through the circuit.
53. A copper wire of length 2 m and area of cross-section $1.7 \times 10^{-6} \text{ m}^2$ has a resistance of 2×10^{-2} ohms. Calculate the resistivity of copper.
54. For a heater rated at 4kW and 220V, calculate
 (a) The current (b) The resistance of the heater (c) The energy consumed in 2 hours
55. An electric lamp of 100Ω , a toaster of resistance 50Ω , and a water filter of resistance 500Ω are connected in parallel to a 220 V source. What is the resistance of an electric iron connected to the same source that takes as much current as all three appliances, and what is the current through it?
56. What are the advantages of connecting electrical devices in parallel with the battery instead of connecting them in series?
57. How can three resistors of resistances 2 ohm, 3 ohm, and 6 ohm be connected to give a total resistance of (i) 4ohm (ii) 1 ohm?
58. One of the fundamental equations used in electricity and electronics is *Ohm's Law*: the relationship between voltage (E or V, measured in units of *volts*), current (I, measured in units of *amperes*), and resistance (R, measured in units of *ohms*):
 Where,
 E = Voltage in units of volts (V)
 I = Current in units of amps (A)
 R = Resistance in units of ohms (Ω)
 Solve for the unknown quantity (E, I, or R) given the other two:
 I = 20 mA, R = 5 k Ω ; E =
 E = 7.2 kV, R = 900 Ω ; I =
 E = 1.02 mV, I = 40 μ A; R =

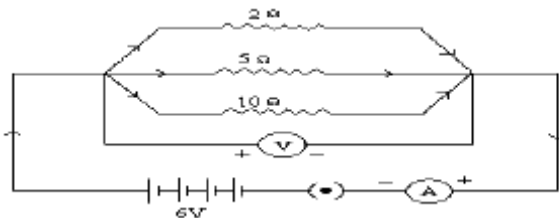
59. Suppose you were to build this circuit and take measurements of current through the resistor and voltage across the resistor:



Plot these figures on the graph. What mathematical relationship do you see between voltage and current in this simple circuit?

Current(in A)	Voltage(in V)
1.50	4.51
1.80	5.41
2.00	5.99
2.51	7.49

60. In the circuit diagram given below:



Calculate:

- the current through each resistor
- the total current in the circuit
- the total effective resistance of the circuit.

5mark questions

70. State ohm's law. Describe an experiment with a neat labelled circuit diagram to verify ohm's law.

71. What do you understand by the electrical resistance of a wire? State and define S.I. unit of resistance. The resistance of an electric lamp filament is 230 ohms. The lamp is switched on when the line voltage is 115 volts. What is the current in the lamp circuit?

72. (a) Why are coils of electric irons and electric toasters made of an alloy rather than a pure metal?

(b) How does the resistance of a wire vary with its:

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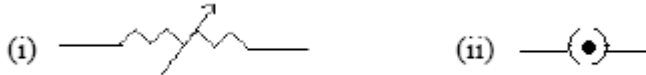
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(i) area of cross-section? (ii) diameter?

(c) What will be the resistance of a metal wire of length 2 m and area of cross-section $1.55 \times 10^{-6} \text{ m}^2$, if the resistivity of the metal be $2.8 \times 10^{-8} \text{ ohm m}$?

73. a) Name and instrument that measures electric current in a circuit. Define the unit of electric current.

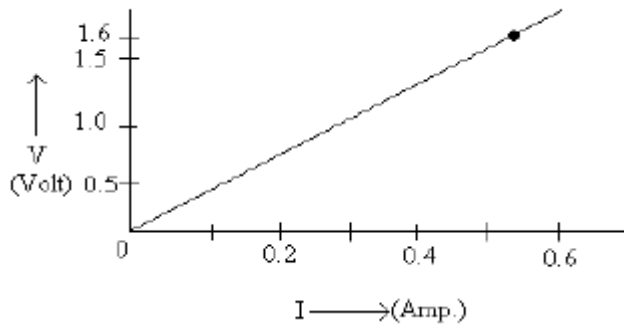
b) What do the following symbols mean in circuit diagrams?



c) An electric circuit consisting of a 0.5m long Nichrome wire XY, and ammeter, a voltmeter, four cells of 1.5 V each and a plug key was set up.

74. i) Draw a diagram of this electric circuit to study the relation between the potential difference maintained between the points 'X' and 'Y' and the electric current flowing through XY.

ii) Following graph was plotted between V and I values:



What would be the values of V/I ratios when the potential difference is 0.8 V, 1.2 V and 1.6V respectively? What conclusion do you draw from these values?

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