CLASS 10 PHYSICS PREVIOUS YEAR QUESTIONS
ELECTRICITY

Question 1. A current of 10 A flows through a conductor for two minutes.
(i) Calculate the amount of charge passed through any area of cross section of the conductor.
(ii) If the charge of an electron is 1.6×10^{-19} C, then calculate the total number of electrons flowing.
(Board Term I, 2013)

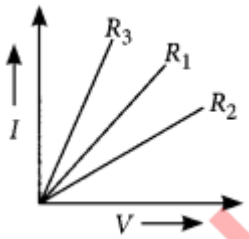
Question 2. Define electric current. (1/5, Board Term 1,2017)

Question 3. Define one ampere. (1/5, Board Term 1,2015)

Question 4. Name a device that you can use to maintain a potential difference between the ends of a conductor. Explain the process by which this device does so. (Board Term I, 2013)

Question 5. 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
(iv) Variable resistor
(v) Battery
(vi) Electric bulb
(vii) Resistance (4/5, Board Term 1,2017)

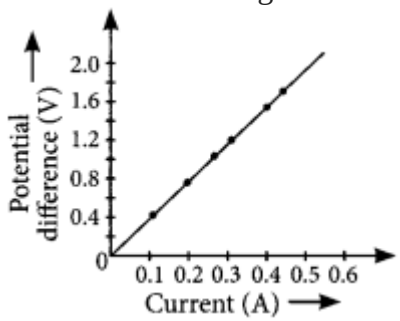
Question 6. A student plots V-I graphs for three samples of nichrome wire with resistances R_1, R_2 and R_3. Choose from the following the statements that holds true for this graph. (2020)



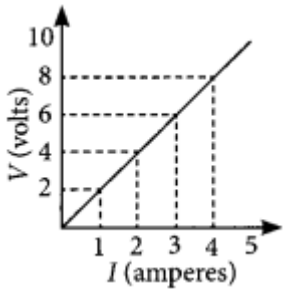
(a) $R_1 = R_2 = R_3$
(b) $R_1 > R_2 > R_3$
(c) $R_3 > R_2 > R_1$
(d) $R_2 > R_1 > R_3$

Question 7. State Ohms law. (AI 2019)

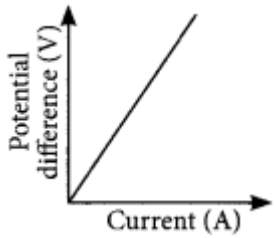
Question 8. A V-I graph for a nichrome wire is given below. What do you infer from this graph? Draw a labelled circuit diagram to obtain such a graph. (2020)



Question 9. Study the V-I graph for a resistor as shown in the figure and prepare a table showing the values of I (in amperes) corresponding to four different values V (in volts). Find the value of current for V = 10 volts. How can we determine the resistance of the resistor from this graph? (Board Term I, 2016)



Question 10.
V-I graph for a conductor is as shown in the figure



(i) What do you infer from this graph?
(ii) State the law expressed here. (Board Term I, 2014)

Question 11. State Ohm's law. Draw a labelled circuit diagram to verify this law in the laboratory. If you draw a graph between the potential difference and current flowing through a metallic conductor, what kind of curve will you get? Explain how would you use this graph to determine the resistance of the conductor. (Board Term I, 2016)

Question 12. 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. (Board Term I, 2014)

Question 13. Assertion (A) : The metals and alloys are good conductors of electricity.
Reason (R) : Bronze is an alloy of copper and tin and it is not a good conductor of electricity.
(a) Both (A) and (R) are true and (R) is the correct explanation of the assertion (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of the assertion (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true. (2020)

Question 14. A cylindrical conductor of length 'l' and uniform area of cross section 'A' has resistance 'R'. The area of cross section of another conductor of same material and same resistance but of length '2l' is (2020)
(a) A2
(b) 3A2
(c) 2A
(d) 3A

Question 15. Assertion (A) : Alloys are commonly used in electrical heating devices like electric iron and heater.
Reason (R): Resistivity of an alloy is generally higher than that of its constituent metals but the alloys have low melting points then their constituent metals.
(a) Both (A) and (R) are true and (R) is the correct explanation of the assertion (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of the assertion (A).

(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true. (2020)

Question 16. How is the resistivity of alloys compared with those of pure metals from which they may have been formed? (Board Term I, 2017)

Question 17. (i) List three factors on which the resistance of a conductor depends.
(ii) Write the SI unit of resistivity. (Board Term 1, 2015)

Question 18.Calculate the resistance of a metal wire of length 2m and area of cross section 1.55×10^{6} m^2, if the resistivity of the metal be 2.8×10^{-8} Ωm. (Board Term I, 2013)

Question 19. (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)

Question 20. Calculate the resistivity of the material of a wire of length 1 m, radius 0.01 cm and resistance 20 ohms. (Board Term I, 2017)

Question 21. A copper wire has diameter 0.5 mm and resistivity 1.6×10^{-8} Ω m. Calculate the length of this wire to make it resistance 100 Ω. How much does the resistance change if the diameter is doubled without changing its length? (Board Term I, 2015)

Question 22. 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 meter, find the length of the wire. (Board Term I, 2014)

Question 23. A wire has a resistance of 16 Ω. It is melted and drawn into a wire of half its original length. Calculate the resistance of the new wire. What is the percentage change in its resistance? (Board Term I, 2013)

Question 24. If the radius of a current carrying conductor is halved, how does current through it change? (2/5 Board Term I, 2014)

Question 25. Define resistance of a conductor. State the factors on which resistance of a conductor depends. Name the device which is often used to change the resistance without changing the voltage source in an electric circuit. Calculate the resistance of 50 cm length of wire of cross sectional area 0.01 square mm and of resistivity 5×10^{-8} Ω m. (Board Term I, 2014)

Question 26. If a person has five resistors each of value 15 Ω, then the maximum resistance he can obtain by connecting them is
(a) 1 Ω
(b) 5 Ω
(c) 10 Ω
(d) 25 Ω (2020)

Question 27. The maximum resistance which can be made using four resistors each of 2 Ω is
(a) 2 Ω
(b) 4 Ω
(c) 8 Ω
(d) 16 Ω (2020)

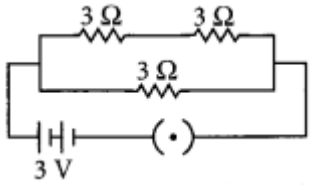
Question 28. The maximum resistance which can be made using four resistors each of resistance 12 Ω is
(a) 2 Ω
(b) 1 Ω
(c) 2.5 Ω
(d) 8 Ω (2020)

Question 29. Three resistors of 10 Ω, 15 Ω and 5 Ω are connected in parallel. Find their equivalent resistance. (Board Term I, 2014)

Question 30. List the advantages of connecting electrical devices in parallel with an electrical source instead of connecting them is series. (Board Term I, 2013)

Question 31. Show how would you join three resistors, each of resistance 9 Ω so that the equivalent resistance of the combination is (i) 13.5 Ω, (ii) 6 Ω (2018)

Question 32. Three resistors of 3 Ω each are connected to a battery of 3 V as shown. Calculate the current drawn from the battery. (Board Term I, 2017)



Question 33. Two identical resistors are first connected in series and then in parallel. Find the ratio of equivalent resistance in two cases. (Board Term I, 2013)

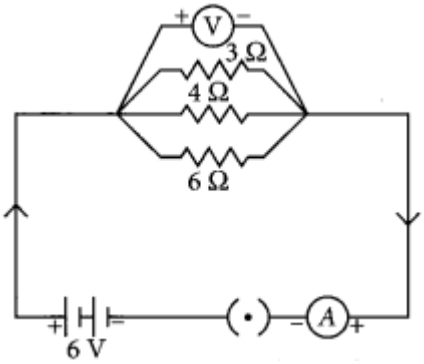
Question 34. (a) A 6 Ω resistance wire is doubled on itself. Calculate the new resistance of the wire.
(b) Three 2 Ω resistors A, B and C are connected in such a way that the total resistance of the combination is 3 Ω. Show the arrangement of the three resistors and justify your answer. (2020)

Question 35. Draw a schematic diagram of a circuit consisting of a battery of 3 cells of 2 V each, a combination of three resistors of 10 Ω, 20 Ω and 30 Ω connected in parallel, a plug key and an ammeter, all connected in series. Use this circuit to find the value of the following :
(a) Current through each resistor
(b) Total current in the circuit
(c) Total effective resistance of the circuit. (2020)

Question 36. (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 Ω each are joined in parallel to a 6 V battery. Find the current drawn from the battery. (Delhi 2019)

Question 37. For the series combination of three resistors current in each resistor, establish the relation $R = R_1 + R_2 + R_3$ where the symbols have their usual meanings. Calculate the equivalent resistance of the combination of three resistors of 6 Ω, 9 Ω and 18 Ω joined in parallel. (Board Term I, 2016)

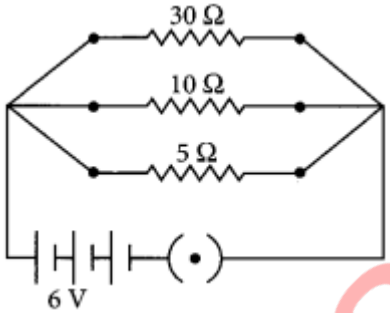
Question 38. State ohms law. Represent it graphically. In the given circuit diagram calculate
(i) the total effective resistance of the circuit.
(ii) the current through each resistor.



Question 39. (a) Prove that the equivalent resistance of three resistors R_1, R_2 and R_3 in series is $R_1 + R_2 + R_3$
(b) You have four resistors of 8 Ω each. Show how would you connect these resistors to have effective resistance of 8 Ω? (4/5, Board Term I, 2015)

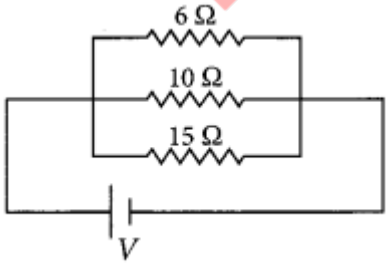
Question 40. Draw a labelled circuit diagram showing three resistors R_1, R_2 and R_3 connected in series with a battery (E), a rheostat (Rh), a plug key (K) and an ammeter (A) using standard circuit symbols. Use this circuit to show that the same current flows through every part of the circuit. List two precautions you would observe while performing the experiment. (Board Term I, 2014)

Question 41. Two wires A and B are of equal length and have equal resistances. If the resistivity of A is more than that of B, which wire is thicker and why ? For the electric circuit given below calculate:



(i) current in each resistor
(ii) total current drawn from the battery, and
(iii) equivalent resistance of the circuit. (Board Term I, 2014)

Question 42. (a) Derive an expression to find the equivalent resistance of three resistors connected in series. Also draw the schematic diagram of the circuit.
(b) Find the equivalent resistance of the following circuit.



Question 43. Draw a circuit diagram for a circuit consisting of a battery of five cells of 2 volts each, a 5 Ω resistor, a 10 Ω resistor and a 15 Ω resistor, an ammeter and a plug key, all connected in series. Also connect a voltmeter to record the potential difference across the 15 Ω resistor and calculate
(i) the electric current passing through the above circuit and
(ii) potential difference across 5 Ω resistor when the key is closed. (Board Term 1, 2013)

Question 44. The resistance of a resistor is reduced to half of its initial value. In doing so, if other parameters of the circuit remain unchanged, the heating effects in the resistor will become
(a) two times
(b) half
(c) one-fourth
(d) four times (2020)

Question 45. (a) Write the mathematical expression for Joules 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)

Question 46. Write Joules law of heating. (1/3, 2018)

Question 47. Explain the use of an electric fuse. What type of material is used for fuse wire and why? (Board Term I, 2016)

Question 48. (a) Why is tungsten used for making bulb filaments of incandescent lamps?
(b) Name any two electric devices based on heating effect of electric current. (2/5, Board Term I, 2015)

Question 49. A fuse wire melts at 5 A. If it is desired that the fuse wire of same material melt at 10 A, then whether the new fuse wire should be of smaller or larger radius than the earlier one? Give reasons for your answer. (3/5, Board Term I, 2014)

Question 50. What is heating effect of current? List two electrical appliances which work on this effect. (2/5, Board Term I, 2013)

Question 51. 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
(a) 0.4 A
(b) 0.6 A
(c) 0.8 A
(d) 1A (2020)

Question 52. Write the relation between resistance (R) of filament of a bulb, its power (P) and a constant voltage V applied across it. (Board Term I, 2017)

Question 53. Power of a lamp is 60 W. Find the energy in joules consumed by it in Is. (Board Term I, 2016)

Question 54. 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. (2/3, 2018, Board Term I, 2014)

Question 55. How much current will an electric iron draw from a 220 V source if the resistance of its element when hot is 55 ohms? Calculate the wattage of the electric iron when it operates on 220 volts. (Board Term I, 2016)

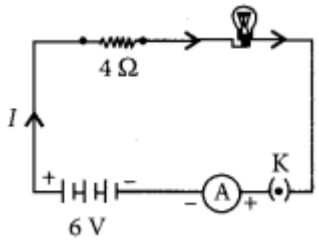
Question 56. An electric iron has a rating of 750 W; 200 V. Calculate:
(i) the current required.
(ii) the resistance of its heating element.
(iii) energy consumed by the iron in 2 hours. [Board Term 1, 2015]

Question 57. An electric bulb is connected to a 220 V generator. The current is 2.5 A. Calculate the power of the bulb. (1/3, Board Term I, 2015)

Question 58. (a) Define power and state its SI unit.
(b) A torch bulb is rated 5 V and 500 mA. Calculate its
(i) power
(ii) resistance
(iii) energy consumed when it is lighted for 2 12 hours.

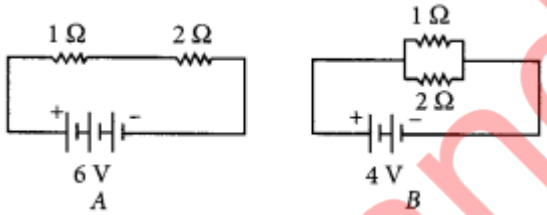
Question 59. Two identical resistors, each of resistance 15 Ω, are connected in (i) series, and (ii) parallel, in turn to a battery of 6 V. Calculate the ratio of the power consumed in the combination of resistors in each case. (2020)

Question 60. An electric lamp of resistance 20 Ω and a conductor of resistance 4 Ω. are connected to a 6 V battery as shown in the circuit. Calculate.



(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. (Delhi 2019)

Question 61. Compare the power used in 2 Ω. resistor in each of the following circuits. (AI 2019)



Question 62. A bulb is rated 40 W; 220 V. Find the current drawn by it, when it is connected to a 220 V supply. Also find its resistance. If the given bulb is replaced by a bulb of rating 25 W; 220 V, will there be any change in the value of current and resistance? Justify your answer and determine the change. (AI 2019)

Question 63. (a) How two resistors, with resistances R_1 Ω and R_1 Ω respectively are to be connected to a battery of emf V volts so that the electrical power consumed is minimum?
(b) In a house 3 bulbs of 100 watt each lighted for 5 hours daily, 2 fans of 50 watt each used for 10 hours daily and an electric heater of 1.00 kW is used for half an hour daily. Calculate the total energy consumed in a month of 31 days and its cost at the rate of Rs 3.60 per kWh. (Board Term I, 2017)

Question 64. (a) An electric bulb is connected to a 220 V generator. If the current drawn by the bulb is 0.50 A, find its power.
(b) An electric refrigerator rated 400 W operates 8 hours a day. Calculate the energy per day in kWh.
(c) State the difference between kilowatt and kilowatt hour. (3/5, Board Term I, 2013)

Question 65. (i) State one difference between kilowatt and kilowatt hour. Express 1 kWh in joules.
(ii) A bulb is rated 5V; 500 mA. Calculate the rated power and resistance of the bulb when it glows.
(Board Term I, 2013)