PRACTICE EXERCISE 12.1

Q1. By what other name is the unit joule/columb called? **Ans:** Volt

Q2. Which of the following statements correctly defines a volt? **Ans:** (b)
(a) a volt is a joule per ampere.
(b) a volt is a joule per coulomb.

Q3. What is meant by saying that the electric potential at a point is 1 volt?

Q4. What is the unit of electric charge?

Q5. Define one coulomb charge.

Q6. Fill in the following blanks with suitable words:
(a) Potential difference is measured in ..... by using a. ..... placed in ..... across a component.
(b) Copper is a good..... Plastic is an.....

Q7. What is meant by conductors and insulators? Give two examples of conductors and two of insulators.

Q8. Which of the following are conductors and which are insulators?
Sulphur, Silver, Copper, Cotton, Aluminium, Air Nichrome, Graphite, Paper, Procelain, Mercury, Mica Bakelite, Polythene, Manganin.

Q9. Name a device that helps to measure the potential difference across a conductor.

Q10. What is an ammeter. How it is connected in the circuit measure the current between two points. Explain with the help of diagram.

Q11. What do you understand by the term "potential difference"?

Q12. What is meant by saying that the potential difference between two points is 1 volt?

Q13. What is a voltmeter? How is a voltmeter connected in the circuit to measure the potential difference between two points. Explain with the help of a diagram.

Q14. State whether a voltmeter has a high resistance or a low resistance. Give reason for your answer.

Q15. The work done in moving a unit charge across two points in an electric circuit is a measure of:
(a) current
(b) potential difference
(c) resistance (d) power

Q16. Which of the following units could be used to measure electric charge?
(a) ampere (b) joule
(c) volt (d) coulomb

Q17. One coulomb charge is equivalent to the charge contained in:
(a) 2.6×10^{19} electrons
(b) 6.2×10^{19} electrons
(c) 2.65×10^{18} electrons
(d) 6.25×10^{18} electrons

Q18. Three 2V cells are connected in series and used as a battery in a circuit.
(a) What is the p.d. at the terminals of the battery? **Ans.** 6V
(b) How many joules of electrical energy does 1 C gain on passing through (i) one cells (ii) all three cells?
Ans. (i) 2J (ii) 6J

Q19. The atoms of copper contain electrons and the atoms of rubber also contain electrons. Then why does copper conduct electricity but rubber does not conduct electricity?

Q20. By what name is the physical quantity coulomb/ second called? ***V.V.I.***

Q21. What is the flow of charge called?

Q22. What actually travels through the wires when you switch on a light?

Q22. Which particles constitute the electric current in a metallic conductor?

Q23. In which direction does conventional current flow around a circuit?

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PRACTICE EXERCISE 12.2

Q1. If 10^3 electron passing through a conductor through a particular area of cross section then calculate total amount of charge passing through the conductor. **Ans.** 16×10^{-15} C

Q2. If 2×10^{50} elctrons are passing through a conductor. Find total amount of charge passing through the conductor. **Ans.** 3.2×10^{31}C

Q3. If 20 coloumb of charge passing through a conductor in 10 sec then find magnitude of current passing through the conductor. **Ans.** 2A

Q4. If 3.2×10^3 coloumb of charges passing through a conductor. Find number of electrons passing through the conductor. **Ans.** 2×10^{22}

Q5. If 2×10^{50} electrons passing through a conductor in 12 sec. Find amount of electric current passing through the conductor. **Ans.** 2.6×10^{30} A

Q6. If 2×10^{30} electron passing through a conductor. Find total amount of charge passes through the conductor. **Ans.** 3.2×10^{31} C

Q7. If 10^{50} coloumb of charge passes through a conductor in a given time through a particular area of cross section. Find number of electrons passes through conductor. **Ans.** 6.25×10^{68}

Q8. If 6×10^6 charge passing in a minute through the conductor. Then find the amount of current passing through the conductor. **Ans.** 5×10^4 A

Q9. If 20 ampere of current is passing in 5 minutes through the conductor. Find total amount of charge passing through the conductor. **Ans.** 6000 coloumb

Q10. If 60×10^{12} elctron passing through a conductor in 5 sec then find amount of current passing through the conductor. **Ans.** 19.2×19^{-8} A

Q11. If 2×10^{-3} ampere current is passing through a conductor in 5 minutes. Then find number of electrons passing through the conductor. **Ans.** 37.5×10^{17}

Q12. If 2×10^{22} electrons passing through a conductor in a particular time. Find total amount of charge flowing through the conductor. **Ans.** 3.2×10 C

Q13. If 12×10^{50} electrons passing through a conductor in a particular time. Then find total amount of charge flowing through it. **Ans.** 1.92×10^5C

Q14. If 5 Amphere of current is passing through a conductor in 5 sec. Find total amount of charge passing through the conductor. **Ans.**25C

Q15. If 20 mA current is passing through a conductor in 2 minutes. Find total amount of charge passing through the conductor. **Ans.** 2.4 C

Q16. If 2×10^{-6} A of current passing through a conductor through particular area of cross section in 2 minutes 30 sec. Find total amount of charge passing through the conductor. **Ans.** 3×10^{-4} C

Q17. If 2×10^{20} electrons passing through a conductor in 10 sec. Find electric current passing through the conductor. **Ans.** 3.2A

Q18. If 5A of current is passing through a conductor in 12 sec. Find number of electrons passing through the conductor. **Ans.** 3.1×10^{20}

Q19. If 5×10^{-2} A of current is passing through a conductor in 5 minutes. Find number of electrons passing through the conductor. **Ans.** 9.325×10^{19}

Q20. If 2×10^{21} electrons passing through a conductor. Find the amount of charge passing through the conductor. **Ans.** 3.2×10^2 C

Q21. If 5×10^{-19} electrons passing through a conductor. Find total amount of charge, passing through it. **Ans.** 8×10^{-38} C

Q22. If 2×10^{25} electrons passing through a conductor. Find total amount of charge passing through it. **Ans.** 3.2×10^6 C

Q23. If 20C charge passing through a conductor in particular time. Find number of electrons passing through it. **Ans.** 1.2×10^{20}

Q24. If 5A current passing through a conductor in 10 sec. Then find amount of charge passing through conductor. **Ans.**50C

Q25. If 3×10^2C charge passing through a conductor in 5 minutes. Then find amount of current passing through it. **Ans.** 1A

Q26. If 20 mA of current is passing through a conductor in 5 minute 30 sec then find amount of charge passing through the conductor. **Ans.**3C

Q27. If 2×10^{23} electrons are passing through a conductor in 10^2 seconds. Then find amount of current passing through it. **Ans.** 3.2×10^2 A

Q28. If 5 mA current passing through a conductor in 10^3 seconds. Find the number of electrons passing through conductor. **Ans.**5

Q29. In how much time 5×10^{-19} electrons passing through a conductor. If curent passing through conductor is 5A. **Ans.** 1.5×10^2

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PRACTICE EXERCISE 12.3

Q1. In which direction do electrons flow?

Q2. Which of the following equation shows the correct relationship between electrical units?
1 A = 1 C/s or 1C = 1 A/s

Q3. What is the unit of electric current?

Q4. How many milliamperes are there in 1 ampere? **Ans.** 10^3

Q5. How many microamperes are there in are ampere? **Ans.** 10^6

Q6. Which of the two is connected in series: ammeter or voltmeter?

Q7. Compare how an ammeter and a voltmeter are connected in a circuit.

Q8. If 20C of charge pass a point in a circuit in one second what current is flowing?
Ans.20A

Q9. A current of 4A flows around a circuit for 10s. How much charge flows past a point in the circuit in this time? **Ans.** 40C

Q10. What is the current in a circuit of the charge passing each point is 20C in 40s? **Ans.**0.5A

Q11. How much work's done in moving a charge of one coloumb, from a point at 118 volts to a point at 128 volts.
Ans: 20 Joules

Q12. An amount of 100J of work is done in transferring a charge of 5C from one terminal of a battery to the other. Find the voltage of the batlery. **Ans: 20 volt**

Q13. When a particle carrying a charge 10×10^{-6} coulombs is brought from infinity to a point P, 2×10^{-3} Joules of work is done, What is the potential at the point P. **Ans: 200V**

Q14. What is the electric potential at a point in an electric field when 24 J of work is done in moving a charge of 84 C from infinity. **Ans: 0.285 volt**

Q15. Name a device which helps to maintain potential difference across a conductor (say, a bulb). **Ans.:** battery

Q16. If a potential difference of 10V causes a current of 2A to flow for 1 minute, how much energy is transferred? **Ans:** 1200J

Q17. What is an electric current? What makes an electric current flow in a wire?

Q18. Define the unit of electric current (or Define ampere).

Q19. What is an ammeter? How is it connected in a circuit? Draw a diagram to illustrate your answer.

Q10. Write down the formula which related electric charge, time and electric current.

Q21. A radio set draws a current of 0.36A for 15 minutes. Calculate the amount of electric charge that flows through the circuit.
Ans: 324C

Q22. Why should the resistance of:
(a) an ammeter be very small?
(b) an voltmeter be very large?

Q23. Draw circuit symbols for (a) fixed resistance (b) variable resistance (c) a cell (d) a battery of three cells (e) an open switch (f) a closed switch.

Q24. What is a circuit diagram? Draw the labelled diagram of an electric circuit comprising of a cell, a resistor, an ammeter, a voltmeter and a closed switch (or closed plug key).

Q25. If the charge on an electron is 1.6×10^{-19} coulombs, how many electrons should pass through a conductor in 1 second to constitute 1 ampere current? **Ans:** 6.25×10^{18}

Q26. A charge of 25 C is moved from nfinity to two points A and B in an electric field. The work done to do so up to A and B is 10 J and 12.5 J respectively. What is the potential difference between points Aand B.
Ans: 0.1 volt

Q27. A charge of 400C flows through a conductor for 13 minutes and 20 seconds. Find the magnitude of the current flowing through the conductor.
Ans: 0.5 A

Q28. A charge of 8860 C flows through a conductor in 2 minutes and 40 seconds. Calculate the magnitude of the current.
Ans: 55.375 A

Q29. Potential difference between two points of a wire carrying 2 ampere current is 0.1 volt. Calculate the resistance between these points. **0.5** Ω

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PRACTICE EXERCISE 12.4

Q1. Name the law which relates the current in a conductor to the potential difference across its ends.

Q2. Name the unit of electrical resistance and give its symbol.

Q3. Name the physical quantity whose unit is "ohm".

Q4. What is the general name of the substances having infinitely high electrical resistance?

Q5. Keeping the resistance constant, the potential difference applied across the ends of a components is halved. By how much does the current change?

Q6. State the factors on which the strength of electric current flowing in a given conductor depends.

Q7. Which has less electrical resistance: a thin wire or a thick wire (of the same length and same material)?

Q8. Keeping the potential difference constant, the resistance of a circuit is halved. By how much does the current change?

Q9. A potential difference of 20 volts is applied across the ends of a resistance of 5 ohms. What current will flow in the resistance?

Ans: 9Ω

Q10. A resistance of 20 ohms has a current of 2 amperes flowing in it. What potential difference is there between its ends?

Ans: 40V

Q11. A current of 5 amperes flows through a wire whose ends are at a potential difference of 3 volts. Calculate the resistance of the wire.

Ans: 0.6Ω

Q12. Distinguish between good conductors, resistors and insulators. Name two good conductors, two resistors and two insulators.

Q13. Classify the following into good conductors and insulators:

Rubber, Mercury, Nichrome, Polythene, Aluminium, Wood, Manganin, Bakelite, Iron, Paper, Thermocol, Metal coin.

Q14. What is Ohm's law? Explain how it is used to define the unit of resistance.

Q15. What happens to the resistance as the conductor is made thinner?

Q16. Keeping the potential difference constant, the resistance of a circuit is doubled. By how much does the current change?

Q17. Why do electricians wear rubber hand gloves while working with electricity?

Q18. What p.d. is needed to send a current of 6A through an electrical appliance having a resistance of 40Ω?

Ans: 240V

Q19. An electric circuit consisting of a 0.5m long nichrome wire XY, an ammeter, a voltmeter, four cells of 1.5V each and a plug key was set up.

(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.

Q20. What is the ratio of potential difference and current known as?

Q21. An electric room heater draws a current of 2.4A from the 120V supply line. What current will this room heater draw when connected to 240V supply line?

Ans: 4.8 A

Q22. Name the electrical property of a material whose symbols is "omega".

Q23. The graph between V and I for a conductor is a straight line passing through the origin.

(a) Which law is illustrated by such a graph?

(b) What should remain constant in a statement of this law?

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PRACTICE EXERCISE 12.5

Q1. A p.d. of 10 V is needed to make a current of 0.02 A flow through a wire. What p.d. is needed to make a current of 250 mA flow through the same wire? **Ans:** 125V

Q2. A current of 200 mA flows through a $4k\Omega$ resistor. What is the p.d. across the resistor? **Ans:** 800V

Q3. What happens to the resistance as the conductor is made thicker?

Q4. If the length of a wire is doubled by taking more of wire, what happens to its resistance?

Q5. On what factor does the resistance of a conductor depend?

Q6. Name the material which is the best conductor of electricity.

Q7. Which among iron and mercury is a better conductor of electricity?

Q8. Why are copper and aluminium wires usually used for electricity transmission?

Q9. Name the material which is used for making the heating element of an electric iron.

Q10. What is nichrome? State its one use.

Q11. Give two reasons why nichrome alloy is used for making the heating elements of electrical appliances.

Q12. Why are the coils of electric irons and electric toasters made of an alloy rather than a pure metal?

Q13. Which has more resistance:

(a) a long piece of nichrome wire or a short one?

(b) a thick piece of nichrome wire or a thin piece?

Q14. How does the resistance of a pure metal change if its temperature decreases?

Q15. What do you understand by the "resistivity" of a substance?

Q16. A wire is 1.0 m long, 0.2 mm in diameter and has a resistance of 10Ω. Calculate the resistivity of its material?

Ans: $31.4 \times 10^{-8}\Omega - m$

Q17. Write down an expression for the resistance of a metallic wire in terms of the resistivity.

Q18. What will be the resistance of a metal wire of length 2 metres and area of cross-section $1.55 \times 10^{-6}\, m^2$, if the resistivity of the metal be $2.8 \times 10^{-8}\Omega$ m? **Ans:** 0.036Ω

Q19. Give two examples of substances which are good conductors of electricity. Why do you think they are good conductors of electricity?

Q20. Calculate the resistance of a copper wire 1.0km long and 0.50mm diameter if the resistivity of copper is $1.7 \times 10^{-8}\Omega\, m$.

Ans. 86.5Ω

Q21. Will current flow more easily through a thick wire or a thin wire of the same material when connected to the same source? Give reason for your answer.

Q22. Calculate the area of cross-section of a wire if its length is 1.0m, its resistance is 23Ω and the resistivity of the material of the wire is $1.84 \times 10^{-6}\Omega$ m. **Ans:** $8.0 \times 10^{-8}\, m^2$

Q23. Define resistivity. Write an expression for the resistivity of a substance. Give the meaning of each symbol when occurs in it.

Q24. State the SI unit of resistivity.

Q25. Distinguish between resistance and resistivity.

Q26. Name two factors on which the resistivity of a substance depends and two factors on which it does not depend.

Q27. The resistance of a metal wire of length 1m is 26Ω at 20^0C. If the diameter of the wire is 0.3 mm, what will be the resistivity of the metal at that temperature?

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PRACTICE EXERCISE 12.6

Q1. The resistance of a wire of length 80 cm and of uniform area of cross section 0.025cm^2, is found to be 1.50 ohm. calculate specific resistance of wire.

Ans: 0.00047125 Ω.cm

Q2. A wire of resistance 4.5 Ω and length 150cm, has area of cross section of 0.04cm^2. Calculate the specific resistance of wire. **Ans: 0.0012 Ω.cm**

Q3. A wire of length 40cm and area of cross-section 0.1 mm^2 has a resistance of 0.8Ω. Calculate sp. resistance of wire.

Ans: 0.00002 Ω-cm

Q4. What should bet the length of nichrome wire of resistance 4.5Ω, if the length of similar wire is 60cm and resistance 2.5Ω. **Ans: 108 cm**

Q5. A nichrome wires has a resistance of 5Ω. Find the resistance of another nichrome wire, whose lenght is four times and area of cross-section three times the first wire. **Ans: 6.6 Ω**

Q6. A resistance wire made from German silver has a resistance of 4. 25Ω. Calculate the resistance of another wire, made from same material, such that its length increases by 4 times and area of crossection decreases by three times.

Ans: 51Ω

Q7. Find the resistance of a conductor, when its length is 5 cm, area of cross section is 1.5 cm2 and the resistivity of the conductor is 2.1 × 10^{-6} Ω–m. **Ans: 7 × 10^{-4}Ω**

Q8. Find the resistance of a conductor, whose length is 2 m, area of cross - section is 0.25 m^2 and the resistivity of the conductor is 0.15 × 10^{-3} Ω–m.. **Ans: 1.2 × 10^{-3}Ω**

Q9. Find the resistance of a conductor, whose length is 200 m, area of cross - section is 25 cm^2 and the resistivity of the conductor is 0.25 × 10^{-6} Ω–m.. **Ans: 2 × 10^{-2}Ω**

Q10. Find the resistance of a conductor, whose length is1.5 cm, area of cross - section is 300 mm^2 and the resitivity of the conductor is 0.25 Ω–m. **Ans: 0.125 Ω**

Q11. Find the resistance of a conductor, whose length is 2 ×10^{12} cm, area of cross - section is.12 ×10^{-6} cm^2 and the resitivity of the conductor is 2.5 × 10^8 Ωmm.

Ans: 4.1 × 10^{26} Ω

Q12. Find the resitivity of a material, whose resistance is 200Ω, area of cross - section is 25 m^2 and the length of the material is 100 m. **Ans: 50 Ωm**

Q13. Find the resitivity of a conductor, whose lenght is 0.0025 mm, area of cross - section is 256 ×10^{16} mm^2 and the length of the resistance of the conductor is 200 × 10^{-6} Ω. **Ans: 2.56 × 10^{19} Ωm**

Q14. Find the resitivity of a conductor, whose lenght is 200 cm, area of cross - section is 0.25 ×10^{-6} mm^2 and the resistance of the conductor is 200miliOhm

Ans: 1.25 × 10^{-10} Ωm

Q15. Find the length of a conductor, whose resistivity is 2.8 ×10^6 Ωm, the resistance of the conductor is 2× 10^{-3} Ω and area of cross section of the conductor is 0.25 cm^2.

Ans: 1.56 × 10^{-8}m

Q16. Find the length of a conductor, whose resistance is 200 μm, the area of cross section of the conductor is 0.125 cm^2 and the resisitivty of the conductor is 0.25 × 10^{-6}Ωscm.

Ans: 1.25 × 10^3 m

Q17. Find the length of a conductor, whose resistance is 2 × 10^3 Ω, the area of cross section of the conductor is 2 × 10^{-4} m^2 and the resisitivty of the conductor is 0.12 × 10^6Ωm. **Ans: 3.3 × 10^{-4} m**

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PRACTICE EXERCISE 12.8

Q1. Give the law of combination of resistances in series.

Q2. If five resistances, each of value 0.2 ohm, are connected in series, what will be the resultant resistance? **Ans:** 1Ω

Q3. State the law of combination of resistances in parallel.

Q4. If 3 resistances of 3 ohm each are connected in parallel, what will be their total resistance? **Ans:** 1Ω

Q5. What possible values of resultant resistance one can get by combining two resistances, one of value 2 ohm and the other 6 ohm? **Ans:** 8Ω

Q6. A wire that has resistance R is cut into two equal pieces. The two parts are joined in parallel. What is the resistance of the combination? **Ans.** R/4

Q7. Explain with diagrams what is meant by the "series combination" and "parallel combination" of resistances. In which case the resultant resistance is: (i) less, and (ii) more, than either of the individual resistance?

Q8. A battery of 9V is connected in series with resistors of 0.2Ω , 0.3Ω , 0.4Ω , 0.5Ω and 12Ω. How much current would flow through the 12Ω resistor? **Ans:** 0.67A

Q9. A wire of resistance R_1 is cut into five equal pieces. These five pieces of wire are then connected in parallel. If the resultant resistance of this combination be R_2, then the ratio $R_1 : R_2$ is

(a) $\frac{1}{25}$ (b) $\frac{1}{5}$

(c) 5 (d) 25 **Ans.**25

Q10. Two resistors, with resistances 5Ω and 10Ω respectively are to be connected to a battery of emf 6V so as to obtain:

(i) minimum current flowing

(ii) maximum current flowing

(a) How will you connect the resistances in each case?

(b) Calculate the strength of the total current in the circuit in the two cases.

Ans. 0.4A, 1.8A

Q11. A resistor has a resistance of 176 ohms. How many of these resistors should be connected in parallel so that their combination draws a current of 5 amperes from a 220 volt supply line? **Ans:** 4

Q12. An electric heater which is connected to a 220V supply line has two resistance coils A and B of 24Ω resistance each. These coils can be used separately (one at a time), in series or in parallel. Calculate the current drawn when:

(a) only one coil A is used. **Ans:** 9.2A

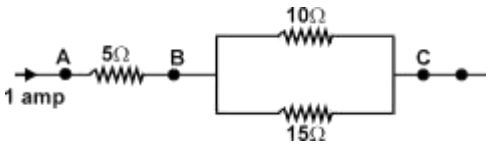
(b) coils A and B are used in series. **Ans:** 4.6A

(c) coils A and B are used in parallel. **Ans:** 18.3A

Q13. A p.d. of 4V is applied to two resistors of 6Ω and 2Ω connected in series. Calculate.

(a) the p.d. across the 6Ω resistor **Ans:** 3V

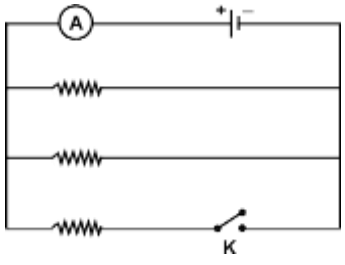
Q14. Three resistors are connected as shown in the diagram. Through the resistor 5 ohm, a current of 1 ampere is flowing



(i) What is the current through the other two resistors?

(ii) What is the p.d. across AB and across AC? **Ans:** 0.6 A, 0.4 A, 5W, 11W

Q15. In the diagram shown alongside, the cell and the ammeter both have negligible resistance. The resistor are identical. With the switch K open, the ammeter reads 0.6A. What will be the ammeter reading when the switch is closed?



Ans: 0.9A

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PRACTICE EXERCISE 12.9

Q1. Two resistances when connected in parallel give resultant value of 2 ohm; when connected in series the value becomes 9 ohm. Calculate the value of each resistance. **Ans:** $6\Omega, 3\Omega$

Q2. A resistor of 8 ohms is connected in parallel with another resistor X. The resultant resistance of the combination is 4.8 ohms. What is the value of the resistor X?

Ans: 12Ω

Q3. You are given three resistances of 1, 2 and 3 ohms. Show by diagrams, how with the help of these resistances you can get:

(i) 6Ω **(i)** $\frac{6}{11}\Omega$ **(i)** 1.5Ω

Q4. How will you connect three resistors of 2Ω, 3Ω and 5Ω respectively so as to obtain a resultant resistance of 2.5Ω? Draw the diagram to show the arrangement.

Q5. How will you connect three resistors of resistances $2\ \Omega$, 3Ω and $6\ \Omega$ to obtain a total resistance of (a) 4Ω and (b) 1Ω?

Q6. How will you connect three resistors of 3Ω, 12Ω and 3Ω so as to obtain a resultant of $5.4\ \Omega$?

Q7. Are the lights in your house wired in series?

Q8. What happens to the other bulbs in a series circuit if one bulb blows off?

Q9. What happens to the other bulbs in a parallel circuit if one bulb blows off?

Q10. Which type of circuit, series or parallel, is preferred while connecting a large number of bulbs:

(a) for decorating a hotel building from outside?

(b) for lighting inside the rooms of the hotel?

Q11. Draw a circuit diagram to show how two 4V electric lamps can be lit brightly from two 2V cells.

Q12. Why is series arrangement not used for connecting domestic electrical appliances in a circuit?

Q13. Give three reasons why different electrical appliances in a domestic circuit are connected in parallel.

Q14. Ten bulbs are connected in a series circuit to a power supply line. Ten identical bulbs are connected in a 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 brighter?

(c) In which circuit, if one bulb blows out, all others will stop glowing?

(d) Which circuit would have less current in it?

Q15. If you were going to connect two light bulbs to one battery, would you use a series or a parallel arrangement? Why? Which arrangement takes more current from the battery?

Q16. Why is the better way to connect lights and other electrical appliances in domestic wiring: series circuits or parallel circuits? Why?

Q17. Christmas tree lamps are usually wired in series. What happens if one lamp breaks?

Q18. An electrician has wired a house in such a way that if a lamp gets fused in one room of the house, all the lamps in other rooms of the house stop working. What is the defect in the wiring?

Q19. Draw a circuit diagram showing two electric lamps connected in parallel together with a cell and a switch that works both lamps. Mark an (A) on your diagram to show where an ammeter should be placed to measure the current.

Q20. The lamps in a household circuit are connected in parallel because:

(a) this way they require less current.

(b) if one lamp fails the other remain lit

(c) this way they require less power

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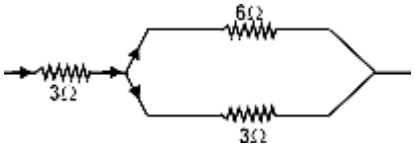
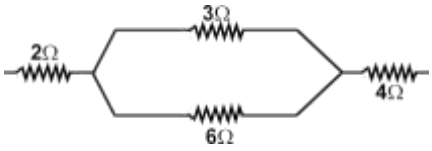
PRACTICE EXERCISE 12.10

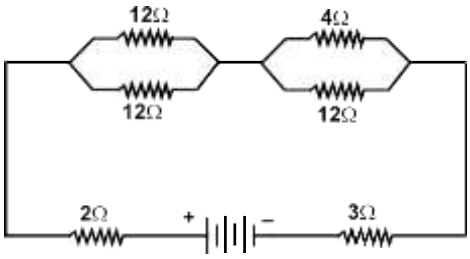
Q1. Find the effective resistance of the given circuit diagram. [Ans. 5Ω]



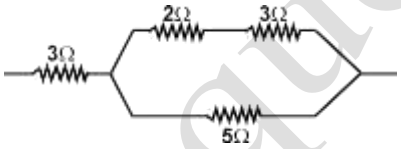
Q2. Find the effective resistance of the following circuit diagram. [Ans. 8Ω]



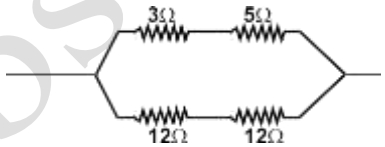
Q3. Find the effective resistance of the given circuit diagram. [Ans. $\frac{76}{5}\Omega$]



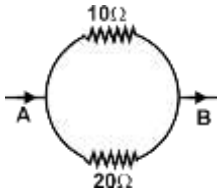
Q4. Find the effective resistance of the given circuit diagram. [Ans. $\frac{17}{5}\Omega$]



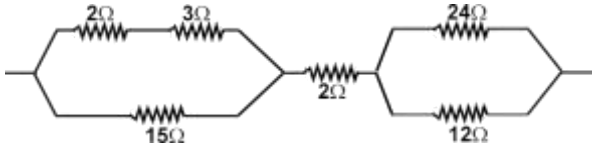
Q5. Find the effective resistance of the given circuit diagram. [Ans. 6Ω]



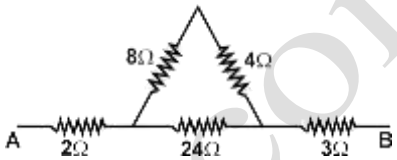
Q6. Find the effective resistance of the given circuit diagram between A and B. [Ans. $\frac{20}{3}\Omega$]



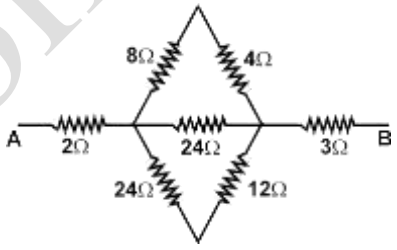
Q7. Find the effective resistance of the given circuit diagram. [Ans. $\frac{55}{4}$]



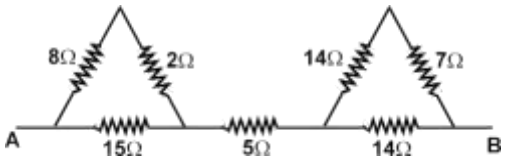
Q8. Find the effective resistance of the given circuit diagram between A and B. [Ans. 13Ω]



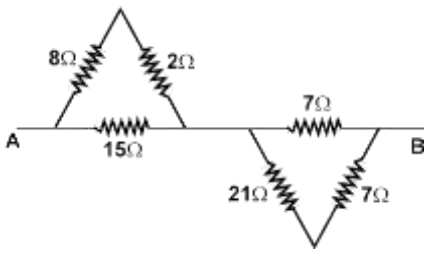
Q9. In the given circuit diagram find the effective resistance between A and B. [Ans. $\frac{127}{11}\Omega$]



Q10. Find the effective resistance of the given circuit between A and B. [Ans. $\frac{97}{5}\Omega$]



Q11. Find the effective resistance between A and B. [Ans. $\frac{58}{5}\Omega$]



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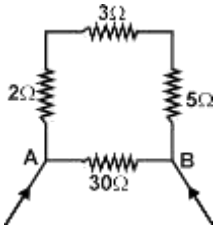
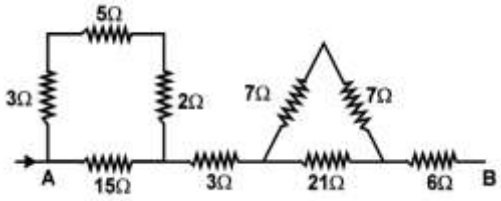
PRACTICE EXERCISE 12.11

Q1. Find the effective resistance of the following circuit diagram between A and B.

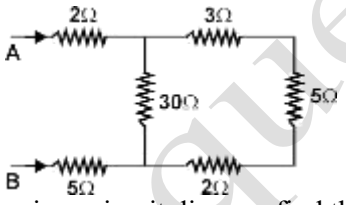


[Ans. $\frac{15}{2}\Omega$]

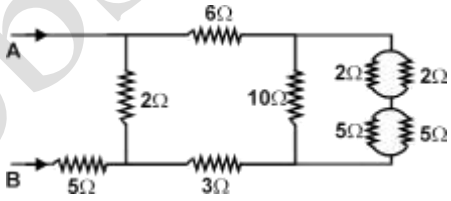
Q2. In the given circuit diagram find the effective resistance between A and B. [Ans. $\frac{117}{5}\Omega$]



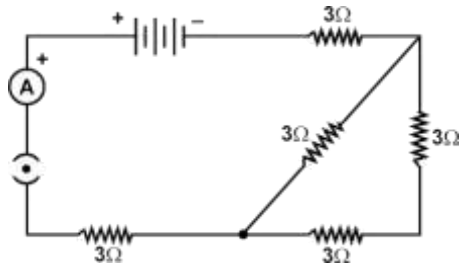
Q3. Find the effective resistance between A and B. [Ans. $\frac{29}{2}\Omega$]



Q4. In the given circuit diagram find the effective resistance between A and B.[Ans. $\frac{2461}{367}\Omega$]



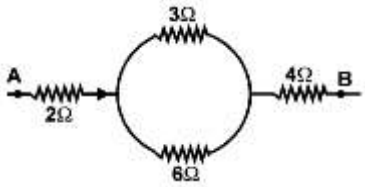
Q5. Find the effective resistance of the following circuit diagram. [Ans. 8Ω]



Q6. If a student by mistake connects voltmeter in series with or an ammeter in parallel of a circuit, what will happen.

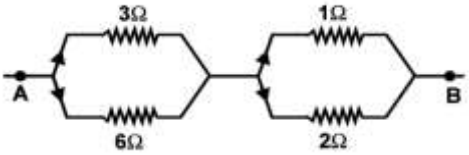
Q7. Find the effective resistance of the following circuit diagram between A and B:

(i)



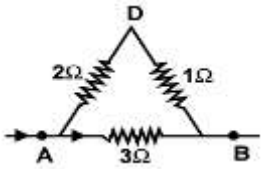
[Ans. 8Ω]

(ii)



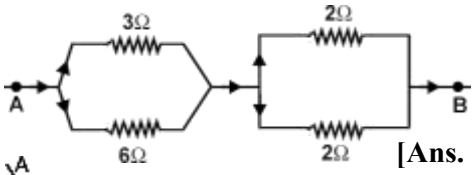
[Ans. 2.6]

(iii)



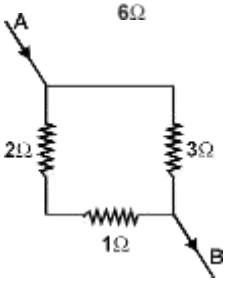
[Ans 1.5Ω]

(iv)



[Ans. 3Ω]

(v)



[Ans. 1.5Ω]

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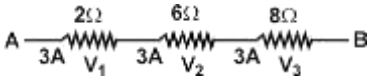
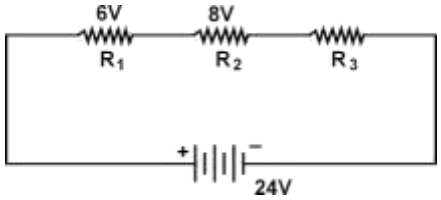
PRACTICE EXERCISE 12.12

Q1. In the given figure find the potential difference across 2Ω, 6Ω and 8Ω resistance.

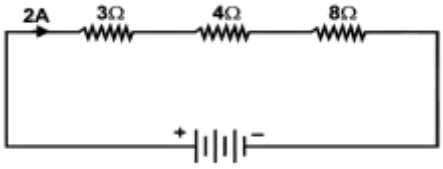


[Ans. 6V, 18V, 24V]

Q2. In the given figure, find the potential difference across R_3. [Ans. 10V]

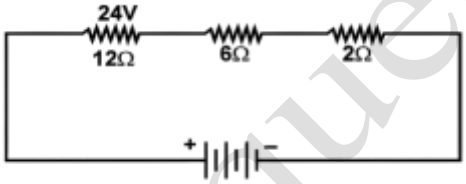


Q3. In the given figure, find the value of supply potential.



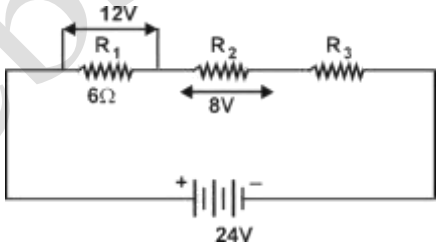
[Ans. 30V]

Q4. In the given figure, find supply potential



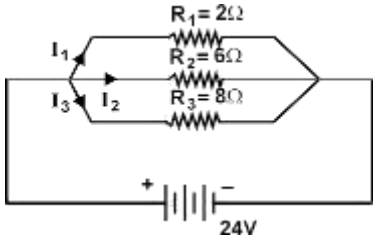
[Ans. 40V]

Q5. In the given figure, find the value of resistance R_2 and R_3.

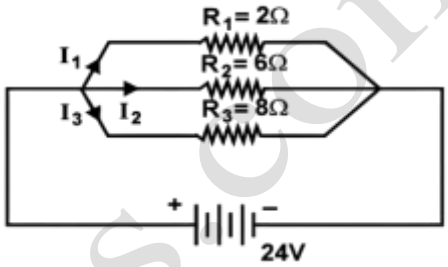


[Ans. $R_2 = 4\Omega$, $R_3 = 2\Omega$]

Q6. In the given figure, find potential difference across resistance R_2. [Ans. 24V]

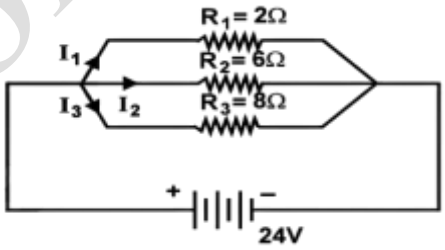


Q7. In the given figure, find the value of current I_2.



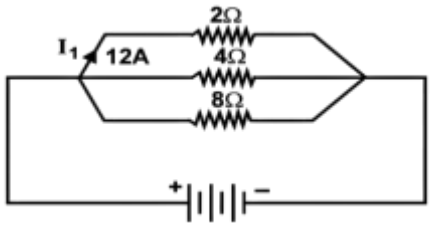
[Ans. $I_2 = 4A$]

Q8. In the given figure, find supply current.



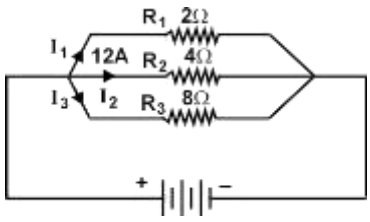
[Ans. 19A]

Q9. In the given figure, find supply potential



[Ans. 24V]

Q10. In the given figure, find the current passing through R_2 and R_3.



[Ans. $I_2 = 6A$, $I_3 = 3A$]

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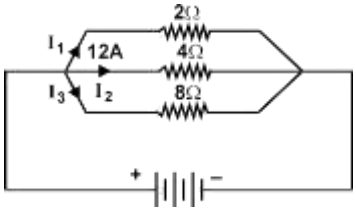
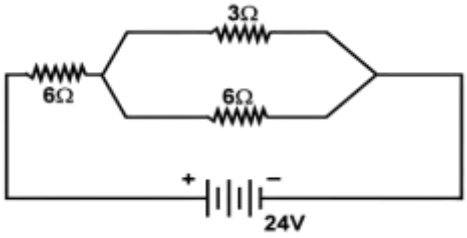
PRACTICE EXERCISE 12.13

Q1. In the given figure, find the supply current

[Ans. 21A]

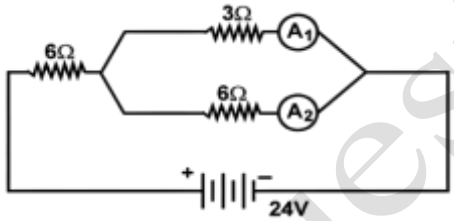


Q2. In the given figure, find the potential difference across 3Ω resistance.

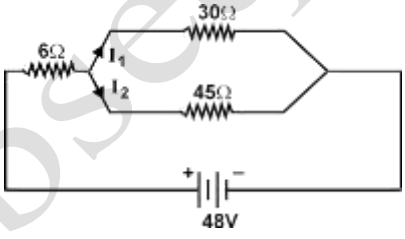


[Ans. 6V]

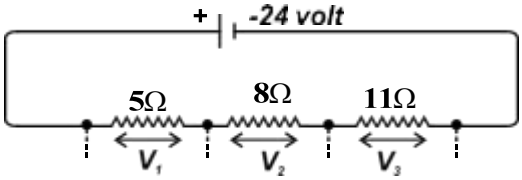
Q3. In the given figure, find the reading of ammeter A_1 and A_2. [Ans. 2A, 1A]



Q4. In the given figure find the current passing through 45Ω resistance. [Ans. $I_2 = 0.8A$]



Q6. In the given fig. find:

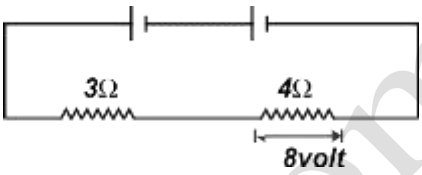


(a) The current drawn from the battery.
(b) Potential difference at the ends of each resistance. **Ans.a. 1 A, b. 5v, 8v, 11v**

Q7. In the given circuit the P.D across the 4Ω resistor is 8V:

(i) What is the current through 4Ω resistor.
(ii) What is the current 3Ω resistor.
(iii) What is P.D across 3Ω resistor.
(iv) What is the P.D of battery.

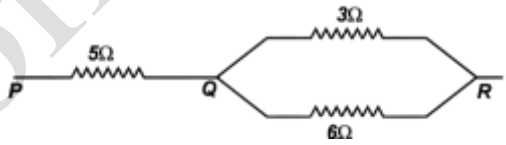
Ans. (i)2A,(ii) 2A,(iii) 6v,(iv) 14v



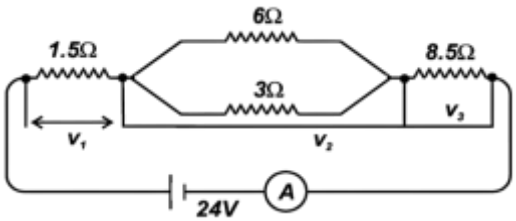
Q8. In the given the P.D across PR is 14 volts calculate:

(i) The resistance between QR.
(ii) The current flowing through PQ.
(iii) The P.D across PQ.
(iv) The current flowing through 3Ω resister.

Ans. (i) 2Ω (ii) 2A (iii) 10v (iv) 1.33A

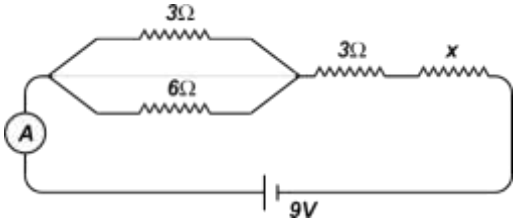


Q9. In the given fig. find the reading of ammeter and P.D, V_1 V_2 and V_3.



Ans. 2A, V_1 = 3v, V_2 = 4v, V_3 = 17v

Q10. In the given fig. ammeter reads 0.2A calculate the value of resistor X.



Ans. 40Ω

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PRACTICE EXERCISE 12.14

Q1. State the practical unit of measurement of electrical energy.

Q2. How many joules are there in one k.W.h.

Q3. State (i) S.I unit of electrical energy (ii) Commercial unit of electrical energy.

Q4. Name the quantity whose unit is (i) Kilowatt (ii) kilowatt hour.

Q5. Which quantity has the unit of watt

Q6. Write the formula for electric power in terms of potential difference and current.

Q7. State whether an electric heater will consume more electrical energy or less energy per second when the length of its heating element is reduced give reason your answer.

Q8. If the current passing through a conductor is doubled, what will be the change in heat produced.

Q9. State three factors on which the heat produced by an electric current depend.

Q10. Give three application of the heating effect of electric current.

Q11. Which effect of current is utilized in an electric bulb.

Q12. Which effect of current is utilized in the working of an electric fuse.

Q13. Two exactly similar heating resistance, are to be used connected across a mains supply to heat some water. Is more heat obtained per minute if they are connected in series or if they are connected parallel. Give reason of your answer.

Q14. What do you understand by the term electric work.

Q15. What do you understand by the term electric power.

Q16. What do you understand by the term electric Energy.

Q17. Distinguish between kilowatt and kilowatt hour.

Q18. Drive expression for electric work connecting current, resistance and time.

Q19. Name and define the standard unit of electrical energy.

Q20. State two factors on which the electrical energy consumed by an electrical appliance depends.

Q21. The roting of an electric bulb is 200V, 40W. Write the meaning of this statement.

Q22. Name the commercial unit of electric energy.

Q23. What is the SI unit of (i) electric energy, and (ii) electric power?

Q24. Which quantity has the unit of watt?

Q25. What is the meaning of the symbol kWh? Which quantity does it represent?

Q26. If the potential difference between the end of a wire of fixed resistance is doubled, by how much does the electric power increase?

Q27. An electric lamp is labelled 12V, 36W. This indicates that it should be used with a 12V supply. What other information does the label provide? **Ans:** 41A

Q28. Define watt. Write down an equation linking watts, volts and amperes.

Q29. Define watt-hour. How many joules are equal to 1 watt-hour?

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PRACTICE EXERCISE 12.15

Q1. An electric heater has a resistance of 40Ω and draws a current of 4A. Calculate (i) the power consumed by the heater (ii) the p.d. applied at the ends of the heater. **(i) 640w (ii) 160V**

Q2. An electric heater of power 1600 W has a resistance of 36Ω. Calculate he magnitude of the current and the p.d. at its ends. **(i) 6.67 A (ii) 240 V**

Q3. An electric heater is rated as 1200W - 200V. calculate (i) the current flowing through it (ii) resistance of heating element. **(i) 6A (ii) 33.33Ω**

Q4. An electric motor of power rating 750w operates at 250V. Calculate the inductive resistance of the motor and current flowing through it. **(i) 83.33Ω (ii) 3A**

Q5. An electric heater draws a current of 5A and its element has a resistance of 50Ω. If the heater is switched on for 5 minutes, calculate the energy released by the heater in kilojoules. **375 kJ**

Q6. An electric kettle draws a current of 4 A for 2.5 minutes. If the resistance of its element is 100Ω, calculate the electric energy drawn by in kettle in kilojoules. **240 kJ**

Q7. A geyser is rated 2000 W and operates 2 hours a day on 200V mains. Calculate the monthly bill of running the geyser when energy costs Rs. 1.90 per kWh. **Rs. 228**

Q8. An electric oven of resistance 20Ω draws a current of 10A. It works 3 hours daily. Calculate the weekly bill when energy costs Rs. 1.60 per kVAh. [Hint: $P = I^2.R$] **Rs. 67.20**

Q9. An electric bulb draws a current of 0.8A and works on 250V on the average 8 hours a day. If energy costs Rs. 1.50 per kWh, calculate the monthly bill. **Rs 72.00**

Q10. An electric motor of 1.5kw and two cooler of 500W each operated for 4 hours a day. If energy costs Rs. 1.80 per kWh, calculate the weekly bill. **Rs. 126.00**

Q11. An electric kettle rated at 220 V, 2.2 kW, works for 3 hours. Find the energy consumed and the current drawn. **Ans: 6.6 kWh ; 10A**

Q12. State whether an electric heater will consume more electrical energy or less energy per second when the length of its heating element is reduced. Give reasons for your answer. **Ans: More En.**

Q13. A current of 5A flows through an electric heater which is connected to a voltage of 250V. Find the amount of heat produced. in 10 min. **Ans: 750 kJ**

Q14. An electric bulb is marked 100 W, 230 V if the supply voltage drops to 115 V, what is the heat and light energy produced by the bulb in 20 min. **Ans: 3000 J**

Q15. An electric bulb of resistance 480 ohms is connected to 230 volt mains. Find the amount of electricity consumed in 10 sec. **Ans: 1120.3 J**

Q16. A current of 4A flows through a 12 V, car head light bulb for 10 min. How much energy transfer occurs during this time. **Ans: 28..8 kJ**

Q17. A current of 5 A flows through an electric press of resistance 44 ohm. Calculate the energy consumed by the press in 5 min. **Ans: 3.3×10^5 J**

Q18. A current of 0.5A flows through a resistance of 10 ohm for 1/2 hours, find the amount of electrical energy consumed by the resistance. **Ans: 4500 J**

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ADDITIONAL SOLVED QUESTIONS

Q1. **A wire of resistivity ρ is stretched to double its length. What will be its new resistivity?** ***V.V.I.***

Ans. The resistivity of a wire depends on the nature of its material and not on its length, Therefore, no change in resistivity.

Q2. **Magnanin is used for making standard resistors. Why?**

Ans. Magnanin is used for making standard wire dur to following reason:

(i) It has high resistivity

(ii) It has not oxidised easily

Q3. **Name three materials whose resistivity decreases with rise in temperature.**

Ans. Carbon, Silicon and Germanium.

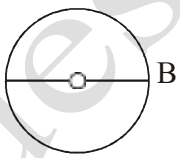
Q4. **A wire of resistance 4 R is bent in the form of a circle. What is the effective resistance between the ends of diameter.**

Ans. $R' = R$

$$\frac{1}{R^1} = \frac{1}{2R} + \frac{1}{2A}$$

$$\frac{1}{R} = \frac{1+1}{2R}$$

$$\frac{1}{R^1} = \frac{2}{2R} \quad \because R^1 = R$$



Q5. **Why resistance becomes more in series combination.**

Ans. In series combination of resistors, the effective length of the conductor increases. Hence resistance increases, because $R \propto l$.

Q6. **Why resistance becomes less in parallel combination.**

Ans. In parallel combination of resistors, the effective area of cross-section of the conductor increases. Hence resistance decreases, because of resistance inversely proportional to the area of cross section.

Q7. **A wire of resistivity ρ is stretched to three times to length. What will be its new resistivity.** ***V.V.I.***

Ans. There will be no change in its resistivity because resistivity does not depend on the length of wire.

Q8. **Two wires of equal length, one of copper and other of magnanin have the same resistance, which wire is thicker.**

Ans. If two different material having some length then area of cross section (or thickness) directly the length of proportional to wire so meganin resistivity is greater then the upper so thickness of megnanin is higher than copper wire.

Q9. **What is the resistance of an ideal voltmenter and ammeter poet mater and ammeter are the resistence of an ideal respectively.**

Ans. Infinite and Zero

Q10. **Write two characteristics of the wire of an electric heater.**

Ans. It should have:

a. high melting point

b. high resistivity or resistance

Q11. **Two electric bulbs A and B are marked 220 V, 40 W and 200 V, 60 W respectively. Which one of these bulbs has a higher resistance.**

Ans. 40 W, 220V bulb has a higher resistance because resistance inversely proportional to the power i.e., $R \propto 1/P$ at constant voltage.

Q12. **Which electric bulb has greater heat production: a 100 W or 200 W. Assume that both the bulbs are connected to the same supply.**

Ans. 200 W bulb will produce a greater amount of heat because heat produced (H) is directly proportional to the power of the bulb i.e. $H \propto P$ at constant potential.

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Q13. **The heating coil A and B made of the same material are connected in parallel across the mains. The length and the diametre of A are twice that of B. In which will more heat be produced. How much.**

Ans. The rate of heat production in A will be double than that in B.

Q14. **Name the liquid which is a good conductor of electricity but does not undergoes electrolysis on passage of an electric current.**

Ans. Mercury

Q15. **Why no electrolysis takes place in case of pure water.**

Ans. Because pure water does not dissociate into ions.

Q16. **Why is negligible heat produced in the connecting wires.**

Ans. Connecting wires are made up of copper which has very low resistance. Due to this Negligible Heat produced in the connecting wire.

Q17. **What is the resistance of air gap.**

Ans. It is very-very large say almost infinity.

Q18. **If a student by mistake connects voltmeter in series with or an ammeter in parallel of a circuit, what will happen.** ***V.V.I.***

Ans. When the voltmeter is connected in series, the resistance of the circuit becomes too much high resulting. The value of current decreases too much. Thus, the voltmeter would not read the required potential difference. When the ammeter is connected in parallel. In a circuit, the resistance of circuit is decreases too much. Due to this a large current would flow which can damage the ammeter.

Q19. **The rating of an electric appliance is 200V, 40W. Write the meaning of this statement.**

Ans. The meaning of this statement it electric appliance at 200V then it consume 40J energy per second.

Q20. **The power of an electric bulb is 60W. Write the meaning of this statement.**

Ans. It means this bulb consume 40J energy per second.

Q21. **Two bulbs are marked 60 W - 220 V and 100 W - 220 V. They are connected in parallel to the 220 V mains. Which bulb will glow brighter. If one of the two bulbs be switched off, will the light in the room increases or decreases.**

Ans. Since $R \propto 1/P$, hence resistance of 100 W bulb will be lower. In parallel, the potential difference across both the bulbs is same. Hence the rate of production of heat energy will be higher in the lower resistance bulb i.e., 100 W bulb ($P = V^2/R$). On switching off one bulb, there will be no effect on the brightness of the other, and hence the total light in the room will decrease.

Q22. **The electric potential at a point in the electric field is 20V. Write the meaning of this statement.**

Ans. It means 20J of work is done to bringing a unit positive charge from infinity to that point in the electric field.

Q23. **The potential difference between two points in the electric field is 50 volt. Write the meaning of this statement.**

Ans. It means 50 J of work is done to transfer one columb of charge from one point to another point in the electric field.

Q24. **The resistivity of material X is 1.6×10^{-3} m. Write the meaning of this statement.**

Ans. It means, if we take length material 1m and its area of cross section is $1m^2$, then its resistance is $1.6 \times 10^{-3}\ \Omega$.

Q25. **When do you say that the resistance of a wire is 1Ω?**

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Ans. The resistance of wire is said to be one ohm. When P.D. across the wire is one volt and current passing the conductor is one Ampere.

Q26. **The electric power consume by a device may be calculate by using either $P = I^2R$ or $P = \frac{V^2}{R}$. In first expression power is directly proportional to the resistance and in second expression power is inversely proportional to the resistance flow it is possible.**

Ans. In the expression $P = I^2R$. Power is directly proportional to R when V is constant in the expression $P = \frac{V^2}{R}$. Power is inversely proportional to R. When is constant.

Q27. **Question - from JPG page no 503**

Ans. When P.D. taken on y-axis and current on x-axis then slop of glap α resistance of the circuit. When P.D. taken on x-axis and current on y-axis, then resistance of the circuit inversely proportional to the slop of graph line. We know that when resistance are connected in series combination then effective resistance increases and when they are connect in parallel the effective resistances decreases $\therefore$ both diagram are correct.

Q28. **question from JPH page no. 503**

Q29. **Why Ammeter negligible resistance.**

Ans. Since Ammeter connected in series of the electrical circuit if Ammeter has to much resistance then combined resistance of the circuit increase too much due to this supply current decrease. Hence Ammeter can't measure the accurate value of current.

Q30. **Why Ammeter has to much resistance.**

Ans. We know that voltmeter connected in parallel of the electric circuit. It voltmeter has less resistance then current passing through the voltmeter large amount of..

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MULTIPLE CHOICE QUESTIONS

Q1. According to Coulomb law

(a) $F = K\frac{q_1q_2}{r^2}$ (b) $F = \frac{q_1q_2}{r^2}$

(c) $F = K\frac{q_1q_2}{r}$ (d) $F = K\frac{r^2}{q_1q_2}$

[Ans: a]

Q2. Which of the following is not an insulator?

(a) Plastic (b) Rubber

(c) Graphite (d) None of these

[Ans: c]

Q3. Which of the following is not a conductor?

(a) Silver (b) Salt solution

(c) Glass (d) Aluminium

[Ans: c]

Q4. S.I. unit of charge is

(a) Ampere (b) Volt

(c) Joule (d) Coulomb

[Ans: d]

Q5. S.I unit of electric current is

(a) Joule (b) Ampere

(c) Volt (d) Coulomb

[Ans: b]

Q6. S.I. unit of electric potential is

(a) Joule (b) Ampere

(c) Volt (d) Coulomb

[Ans: c]

Q7. The device used to measure electric current is

(a) Voltmenter (b) ammeter

(c) Galvanometer (d) None of these

[Ans: b]

Q8. In which of the following appliances, the heating effect due to resistance is undesirable?

(a) Electric heater (b) Electric Motor

(c) Electric Iron (d) None of the above

[Ans: b]

Q9. The S.I. unit of electric power is

(a) joules (b) watt

(c) volt (d) ampere

[Ans: b]

Q10. The relation between Kilowatt-hour and Joules is

(a) 1 kWh = 100 joules

(b) 1 kWh = 3.6×10^3 Joules

(c) 1 kWh = 3.6×10^9 Joules

(d) 1 kWh = 3.6×10^6 Joules

[Ans: d]

Q11. The commercial unit of electric energy is

(a) Kilowatt-hour (b) Watt-hour

(c) Kilowatt (d) Kilowatt-minute

[Ans: a]

Q12. A torch bulb is rated at 2.5 volt, 500mA. Its power is

(a) 0.25W (b) 1.25W

(c) 1.00W (d) 1.50W

[Ans: b]

Q13. A 100 Watt electric bulb is lighted for 2 hours daily. Calculate the energy consumed (in kwh) in 30 days.

(a) 60 kwh (b) 6 kwh

(c) 0.2 kwh (d) 0.6 kwh

[Ans: b]

Q14. Ohm's law is relatin between the

(a) resistance in a circuit to the current and the potential difference

(b) power in a circuit to the current and the potential difference

(c) resistance in a circuit to the power and the potential difference.

(d) none of these

[Ans: a]

Q15. A piece of wire having resistance R is cut into four equal parts. The resistance of each part compared with the original resistance is

(a) $\frac{1}{2}$ times (b) $\frac{1}{3}$ times

(c) $\frac{1}{4}$ times (d) $\frac{1}{8}$ times

[Ans: c]

Q16. A piece of wire is redrawn by pulling it until its length is doubled. The new resistance is — the original resistance

(a) two times (b) three times

(c) same as (d) four times

[Ans: d]

Q17. 20 Joules of work is done to boring 1 Coulomb charge from infinity to a point A. The electric potential at point A is

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(a) 20 J/C (b) 20
(c) 30 J/C (d) 30

[Ans: a]

Q18. One coulomb of charge flows through any cross-section of a conductor in 1 second. What is the current flowing through the conductor.
(a) 0.1 Ampere (b) 1 Ampere
(c) 2 Ampere (d) 10 Ampere

[Ans: b]

Q19. The magnitude of charge on an electron is
(a) 4×10^{-19} C (b) 2.6×10^{-19} C
(c) 1.6×10^{-19} C (d) $1.6 \times 10^{+19}$ C

[Ans: c]

Q20. 1 volt.....
(a) 1 joule / coulomb
(b) 1 coulomb / joule
(c) 1 joule / coulomb^2
(d) 1 joule / coulomb

[Ans: a]

Q21. Unit of electric potential is
(a) ampere (b) volt
(c) coulomb (d) joule

[Ans: b]

Q22. Work done to move a charge from one point to another of a conductor is
(a) electric potential
(b) potential difference
(c) electric field
(d) electric current

[Ans: b]

Q23. Unit of electric current is
(a) joule (b) coulomb
(c) ohm (d) ampere

[Ans: d]

Q24. Resistance of a metallic conductor
(a) increases with the increase in temperature
(b) increases with the decrease in temperature
(c) decreases with the increase in temperature
(d) none of these

[Ans: a]

Q25. Two resistance 1Ω and 2Ω are connected in series and then in parallel. The ratio of the effective resistance of series and parallel combination of resistances is
(a) 2: 9 (b) 9: 2
(c) 3: 1 (d) 1: 2

[Ans: b]

Q26. A wire of resistanceR is cut into five equal pieces. These pieces are connected in parallel and the equivalent resistance of the combination is R'. Then the ratio R/R' is
(a) $\frac{1}{5}$ (b) 5
(c) $\frac{1}{25}$ (d) 25

[Ans: d]

Q27. An electric heater is rated 100 W and 220 V. If it is operated on 100 V, the power consumption will be:
(a) 10 W (b) 25 W
(c) 15 W (d) 100 W

[Ans: b]

Q28. Electric power is given by
(a) V / I (b) I / V
(c) VI (d) V^2 I

[Ans: c]

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PRACTICE EXERCISE 12.16

Q1. A wire of resistivity 'P' is pulled to double its length what will be the new resistivity.

Q2. In a series electrical circuit comparing a resistor made up of a metallic wire, the ammeter reads 5A. The reading of the ammeter decreases to that when the length of the wire is doubled. Why?

Q3. When switch of an electric bulb own. What will be change the resistance of an electric bulb.

Q4. Which one having lesser resistance; A 60w bulb or a 40w bulb?

Q5. The resistance of a conductor is 1Ω. What is meant by this statement.

Q6. The rating of an electric bulb is 60W. What do you meant it.

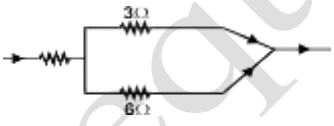
Q7. The rating of a motor is 5kWh. What do you meant it.

Q8. The p.d. at a point in the electric field is 1 volt. What do you meant it.

Q9. The p.d. between two point in the electric field is 5V. What do you meant it.

Q10. The resistivity of a substance x is 15Ω-m. What do you meant it.

Q11. Find the p.d. across 3Ω and 6Ω resistance in the given figure. Also find the supply p.d.



Ans: 2v, 4v

Q12. In a house, four 60W electric bulbs are lighted for 2 hrs. and two 100W bulb are lighted for 4 hour every day. Calculate the energy consumed in the house for 30 days.

Q13. A wire of resistance R is cut into three equal parts

(i) Find the value of resistance each part.

(ii) It three part are connected in parallel. What is the ratio of new resistance and original resistance.

Q14. Why filament of electric bulb made of tungsten metal.

Q15. Why the filament of all heating devices are made of nicrome wire?

Q16. What are the features of fuse wire?

Q17. Which gas is filled in the electric bulb and why?

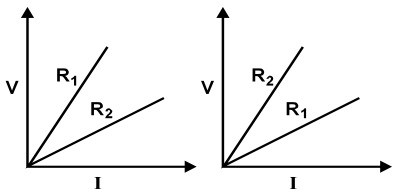
Q18. Two identical resistors each of resistance 10Ω are connected (i) in series (ii) in parallel, in turn to a battery of 6V. Calculate the ratio of power consumed in the combination of resistors in the two cases.

Q19. In an electric circuit with a resistance. Wire and a cell, the current flowing I. What would happens to this current. If the wire is replaced by another thicker wire of same material and same length. Give reason.

[Ans: current increases**]**

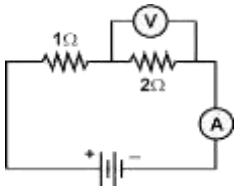
Q20. Two students perform experiments an two given resistors R_1 and R_2 and plot the following V-I graphs.

Q21. If $R_1 > R_2$ which of the two diagrams correctly represent the situation on the plotted curves? Justify your answer.



Ans: 8A, 16 V

Q21. Two electric bulbs A and B marked 220V, 40W and 220V, 60W respectively. Which are of the two has greater resistance in the given figure. Find the reading of ammeter and voltameter.



Q22. A TV set shoots out a beam of electrons. The beam current is 10μA. How many electrons strike. The TV screen in each seconds? How much charge strike the screen in a minute.

[**Ans:** 6.25×10^{13}, 6×10^{-4} C]

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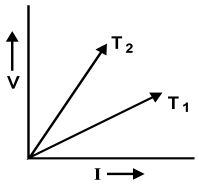
Q23. Two resistors of resistance 3Ω and 6Ω resistivity are connected to a battery of 6V. So as to have (a) minimum resistance (b) minimum current.

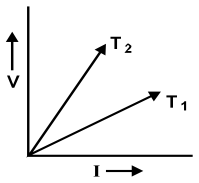
(i) How will you connect the resistance in each case.

(ii) Calculate the strength of current in the circuit in both case.

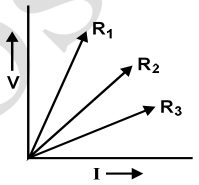
Q24. The voltage-current (V-I) graph of a metallic (circuit) at two different temp T_1 and T_2 as shown. Which of the two temp. is higher and why? **Ans:** $T_2 > T_1$



Q25. The voltage current (V-I) graph of a metallic circuit at two different Temp T_1 and T_2 is shown. Which of the two temp is higher and why. **Ans:** $T_1 > T_2$



Q26. A student carries out an experiment and plot the V-I graph of three samples of nicrome wire with resistance R_1, R_2 and R_3 respectively as shown in figure. Which of the following is true.



(i) $R_1 = R_2 = R_3$ (ii) $R_1 > R_2 > R_3$

(iii) $R_3 > R_2 > R_1$ (iv) $R_2 > R_3 > R_1$

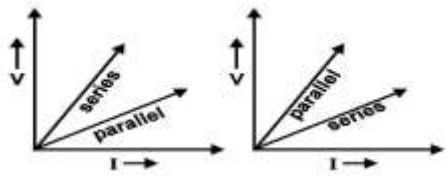
Q27. Two resistors of resistance R and 2R are connected in parallel in an electric circuit. Calculate the ratios of the electric power consumed by R and 2R. **Ans:** 2: 1

Q28. The electric power consumed by a device may be calculated by using either of the two expression $P = I^2R$ or $P = \frac{V^2}{R}$. The first expression indicates that the power is directly proportional to R, whereas the second expression indicates inversely proportional. How the difference of P depends on R. Explained.

Hint: First expression is used when current is same i.e. in series combination second express used when p.d. is same across each resistance i.e. when in parallel combination.

Q29. An electric fused rating 3A is connected in a circuit in this circuit an electric iron of power 1kW is connected which operates at 220V. What will happen? Explain why?

Q30. Two students perform the experiments on series and parallel combination of two given resistance R_1 and R_2 and plot the following: V – I graph, which one is correct situation



Q31. Two wires A and B of same material are connected in parallel. Wire A has length ℓ and radius r and wire B has length 2ℓ and radius 2r. Compare the ratio of the total resistance of parallel combination and the resistance of wire A. **Ans:** 1: 3

Hint: $R_1 = \rho \times \frac{\ell}{A}$, $R_2 = \rho \times \frac{\ell}{A}$

Q32. Why copper and aluminium wires usually used for electricity transmission.

Q33. How does the fuse wire protect electrical appliances.

Q34. Should the resistance of an ammeter be low or high. Give reason or what happens when ammeter connected in parallel.

Q35. Should the resistance of voltmeter below or high. Give reason or what happens when voltmeter connected in series.

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MULTIPLE CHOICE QUESTION'S

Q1. In which of the following case circuit will not work

(a) In an open circuit
(b) In an closed circuit
(c) When bulb is fused
(d) Both (a) and (c)

Q2. Materials which allow electricity to pass through them completely are called

(a) Conductors (b) Insulators
(c) Semi-Insulators (d) None of these

Q3. Which of the following are conductors

(a) Solution of acids (b) Graphite
(c) Carbon (d) All of these

Q4. Which of the following are insulators

(a) Oil (b) Paper
(c) Wax and Mica (d) All of these

Q5. Electric cells has

(a) Two terminals
(b) Three terminals
(c) Four terminals
(d) One terminals

Q6. Air is

(a) Conductor (b) Insulator
(c) Both of these (d) None of these

Q7. Which of the following type of energy can be converted easily into mechanical energy, sound energy, heat energy and light energy?

(a) kinetic energy
(b) potential energy
(c) electric energy
(d) magnetic energy

Q8. When electricity passes through a bulb, it gives off:

A. Sound B. Light
C. Electricity D. Heat
(a) A and B (b) B only
(c) B and C (d) B and D

Q9. The part of a torch bulb which gives off light is the:

(a) glass (b) filament
(c) base (d) metal cover

Q10. Which of the following is not an insulator?

(a) bakelite (b) brass
(c) porcelain (d) mica

Q11. Which of the following is involved in the working of a torch bulb?

(a) chemical effect of current
(b) magnetic effect of current
(c) heating effect of current
(d) shocking effect of current

Q12. The thin wire that gives off light is called:

(a) cell (b) filament
(c) bulb (d) current

Q13. The direction of current in a conducting wire is:

(a) positive to negative
(b) negative to positive
(c) sometime positive sometime negative
(d) none of these

Q14. Lead of pencil is:

(a) semiconductor (b) insulator
(c) conductor (d) none of these

Q15. Metal cap of these electric cell is:

(a) negative terminal
(b) positive terminal
(c) both (a) and (b)
(d) none of these.

Q16. Electricity is produced at

(a) power stations (b) power plants
(c) Both of these (d) None of these

Q17. Electric cell or dry cell produces what amount of electricity

(a) It's doesn't produce at all
(b) very high (c) small
(d) None of these

Q18. The electric cell produces electricity from the

(a) electricity
(b) Chemical stored
(c) power house
(d) Mercury vapours

Q19. The cells/batteries which can be recharged are usually those used in:

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A. Electric clocks B. Mobile phones
C. Cameras D. T.V. remotes
(a) A and B (b) B and C
(c) C and D (d) A and D

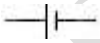
Q20. The torch bulb does not glow in a complete circuit in which one of the following is included. This one is:
(a) paper clip
(b) aluminium foil
(c) mica sheet
(d) pencil lead

Q21. The coloured plastic covered on an electric wire makes the electric wire:
(a) long lasting
(b) more attractive
(c) resistant to corrosion
(d) safe to touch

Q22. A torch bulb which normally works on 4.5 volts electricity is connected to domestic electricity supply of 220 volts. Which of the following will happen to this torch Bulb?
(a) it will glow very brightly(b) it will glow very dimly
(c) it will not glow (d) it will get fused

Q23. The filament of an electric bulb is made of a thin wire of:
(a) copper (b) aluminium
(c) tungsten (d) nichrome

Q24. Gas filled inside the bulb is:
(a) nitrogen (b) carbon dioxide
(c) argon (d) oxygen

Q25.  This symbol is of
(a) Battery (b) Cell
(c) Bulb (d) Switch

Q26.  This symbol is of
(a) Battery (b) Cell
(c) Bulb (d) Switch

Q27. This is
(a) Open switch (b) Closed switch
(c) Battery (d) Bulb

Q28. A device which either breaks with circuits or completes it is called
(a) simple device
(b) electric switch
(c) circuit
(d) switch off

Q29. If we touch a naked current carrying wire, we get a shock. This is because our body is a:
(a) conductor of electricity
(b) insulator of electricity
(c) source of electricity
(d) both b and c

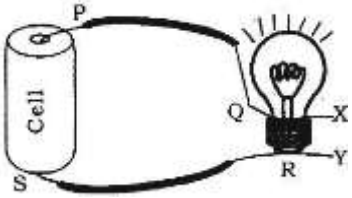
Q30. The metal disc provided at one end of the common cell is the:
(a) switch
(b) positive terminal
(c) negative terminal
(d) Spring

Q31. When the two terminals are connected directly with a wire then:
(a) more electrical energy is stored in the cell
(b) the chemicals get used up very fast.
(c) no current flows in the wire
(d) none of these.

Q32. Most of the electricity carrying wires near highways do not have a plastic covering like the wires used at homes. But there is no substantial loss of energy because:
(a) air is a bad insulator of electricity
(b) air is a bad conductor of electricity
(c) electricity flows very fast near highways.
(d) both b and c

Q33. The filament of a bulb is usually a:
(a) thin wire with many coils
(b) thick wire with many coils
(c) thin straight wire
(d) thick straight wire

Q34. Look at the given figure



It consists of a cell, a bulb with the two

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terminals X and Y and wires with ends P and Q and S and R. The direction of current will be:

(a) PQRS (b) SRQP

(c) PRQS (d) SQRP

Q35. Which of the following does not belong to the group formed by the others?

(a) Aluminium

(b) Salt solution

(c) Ceramic articles

(d) Silver

Q36. Which of the following energy conversions take place in a torch?

(a) electrical → chemical → light

(b) chemical → electrical → light

(c) electrical → light → chemical

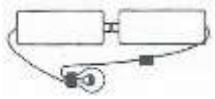
(d) light → chemical → electrical

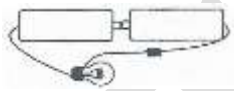
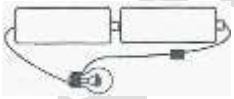
Q37. The instrument that can measure current is called a/an:

(a) Tester (b) Resistor

(c) Voltameter (d) Ammeter

Q38. Which of the following is the correct method of setting a circuit?

(a)  (b) 

(c)  (d) 

Q39. The main function of a switch is to:

(a) allow charges to flow

(b) complete or break a circuit

(c) make the bulb glow easily

(d) prevent electric shocks

Q40. When compared to other kinds of energy providing fuels-like petrol, wood and nuclear reactors, electricity is better. Because it:

(a) causes minimum pollution

(b) is renewable

(c) is cheaper

(d) all of these

Q41. Electric heaters used for cooking have the filament or the heating coil on a plate made up of clay because:

(a) clay is a bad conductor of heat

(b) clay is a bad conductor of electricity

(c) both a and b

(d) none of these

Q42. Photovoltaic cells produce electricity by using:

(a) wind energy

(b) solar energy

(c) geothermal energy

(d) mechanical energy of Water

Q43. Nidhi has two bulbs connected across two cells in a simple circuit. How can she make the bulbs glow dimmer?

(a) Replace one cell with a piece of chalk

(b) Replace one cell with a piece of wire

(c) Replace one bulb with a piece of wire

(d) Replace one bulb with another cell

Q44. The two places on a battery to which the circuit wires can be attached are called:

(a) switch

(b) filament

(c) terminals

(d) insulators

Q45. What happens to a circuit when the switch is off?

(a) The circuit is complete

(b) There is a gap in the circuit

(c) Electricity flows continuously

(d) Electricity flows discontinuously

Q46. Pooja connects a second cell in a simple circuit, how will this effect the brightness of the bulb?

(a) It will stop glowing

(b) It will cause the bulb to fuse

(c) It will become dimmer.

(d) It will become brighter.

Q47. Which of the following does not belong to the group formed by the others?

(a) Iron

(b) Tin

(c) Glass

(d) Steel

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Q48. The components required to make a simple series circuit to light a bulb are:

(a) wires and cell

(b) cell and switch

(c) bulb and wires

(d) both b and c

Q49. The path of electricity is called:

(a) circuit

(b) filament

(c) orbit

(d) none of these

Q50. Which of the following statements is true?

(a) Electricity can be created

(b) Electricity flows in a circuit with gaps

(c) Electricity is the flow of negative charge

(d) All of the above

ANSWERS

1.(d)	**2.** (a)	**3.** (d)	**4.**(d)	**5.**(a)
6.(b)	**7.**(c)	**8.**(d)	**9.**(b)	**10.**(b)
11.(c)	**12.**(b)	**13.** (a)	**14.** (c)	**15.** (b)
16.(c)	**17.** (b)	**18.**(b)	**19.**(b)	**20.**(c)
21.(d)	**22.**(d)	**23.**(c)	**24.**(c,a)	**25.**(b)
26.(a)	**27.**(b)	**28.**(b)	**29.** (a)	**30.** (c)
31. (b)	**32.** (b)	**33.** (a)	**34.** (a)	**35.** (c)
36. (b)	**37.** (d)	**38.** (d,a)	**39.** (b)	**40.** (d)
41. (c)	**42.** (b)	**43.** (b)	**44.** (c)	**45.** (b)
46. (d)	**47.** (c)	**48.** (d)	**49.** (a)	**50.** (c)

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