

**Revision Question Bank**

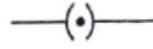
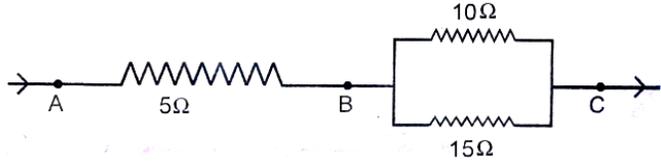
1. What do you mean by electric circuit? How is open circuit different from closed circuit? Draw circuit symbols for open key and closed key.
2. How can three resistors of resistances  $2\ \Omega$ ,  $3\ \Omega$  and  $6\ \Omega$ , be connected to give a total resistance of (a)  $4\ \Omega$  (b)  $1\ \Omega$
3. A heater, joined in parallel with a 60 W bulb, is connected to the mains. If the 60 W bulb is replaced by a 100 W bulb. Will the rate of heat produced by the heater be more or less or remain the same?
4. A heater coil is rated 100 W, 200 V. It is cut in two identical parts. Both parts are connected together in parallel to the same source of 200 V. Calculate the energy liberated per second in the new combination.
5. Nichrome and copper wires of the same length and same radius are connected in series. Current is passed through them. Why does the nichrome wire get heated first?
6. A wire of length  $l$  and resistance  $R$  is stretched so that its length is doubled and the area of cross-section is halved. How will its (a) resistance change? (b) resistivity change?
7. State the formula correlating the electric current flowing in a conductor and the voltage applied across it. Also, show this relationship by drawing a diagram.
8. Several electric bulbs designed to be used on a 220 V electric supply line, are rated 10 W. How many bulbs can be connected in parallel with each other across the two wires of 220 V line if the maximum allowable current is 5 A?
9. Describe an activity to demonstrate Ohm's law. Draw the shape of curve obtained when graph is plotted between  $I$  and  $V$ .
10. (a) Define resistivity.  
(b) Why does cord of electric heater not glow and element does?  
(c) How does electric bulb work?

**Answers**

2. (a) parallel combination of 3 & 6 ohm with 2 ohm in series.  
(b) All the three resistor connected in parallel.
3. Rate of heat produced by the heater will be more.
4. 400J/s.
5. As nichrome is an alloy therefore it has high resistance.
6. (a) Resistance increases by 4 times (b) Resistivity remains same.
8. 110 Bulbs.

**For Solutions:** [www.pioneermathematics.com/latestupdates](http://www.pioneermathematics.com/latestupdates)

## Previous Years Question Bank

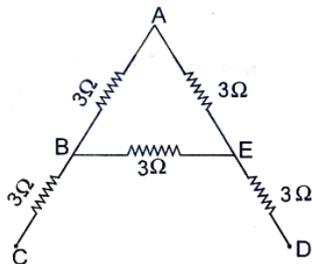
1. Give reason for the following: [CBSE Schools 2016-17]
  - (i) Why are copper and aluminium wires used as connecting wires ?
  - (ii) Why is tungsten used for filaments of electric lamps?
  - (iii) Why is lead - tin alloy used for fuse wires?
  
2. Two resistors of  $6\ \Omega$  and  $3\ \Omega$  are connected in parallel. Four such combinations are connected in series. Calculate the equivalent resistance of the combination thus formed. [CBSE Schools 2016-17]
  
3. What is meant by electric circuit? Why does electric current start flowing in a circuit the moment circuit is complete? When do we say that the potential difference across a conductor in a circuit is 1 volt? Calculate the potential difference between the two terminals of a battery if 12 joules of work is done in transferring 2 coulombs of charge. [CBSE Schools 2016-17]
  
4. (a) Name an instrument that measures electric current in a circuit. Define unit of electric current.  
 (b) What are the following symbols mean in an electric circuit. [CBSE Schools 2016-17]
  - (i)
 
  - (ii)
 
  
- (c) Draw a closed circuit diagram consisting of 0.5 m long nichrome wire XY, an ammeter, a voltmeter, four cells of 1.5 V and a plug key.
  
5. Three resistors are connected as shown. [CBSE Schools 2016-17]

  
- If a current of 1 A flows through the  $5\ \Omega$  resistor, then find the potential difference across AB and AC.
  
6. How many  $484\ \Omega$  resistors are required to be connected in parallel to a 220 V line in order to make a current of 5A flow through it? [CBSE Schools 2016-17]
  
7. (i) Define 1 ohm. What happens to the resistance of a circuit if the current through it is doubled? Justify.  
 (ii) State two factors on which the resistance of a conductor will depend. [CBSE Schools 2016-17]
  
8. (i) Explain the use of an earth wire in domestic circuits. [CBSE Schools 2016-17]  
 (ii) When does short-circuiting occur in domestic circuits? What happens during short circuiting?

9. (i) State Joule's Law of heating. Give any 2 practical applications of heating effect of current.  
 (ii) Two bulbs A and B rated 100 W, 120 V and 60 W, 120 V respectively are connected in parallel across a 120 V source. Find the current flowing through each bulb. Which bulb will glow brighter and why?

[CBSE Schools 2016-17]

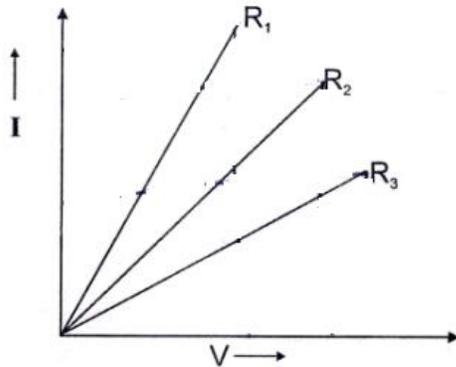
10. In the given figure, the resistance between C and D is:

[CBSE Schools 2016-17]



- (a)  $3\ \Omega$                       (b)  $5\ \Omega$                       (c)  $8\ \Omega$                       (d)  $1\ \Omega$
11. A wire of  $3\ \Omega$  resistance and 5 cm length is stretched to 15 cm length. The new resistance of the wire will be -
- (a)  $9\ \Omega$                       (b)  $11\ \Omega$                       (c)  $\frac{1}{9}\ \Omega$                       (d)  $27\ \Omega$
12. A student carries out an experiment to verify Ohm's law using 3 samples of Nichrome wire. The V-I graphs obtained for all the three are shown below:

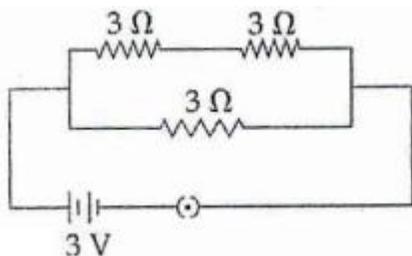
[CBSE Schools 2016-17]



Which of the following relations between their resistances is true for the above mentioned graph?

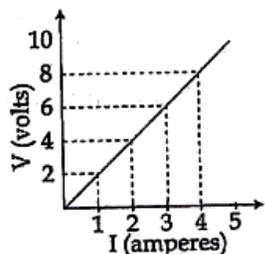
- (a)  $R_1 = R_2 = R_3$                       (b)  $R_1 > R_2 > R_3$                       (c)  $R_3 > R_2 > R_1$                       (d)  $R_2 > R_3 > R_1$
13. An electrical bulb is rated 40 W, 220 V. How many bulbs can be connected in parallel with each other across the two wires of 220 V line if the maximum allowable current is 6 A? [CBSE Schools 2016-17]
14. Calculate the resistivity of the material of a wire of length 1 m, radius 0.01 cm and of resistance 20 ohms. [CBSE Schools 2016-17]
15. (a) Derive the formula for the calculation of work done when current flows through a resistor.  
 (b) One electric bulb is rated 40 W-240 V and other 25 W - 240 V. Which bulb has higher resistance and how many times? [CBSE Schools 2016-17]

16. An electric iron draws 2.2 amperes of current from a 220 V source. Find its  
 (i) resistance and (ii) wattage (Power). [CBSE Schools 2016–17]
17. (a) Define electric current. [CBSE Schools 2016–17]  
 (b) 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 (viii) Wire joint [CBSE Schools 2016–17]
18. Identify the colour change in pH paper when a drop of a sample, which has pH 14 in standard pH-colour chart placed on it. [CBSE Schools 2016–17]  
 (a) Red (b) Yellow (c) Blue (d) Green
19. Write the relation between resistance (R) of filament of a bulb, its power (P) and a constant voltage V applied across it. [CBSE Schools 2016–17]
20. Three resistors of  $3\ \Omega$  each are connected to a battery of 3 V as shown. Calculate the current drawn from the battery. [CBSE Schools 2016–17]

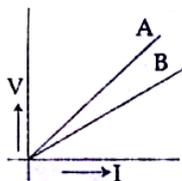


21. What is the function of a Live wire? What is its colour? [CBSE Schools 2016–17]
22. Garima was studying on the terrace of her house. She saw her neighbour screaming and coming out. Garima at once rushed to her neighbour's place and found that the fire was due to short circuit. She advised her neighbour not to throw water on the fire. She at once cut off the electricity supply from the main switch and rang up the fire department.  
 (a) Why did Garima not allow her neighbour to throw water on the fire?  
 (b) What could be the possible cause of fire?  
 (c) What values are imbibed by Garima? [CBSE Schools 2016–17]
23. (a) State the factors on which resistance of a metallic wire depends.  
 (b) What is the unit of resistivity? [CBSE Schools 2016–17]
24. (a) State Ohm's law. Express it mathematically and draw a graph showing V-I relationship.  
 (b) Compute the heat generated while transferring 96000 C of charge in one hour through a potential difference of 50V [CBSE Schools 2015,17]

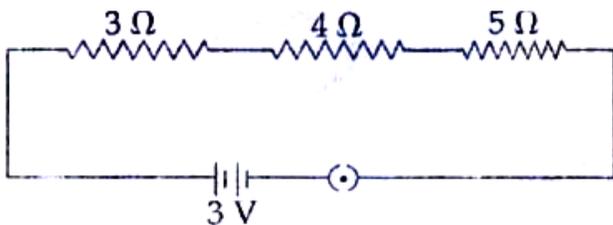
25. Draw a schematic diagram of a circuit consisting a battery of five 2V cells, a 5 ohm, 10 ohm, 15 ohm resistor, a plug key, all connected in series. Calculate the current passing through the circuit when the key is closed. [CBSE Schools 2016-17]
26. A charge of 150 coulomb flows through a wire in one minute. Find the electric current flowing through it. [CBSE Schools 2016-17]
27. 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 of V (in Volts). Find the value of current for V - 10 volts. How can we determine the resistance of the resistor from this graph? [CBSE Schools 2016-17]



28. Give reasons for the following: [CBSE Schools 2016-17]
- It is dangerous to touch the live wire of the main supply rather than neutral wire.
  - In household circuit parallel combination of resistances is used.
  - Using fuse in a household electric circuit is important.
29. What is meant by resistance of a conductor? Name and define its SI unit. List the factors on which the resistance of a conductor depends. How is the resistance of a wire affected if - [CBSE Schools 2016-17]
- its length is doubled,
  - its radius is doubled?
30. Name the safety device used in domestic electric circuit. Explain how it provides safety in our homes while working with electrical appliances. List five precautions that should be observed in a domestic circuit.
31. V - I graphs for two wires A and B are shown in the figure. If both the wires are made of the same material and are of equal thickness, which of the two is of more length? [CBSE Schools 2016-17]

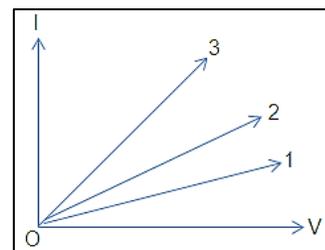


32. Study the following electric circuit and determine the potential difference across 3 Ω resistor. [CBSE Schools 2016-17]



33. We use two expressions: (i)  $H = I^2Rt$ ; (ii)  $H = \frac{V^2}{R}t$  for calculating the energy consumed by a device. Out of these two expressions the first expression indicates that the energy consumed is directly proportional to R whereas the second expression indicates that the energy consumed is inversely proportional to R. How can we explain the seemingly different dependence of H on R in these expressions? **[CBSE Schools 2016–17]**
- The current through a 12 V tungsten filament lamp connected to 12 V battery is 3 A. Calculate (i) the resistance of the filament when in use, and (ii) energy consumed in joules in one hour
34. Explain with the help of an activity that metals conduct electricity. Draw a diagram for the same. **[CBSE Schools 2016–17]**
35. For an electric heater rated 4 kW; 200 V. Calculate:  
(i) the current required (ii) the resistance of the heater  
(iii) the energy consumed in 1 hour **[CBSE Schools 2016–17]**
36. Establish relationship to determine the equivalent resistance R of a combination of three resistors having resistances  $R_1$ ,  $R_2$  and  $R_3$  connected in series. **[CBSE Schools 2016–17]**
- Calculate the equivalent resistance of the combination of three resistors of  $2\ \Omega$ ,  $3\ \Omega$  and  $6\ \Omega$ .  
Joined in parallel.
37. A metal wire has diameter of 0.25 mm and electrical resistivity of  $0.8 \times 10^{-8}\ \Omega\ m$ .  
(a) What will be the length of this wire to make a resistance  $5\ \Omega$ ? **[CBSE Schools 2016–17]**  
(b) How much will the resistance change if the diameter of the wire is doubled?
38. You have two electric lamps having rating 40 W; 220 V and 60 W; 220 V. Which of the two has a higher resistance? Give reason for your answer. If these two lamps are connected to a source of 220V, which will glow brighter? **[CBSE Schools 2016–17]**
39. Obtain an expression for the heat produced in a conductor when a voltage V is applied across it. Heating effect of electric current is desirable as well as undesirable. Explain this statement. **[CBSE Schools 2016,17]**
40. What is meant by resistance of a conductor? Name and define its SI unit. List the factors on which the resistance of a conductor depends. How is the resistance of a wire affected if - **[CBSE Schools 2016–17]**  
(i) its length is doubled, (ii) its radius is doubled?
41. Derive the formula for the heat produced when a current I is passed through a resistor R for time t in an electric circuit. **[CBSE Schools 2016–17]**
42. One of the major causes of fire in office buildings is short circuiting. List three reasons which may lead to short circuiting. How can it be prevented? **[CBSE Schools 2016–17]**

43. State Joules law of heating. Establish the relationship between 1 kWh and 1 joule. A torch bulb is rated 6 V and 750 mA. Calculate the energy consumed by die bulb in 4 hours. **[CBSE Schools 2016–17]**
44. Define kWh or 1 unit. A refrigerator having a power rating of 600 watts operates for 6 hours daily. Calculate the cost of electrical energy to operate it for a month of 30 days. The rate of electrical energy is Rs. 4.80 per kWh. **[CBSE Schools 2016–17]**
45. List any two factors on which resistance of a conductor depends. **[CBSE Schools 2016–17]**
46. In an electric field the work done in bringing a 2 coulomb charge from infinity to a point A is 10 joules and in bringing the same charge to some another point B is 20 joules. Find the potential difference between two points A and B. What would be the work done if the same charge is brought directly from A to B? **[CBSE Schools 2015–16]**
47. Draw diagrams to show series and parallel combinations of resistors. State three salient features each of both the combinations. **[CBSE Schools 2015–16]**
48. Draw a circuit diagram of 10 ohm and 20 ohm resistor connected in series with a battery of 12 V.  
(a) Through which out of 10 ohm and 20 ohm resistor more current will flow?  
(b) Calculate the current flowing through 20 ohm resistor.  
(c) Calculate the potential difference across 10 ohm resistor. **[CBSE Schools 2015–16]**
49. What is short circuit? Why is it dangerous? Write any two precautions which should be taken to avoid short circuit. **[CBSE Schools 2015–16]**
50. (a) What is meant by electric resistance of a conductor? **[CBSE Schools 2015–16]**  
(b) Write the factors on which resistance of a resistor depends?  
(c) Calculate the resistance of a lamp of 36 W connected with 240V.
51. (a) Derive the mathematical expression for the effective resistance of resistors connected in a parallel combination.  
(b) Why are the alloys preferred over pure metals for making elements of heating electrical devices?  
(c) Define SI unit of potential difference. **[CBSE Schools 2014–15]**
52. The V-I graphs of two resistors and their series combination are shown below. Which one of the three graphs represents the series combination of the other two? Give reason for your answer. **[CBSE Schools 2014–15]**
53. State Ohm's law. Draw the circuit diagram to verify this law. **[CBSE Schools 2014–15]**
54. Derive an expression for equivalent resistance when three resistors are connected in a parallel combination. **[CBSE Schools 2013–14]**



55. A potential difference of 250 volts is applied across a resistance of 500 ohms in an electric iron.

Calculate:

(a) Current (b) Heat produced in joules in 10 seconds.

[CBSE Schools 2013–14]

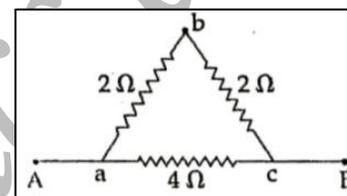
56. Write the relation between resistance (R) of filament of a bulb, its power (P) and a constant voltage V applied across it.

[CBSE Schools 2013–14]

57. When a resistor R is connected to a battery of 3 V, it draws a current I ampere, find the value of R. If a similar resistance is connected in series with it, find the current that will flow through the circuit.

[CBSE Schools 2013–14]

58. With the help of a circuit diagram prove that when a number of resistors are connected in parallel the reciprocal of the equivalent resistance of the combination is equal to the sum of the reciprocals of the individual resistances of the resistors. Find the resistance between A and B in the following network.



[CBSE Schools 2013–14]

59. How many identical 2 V bulbs can be safely connected to a 220 V supply. Explain with the help of a circuit diagrams

[CBSE Schools 2013–14]

60. Write symbols of the following circuit elements:

(i) cell (ii) rheostat (iii) plug key

[CBSE Schools 2014–15]

State the role of these elements in an electric circuit.

61. (a) How does the resistance of a wire change when

[CBSE Schools 2014–15]

(i) its length is tripled ?

(ii) its radius is tripled ?

(iii) its material is changed to one whose resistivity is three times ?

(b) List two reasons why nichrome is used for making heating element of electrical appliances.

62. (i) List three factors on which the resistance of a conductor depends.

(ii) Write the SI unit of resistivity.

[CBSE Schools 2014–15]

63. (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.

(c) An electric bulb is connected to a 220V generator. The current is 2.5 A.

Calculate the power of the bulb.

[CBSE Schools 2014–15]

64. How much current will an electric bulb draw from 220 V source if the resistance of the bulb is

1200 Ω? If in place of bulb, a heater of resistance 100 Ω is connected to the sources calculate the current drawn by it.

[CBSE Schools 2013–14]

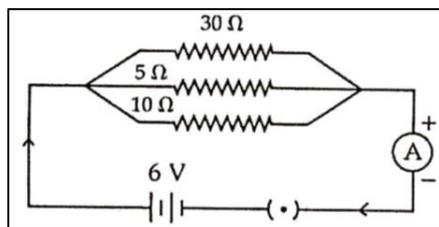
65. (i) Calculate the electrical energy consumed by a 1200 W toaster in 30 minutes,

(ii) What will be the cost of using the same, if one unit of electricity costs Rs. 4 [CBSE Schools 2013–14]

66. For the circuit diagram given above calculate:

- Value of current flowing through each resistor,
- The total current in the circuit,
- The total resistance of the circuit.

[CBSE Schools 2013-14]



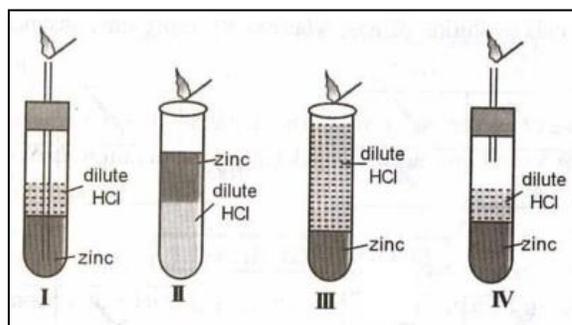
67. Fuse of 3A, 5A and 10A are available. Calculate current and select the fuse for operating electric iron of 1 kW power at 220 V line.

[CBSE Schools 2013-14]

### MCQs [Practical Based Questions]

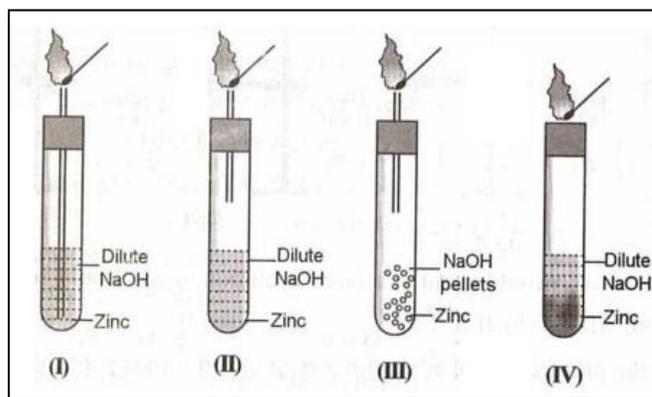
- Four students were given colourless liquids A, B, C, and D of water, lemon juice and a mixture of water and lemon juice respectively. After testing these liquids with pH paper, following sequences in colour change of pH paper were reported.  
I. Blue, Red and Green II. Orange, Green and Green  
III. Green, Red and Red IV. Red, Red and Green.  
The correct sequence of colours observed is :  
(a) I (b) II (c) III (d) IV.
- Four solutions I, II, III and IV were given to a student to test their acidic or basic nature by using a pH paper. He observed that the colour of pH paper turned to Red, Blue, Green and Orange respectively when dipped in four solutions. The correct conclusion made by the statement would be that :  
(a) I, II and III are acidic (b) I and IV are acidic  
(c) II, III and IV are basic (d) II and IV are basic.
- A student was given four unknown colourless samples labelled A, B, C and D and asked to test their pH using pH paper. He observed that the colour of pH paper turned to light green, dark red, light orange and dark blue with samples A, B, C and D respectively.  
The correct sequence of increasing order of the pH value for samples is :  
(a)  $A < B < C < D$  (b)  $A < D < C < B$  (c)  $C < B < A < D$  (d)  $P < C < A < D$ .

4. A drop of colourless liquid was placed on blue litmus paper. The litmus paper turned red. The liquid could be:
- (a) dilute hydrochloric acid                      (b) dilute sodium hydroxide solution  
(c) distilled water                                      (d) sodium bicarbonate solution.
5. The colour of the pH paper strip turned red when it was dipped into a sample. The sample could be :
- (a) dilute sodium bicarbonate solution                      (b) tap water  
(c) dilute sodium hydroxide solution                      (d) dilute hydrochloric acid.
6. A student dips pH papers in solutions A and B and observes that the pH paper turns blue and orange respectively in them. He infers that,
- (a) A is acetic acid; B is sodium carbonate solution.  
(b) A is sodium carbonate solution; B is acetic acid.  
(c) A is HCl solution; B is NaOH solution.  
(d) A is oxalic acid solution; B is sodium carbonate solution.
7. A student added dilute HCl to a test tube containing zinc granules and made following observations :
- I. the zinc surface became dull and black  
II. a gas evolved which burnt with a pop sound  
III. the solution remained colourless.
- The correct observations are :
- (a) I and II                      (b) I and III                      (c) II and III                      (d) I, II and III.
8. Dilute hydrochloric acid is added to solid sodium carbonate. It is observed that .
- (a) no change takes place                      (b) a loud sound is produced  
(c) brisk effervescence occurs (d) the solution turns blue.
9. Your set-ups as given below were arranged to identify the gas evolved when dilute Hydrochloric acid was added to Zinc granules. The most appropriate set-up is :



- (a) I                      (b) II                      (c) III                      (d) IV

10. Which one of the following set-ups is the most appropriate for the evolution of hydrogen gas and its identification?



(a) (I)

(b) (II)

(c) (III)

(d) (IV)

### ANSWERS

1.	c	2.	b	3.	d	4.	a	5.	d
6.	b	7.	d	8.	c	9.	d	10.	b

## Chapter Test

Maximum Marks 30

Maximum Time: 1hr.

1. How do we connect a (a) ammeter and (b) voltmeter? [2]
2. Define the term coulomb. Calculate the amount of charge passing through a conductor in 10 min if current is 100mA. [2]
3. A 1m long and 0.2 mm thick wire has resistance 20 ohm. Find resistivity of material of the wire. [2]
4. Define resistance. State its SI unit. How does resistance vary with length and area of cross-section of the wire? [2]
5. Draw a circuit diagram of an electric circuit containing a cell, a key, an ammeter, a resistor of  $2\Omega$  in series with a combination of two resistors ( $4\Omega$ . each) in parallel and a voltmeter across the parallel combination. Will the potential difference across the  $2\Omega$  resistor be the same as that across the parallel combination of  $4\Omega$  resistors? Give reasons. [3]
6. State Ohm's law. How can it be verified experimentally? Does it hold good in all conditions? [3]
7. Define 1 volt. How are work, charge and potential difference related? A current of 4 mA flows for 5 min through a circuit for which 80 J of work is done. Find the potential difference. [4]
8. A household uses the following electric appliances [4]
  - (a) refrigerator of rating 400 W for 10 hours each day.
  - (b) two electric fans of rating 80 W each for 6 h daily.
  - (c) six electric tubes of rating 18 W each for 6 h daily.Calculate the electricity bill for the household for month of June if cost of electrical energy is Rs. 3.00 per unit.
9. Which devices are connected in parallel and in series to the resistor combination and why? Draw a circuit diagram to find equivalent resistance of two resistors  $R_1$  and  $R_2$  connected in parallel. [4]
10. What is the commercial unit of energy? Derive its relation with SI unit of energy. A bulb is marked 25 W, 220 V. It is used for 10 h daily. Calculate its resistance, while glowing and energy consumed in kWh per day. [4]

## Answers

1. (a) In series (b) In parallel.      2. 60 C.      3.  $6.28 \times 10^{-4}$  ohm.  
5. Yes.      7. 66.67 V.      8. Rs. 504.72.      10. 1936 ohm

For Solutions: [www.pioneermathematics.com/latestupdates](http://www.pioneermathematics.com/latestupdates)