

**Instructions:**

- ✓ Read the chapter in your book - quickly and thoroughly, preferably more than once.
- ✓ Watch the uploaded video classes from School's Website/YouTube channel.
- ✓ For becoming more clear about the basics, watch more than once, if needed.
- ✓ For any difficulty in understanding, contact me.

**(Questions given in this worksheet are important questions for all exams)**

**CHAPTER 11 : CURRENT ELECTRICITY****Cognitive Questions (Mark 1)****1. What is electric current?**

Ans.: The amount of charge that flows in unit time through any cross section of a conductor is called electric current.

**2. What is resistance?**

Ans.: The property of a conductor for which the electric current gets obstructed is called resistance.

**3. Write down the statement of Ohm's Law.**

Ans.: Ohm's Law - "The current passing through a conductor at constant temperature is directly proportional to the potential difference between the two ends of the conductor."

**4. What is electromotive force?**

Ans.: The work done by an energy source to drive a positive unit charge around a circuit from one point back to the same point is called electromotive force of that source.

**5. What is an electric circuit?**

Ans.: The complete path through which electric current can flow is called electric circuit.

**6. What is called specific resistance?**

Ans.: At a particular temperature, the resistance of a conductor of unit length and unit cross sectional area is called the specific resistance of that material at that temperature.

**7. What is rheostat?**

Ans.: A rheostat is a variable resistor which is used to control current.

**8. What is called electric potential?**

Ans. The work done to bring a positive charge from an infinite distance to any point of the electric field is called the electric potential of that point.

**9. What is called 1A?**

Ans.: The flow of electric charge across a surface at the rate of one coulomb per second is called 1A.

**10. Define Watt. (What do you mean by 1 Watt?)**

Ans.: 1 Joule amount of work done or energy spent in 1 second is called 1 Watt.

**11. What is kilowatt-hour?**

Ans.: The amount of electrical energy converted or spent when an electric device of 1 kilowatt power works for 1 hour is called 1 kilowatt-hour.

**12. What is B.O.T.?**

Ans.: The amount of electric energy converted or spent when an electric device of 1 kilowatt power works for 1 hour is called 1 kilowatt-hour or Board of Trade or B.O.T. in short.

**13. What is series circuit?**

Ans.: The circuit in which the electric components are connected one after another in a single loop is called a series circuit.

**14. What is parallel combination of resistance?**

Ans.: When several resistances are connected in such a way that one terminal of all the resistances are joined at a common point and the other terminals are joined at another point and potential difference across each of the resistors remains the same, then this combination of the resistances are called parallel combination of resistances.

**15. What is equivalent resistance?**

Ans.: If a single resistance is used instead of combination of resistances and if the current and potential difference is not changed in the circuit, then that resistance is called the equivalent resistance of the combination.

### Analytical Question (Mark-2)

**1. Why resistance of conductor increases subject to increasing of temperature? Explain.**

Ans.: When temperature increases the free electrons of the conductor get excited and their kinetic energy increases. As a result, when the electrons move within the bulk of a conductor, they collide with the atoms and molecules of the conductor. Due to this, their motion is resisted and the resistance increases.

**2. Why more current flows through the wider wire in compare to narrow wire? Explain.**

Ans.: Area of cross-section of wider wire is more than that of narrow wire. As a result, resistance of the wider wire is lesser. Again, current flows more through wire whose resistance is comparatively low. So, more current flows through wider wire.

**3. Why is nichrome wire used in electric heater?**

Ans.: The resistivity and melting point of nichrome wire is much higher than that of copper. Due to the high resistivity of nichrome, a lot of thermal energy is produced when a current flows through it. This property of nichrome cause water to boil very quickly in electric heater. That is why nichrome wire is used in electric heater.

**4. Explain Ohm's Law.**

Ans.: Let AB be a conductor. Potential at A and B are  $V_A$  and  $V_B$  respectively. If  $V_A > V_B$ , then the potential difference between two ends of the conductor will be  $V = V_A - V_B$  and current will flow from A to B.

Now, at constant temperature from Ohm's Law

$$I \propto V$$

$$\text{or, } \frac{V}{I} = R = \text{Constant}$$

This constant is called resistance of the conductor at that temperature. Thus according to Ohm's Law, if the potential difference between the ends of the conductor is doubled current through it will be doubled.

**5. Write down the role of circuit breaker and fuse in the circuit.**

Ans.: Circuit breakers are used as a safety device. Circuit breaker switches off the electrical supply in a circuit when there is an over flow of current. Circuit breaker

disconnect the electric supply in a definite part of the house. Without circuit breaker in a circuit, this excessive current can cause damage to home appliances.

Fuse is used as a safety device. A fuse is included in an electrical circuit to prevent excessive current flow. The fuse become hot and melts when the electric current flowing through it is greater than a definite value. As a result, the circuit is disconnected and the electrical appliances will be safe. For this reason, fuse is used in circuit.

### 6. What is system loss of electricity? How can system loss be reduced?

Ans.: Conducting wires used to carry electricity from one place to other. During this flow of electricity through resistance, heat is created and this loss of energy is called system loss.

System loss can be decreased by increasing the voltage of the transmission line. Due to the transmission of electricity at high voltage, the loss that occurs due to the power grid or of conductor is decreased to a great extent. For a definite amount of electrical energy, the value of the electric current becomes lower due to high voltage transmission.

### 7. What is the meaning of specific resistance of silver is $1.6 \times 10^{-8} \Omega \text{m}$ ?

Ans.: At a fixed temperature, the resistance of a wire with unit length and unit cross-sectional area is called the relative resistance of that wire. so, the relative resistance of silver is  $1.6 \times 10^{-8} \Omega \text{m}$  means the resistance of a silver wire of 1m length and  $1 \text{m}^2$  cross-sectional area is  $1.6 \times 10^{-8} \Omega$ .

### 8. Value of electromotive force is always greater than potential difference in a closed circuit. Explain.

Ans.: If resistance R is connected to a cell with electromotive force E and internal resistance r, then flow of current in the circuit,

$$I = \frac{\text{Electromotive Force (E)}}{\text{Total Resistance (R + r)}}$$

$$\text{or, } I = \frac{E}{R + r}$$

$$\text{or, } E = IR + Ir$$

$$\text{or, } E = V + Ir \quad \left| \begin{array}{l} \text{Here, } V = IR \\ \text{Voltage fall in Ir circuit} = V' \end{array} \right.$$

Now, when current flows through the cell, flow of current is disrupted due to difference of chemical matter inside cell.  $V' = Ir$  amount of voltage falls to bypass with disruption or the internal resistance.

So,  $E = V + V'$ , since  $V' \neq 0$ , so  $V < E$

As a result, potential difference of the two ends of resistance is less than the electromotive energy of the cell.

**9. What is the reason for low resistance use in earth connecting wire? Explain.**

Ans.: Electric charge accumulates in the metal parts of different electrical machines for different reasons. The metal parts of the machines are connected to the ground so that the accumulated charges can easily go to the ground, this prevent any accident when someone touches the metal parts. In case of ideal ground connection, the resistance of the connecting wire should be zero, otherwise the machines will be in a certain potential difference from the ground which can electrocute anyone touching the machines. But in reality, a wire with zero resistance does not exist. That is why wires with really low resistance are used in this case.

**10. Why is the electric potential of earth considered as zero?**

Ans.: The earth is so big that if charge is added or taken away from it then its potential does not change at all. The earth always takes charge from different bodies and simultaneously it supplies charge to other bodies. Here earth is considered charge less. To determine the potential of a body, the potential of earth is taken as zero.

**11. Why does resistance increase in resistor but decrease in semiconductor with increase of temperature?**

Ans.: If the temperature of a resistor is increased, its resistance increase, but the case is opposite for a semiconductor. The resistance decreases if the temperature goes up in a semiconductor. The reason is, there are free electrons in a resistor for the flow of current, but a semiconductor does not have free electrons. If the temperature is raised, some electrons are found for the flow of current, so a temperature rise causes the decrease of resistance of a semiconductor.

**12. If a wire's length is increased, what kind of change will occur to its resistance? Explain it.**

Ans.: The resistance of a conductor depends on its length and cross-sectional area. The greater the length the greater its resistance. Again, the greater the cross-sectional area of a wire, the lower its resistance. Because the wire's length is increased uniformly by pulling it, so, with the increase of its length, its resistance will increase. Again, its cross-sectional area will decrease, so, its resistance will

increase. Therefore, the thin wire's resistance will be greater than that of the thick wire. So, in this case, when the wire's length is increased uniformly by pulling it, its resistance will increase.

**13. What should be the correct connection of switch in electronic device? Explain.**

Ans.: There are always two wires in an electric supply line, one with high potential (Live Wire) and another is voltage-less neutral (Neutral Wire). When a machine is used, then starting from the live wire the electricity passes through the machine and then returns back to the source through the neutral wire. A voltage-less neutral wire is safe, but a high voltage wire should be used cautiously. When a switch is used to connect electricity to a machine, it can be connected with a high voltage wire or a neutral wire. It is wise to connect the switch with the high voltage wire. Then high voltage will enter the machine only when the switch is on. When the switch is off, there will be no high voltage inside the machine.

**14. Why grounding is necessary in house wiring?**

Ans.: Earthing is the process of creating an alternative path for the flow of faulty/excessive current safely into the ground in the presence of minimal resistance or impedance. The primary purpose of earthing is to reduce the risk of serious electric shock from current leaking into un-insulated metal parts of an appliance, power tool, or other electrical devices.

**15. What change will come in resistance if an electric wire of 100m is cut into two pieces of same length? Explain.**

Ans.: Since resistance is directly proportional to the length, so far a wire of length 100m when cut into two equal pieces, then the magnitude of new resistance will be half of the initial magnitude of resistance.

**16. Why voltmeter is used in parallel in a circuit?**

Ans.: Voltmeter is connected in parallel with circuit elements because it is used to measure the device's voltage. If it is connected in series, then it will change the value of potential difference which will minimize the current in the circuit as it has very large resistance and hence will give faulty reading.

**17. Write down the difference between electromotive force and potential difference.**

Ans.: The differences between electromotive force and potential difference are as follows:

<b><i>Electromotive force (E)</i></b>	<b><i>Potential difference (V)</i></b>
<b>i.</b> It is the source of current, such as - cell, generator etc.	<b>i.</b> It is the two points of a conductor.
<b>ii.</b> It is the cause of potential difference of	<b>ii.</b> It is the result of the electromotive force.
<b>iii.</b> It is greater than the potential difference between two points.	<b>iii.</b> It is lesser than the electromotive force between any two points of the circuit.

### 18. Write down the difference between Ammeter and Voltmeter.

Ans.: The differences between Ammeter and Voltmeter are as follows:

<b><i>Ammeter</i></b>	<b><i>Voltmeter</i></b>
<b>i.</b> It is used to measure the flow of current.	<b>i.</b> It is used to measure the potential difference between two points.
<b>ii.</b> It is connected in series with the circuit.	<b>ii.</b> It is connected in parallel with the circuit.
<b>iii.</b> Resistance of ammeter is zero.	<b>iii.</b> Resistance of voltmeter is infinity.

### 19. If the temperature of a copper wire increases, then what will happen to its resistivity? Explain it.

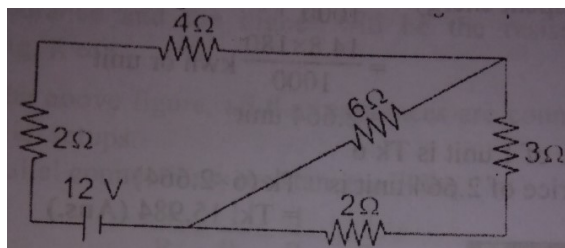
Ans.: If the temperature of a copper wire increases then its resistance will increase too. We know that, when temperature increases, the intermolecular kinetic energy of the body increases. As a result, the flow of electrons that is electric current is obstructed. That's why the resistance of copper increases.

## Creative Questions

### (Solve yourself)

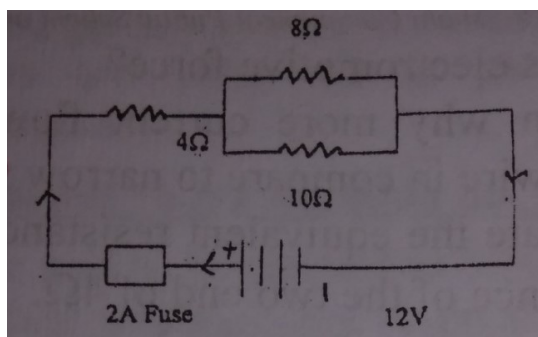
- 1.** Alvi uses a bulb of 220V-100W during his study for 3 hours daily. His brother Alif uses a table lamp of 220V-40W for 4 hours daily. The cost of each unit of electrical energy is 3.5 taka.
  - a) Determine the current of the lamp used by Alif.
  - b) Who is more economical, Alvi or Alif (considering money)? Analyze with mathematical arguments.

2. Observe the following figure carefully and answer to the given questions.



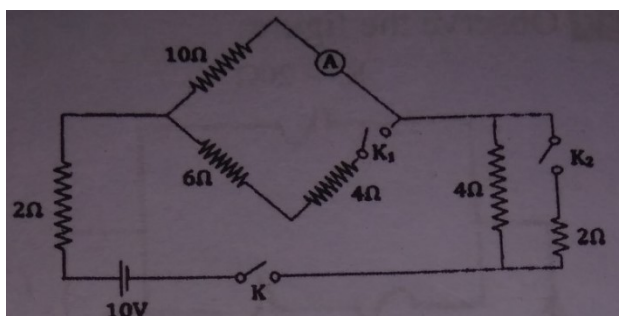
- Calculate the equivalent resistance and potential difference of the two ends of  $4\Omega$ .
- What amount of money is to pay as electric bill for one month if the given circuit run 6 hours per day? (Price per unit Tk. 6, 1 month = 30 days).

3. Observe the following figure carefully and answer to the given questions.



- Calculate the equivalent resistance of the circuit.
- If all resistances in the stem are connected in parallel, will the fuse be burnt for produced electricity? Explain.

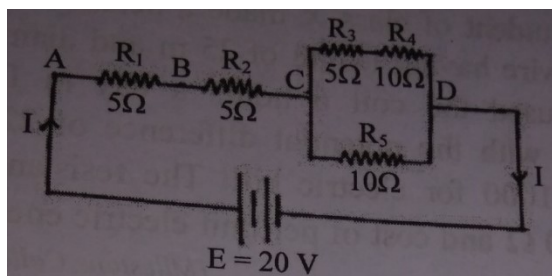
4. Observe the following figure carefully and answer the questions.



- If the keys  $K$  and  $K_2$  are closed and  $K_1$  is opened, then determine ammeter reading.
- If the keys  $K$  and  $K_1$  are locked and  $K_2$  is open, then what percentage of current will change? Analyze mathematically.

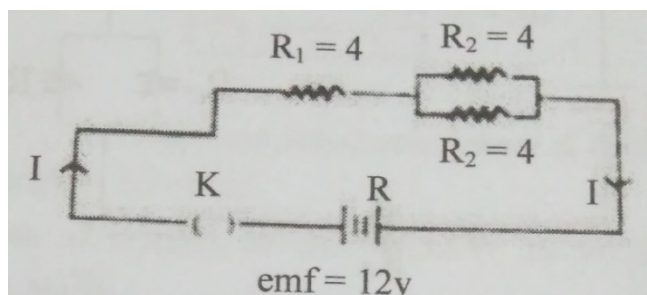


5. Observe the following figure carefully and answer the questions.



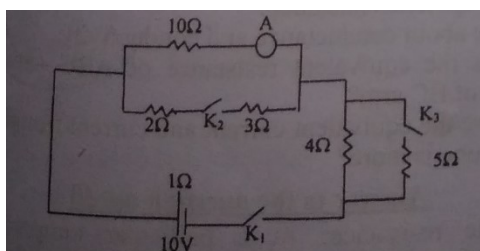
- Determine the equivalent resistance of the circuit.
- Which one is more powerful among the resistances  $R_2$ ,  $R_3$ ,  $R_4$  and  $R_5$ ? Analyze mathematically.

6. Observe the following figure carefully and answer the questions.



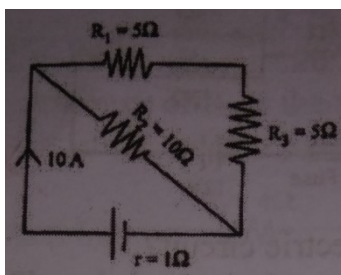
- Find out the equivalent resistance of the circuit.
- Will be the electric current through  $R_1$ ,  $R_2$  and  $R_3$  same or not? Analyze mathematically.

7. Observe the following figure carefully and answer the questions.



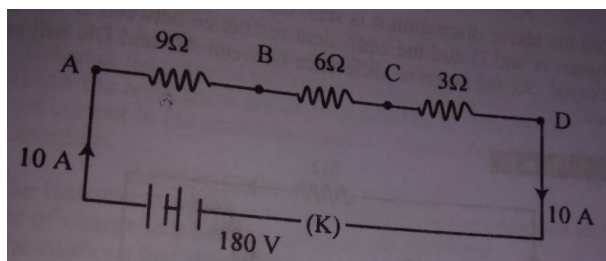
- If the keys  $K_1$  and  $K_3$  are closed and  $K_2$  is opened, what will be the flow of current?
- If the keys  $K_1$  and  $K_2$  are closed and  $K_3$  is opened, how many times the flow of current will be which was mentioned before?

- 8.** Observe the following figure carefully and answer the questions.



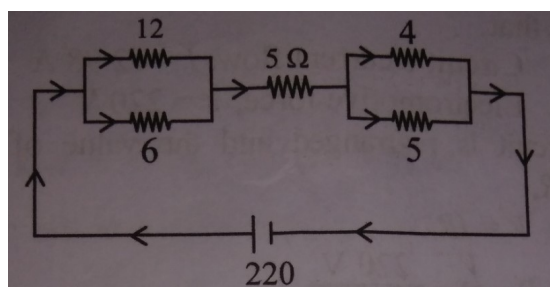
- Determine the difference between E and V. (Where E and V represents usual symbol.)
- Is it possible to get double electric current by rearranging the resistors? Explain with mathematical logic.

- 9.** Observe the following figure carefully and answer the questions.



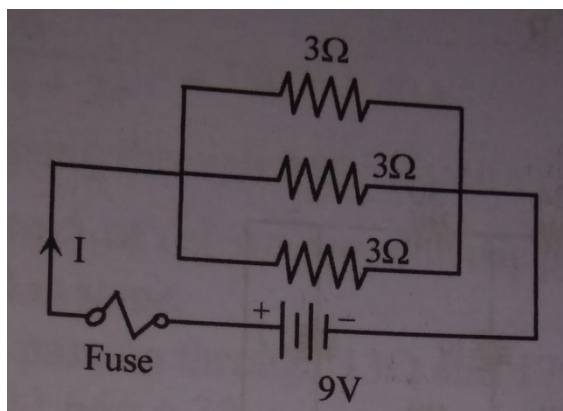
- Determine the potential difference of point A and Point B of the cell.
- Explain using mathematical explanation, what will happen to the flow of current if all the resistors are connected in a parallel manner by keeping the voltage fixed.

- 10.** Observe the following figure carefully and answer the questions.



- Determine the equivalent resistance of the above circuit.
- How are the resistances of the circuit of stem rearranged so that the flow of current will be 12.98A? Draw the circuit by analyzing mathematically.

**11.** Observe the following figure carefully and answer the questions.



- Calculate equivalent resistance of above circuit.
- Without changing the value of resistance to get 2A current in the circuit, how the resistances will be rearranged? Explain with diagram.

### MCQs

#### (Solve Yourself)

- Which one is used in three-pin plugs?
  - circuit breaker
  - switch
  - fuse
  - earth wire
- Which of the following is conductor?
  - human body
  - wood
  - paper
  - plastic
  - a)
- Which of the following is insulator?
  - human body
  - soil
  - glass
  - iron
- Which substance has least specific resistance?
  - silver
  - copper
  - tungsten
  - nichrome

- 5.** If the resistance of a wire is  $5\Omega$  then what will be the conductance?  
 a)  $0.1\Omega^{-1}$   
 b)  $0.2m\Omega^{-1}$   
 c)  $0.2\Omega^{-1}$   
 d)  $4\Omega^{-1}$
- 6.** What is the resistivity of tungsten?  
 a)  $1.7 \times 10^{-8}\Omega m$   
 b)  $1.6 \times 10^{-8}\Omega m$   
 c)  $5.5 \times 10^{-8}\Omega m$   
 d)  $100 \times 10^{-8}\Omega m$
- 7.** Which relation is correct in calculation of electrical energy spent?  
 a)  $W = I^2Rt$   
 b)  $W = IRt$   
 c)  $W = \frac{Vt}{R}$   
 d)  $W = \frac{Vt}{R^2}$
- 8.** On the body of an electric bulb 60W-220v is written. What is the resistance of the bulb?  
 a)  $16.36\Omega$   
 b)  $160\Omega$   
 c)  $280\Omega$   
 d)  $806.67\Omega$
- 9.** The potential difference between two ends of filament of a bulb is 12v and it's resistance is  $4\Omega$ . What is the flow of current?  
 a) 3A  
 b) 4A  
 c) 8A  
 d) 10A
- 10.** How much joule is equal to one-watt hour?  
 a) 3600j  
 b) 3500j  
 c) 3200j  
 d) 3000j
- 11.** Usually which type of filament is used in electrical bulb?  
 a) tungsten  
 b) nichrome  
 c) copper  
 d) aluminum
- 12.** Which one's resistivity is the most?  
 a) nichrome  
 b) copper  
 c) silver  
 d) tungsten
- 13.** What is the relation between the potential difference (V) of the two terminals of a conductor and flow of current (I)?  
 a)  $V = \frac{I}{R}$   
 b)  $I = \frac{R}{V}$   
 c)  $R = \frac{I}{V}$   
 d)  $R = \frac{V}{I}$
- 14.** What will happen to the value of resistance of a conductor when its cross-sectional area is reduced to half?  
 a) increases 2 times  
 b) decreases 2 times  
 c) increases  $\frac{1}{2}$  times  
 d) decreases  $\frac{1}{2}$  times

- 15.** When  $50\Omega$  conductor wire is cutting half, what will be resistance of each part?
- $100\Omega$
  - $50\Omega$
  - $25\Omega$
  - $12.5\Omega$
- 16.** Which one is a good conductor?
- wood
  - copper
  - water
  - rubber
- 17.** How many power consumes an electric fan?
- (60-70)w
  - (65-75)w
  - (70-80)w
  - (80-90)w
- 18.** What will be the conductivity if any conductor is placed in a potential difference of 220v with resistance of  $0.25\Omega$
- $880\Omega^{-1}$
  - 880A
  - $4\Omega^{-1}$
  - 4A
- 19.** What is the conductivity of nichrome?
- $100 \times 10^{-8}(\Omega m)^{-1}$
  - $100 \times 10^8(\Omega m)^{-1}$
  - $1 \times 10^6(\Omega m)^{-1}$
  - $10 \times 10^6(\Omega m)^{-1}$
- 20.** At constant temperature if the potential difference of a conductor made twice then what will be the increase of flow of current?
- $\frac{1}{4}$  times
  - $\frac{1}{2}$  times
  - 2 times
  - 4 times
- 21.** If 1 ampere (1A) current flows through a conductor for 1 second (1s) then which one is correct?
- 1J
  - $1As^{-1}$
  - 1c
  - 1v
- 22.** Opposite quantity of conductivity is called -
- specific resistance
  - resistivity
  - resistance
- Which of the following is correct?
- i and ii
  - i and iii
  - ii and iii
  - i, ii and iii
- 23.** Resistance of copper will increase when -
- temperature is increased
  - length is increased
  - cross-sectional area is increased
- Which one is correct?
- i and ii
  - i and iii
  - ii and iii
  - i, ii and ii

**24.** What is the cause of using circuit breaker in a circuit?

- for safety
- for decreasing electric cost
- for increasing voltage
- for increasing electric flow

**25.** If the same value of three bulbs are connected parallel in a circuit -

- each bulb will give same light
- if one bulb is damaged, other bulbs will be serviceable
- potential difference will be one-third of each bulb

Which of the following is correct?

- i and ii
- i and iii
- ii and iii
- i, ii and iii

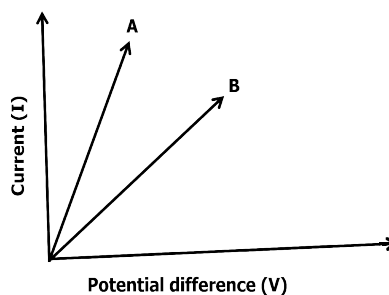
**26.** It is dangerous to stay under any tree during storm and rain since -

- electricity always passes following the shortest path.
- soil and water are electric conductor.
- electricity passes on earth through an object of high position.

Which one of the following is correct?

- i and ii
- i and iii
- ii and iii
- i, ii and iii

**27.**



In case the electric conductor marked above with 'A' and 'B'

- A is a better conductor than B
- B is a better conductor than A
- Resistance of B is greater than that of A

Which of the following is correct?

- i and ii
- ii and iii
- i and iii
- i, ii and iii

**28.** For decoration purpose in wedding ceremony, the circuit used is -

- series circuit
- parallel circuit
- parallel combination circuit

Which one is correct?

- i
- ii
- i and ii
- i, ii and iii

**Follow the stem and answer the question no. 29 and 30.**

In a house daily two rice cooker 484w and two water heater 605w of 220v are used for 5 hours.

**29.** What is the unit consumption per day?

- a) 10.89
- b) 89.10
- c) 11.98
- d) 98.10

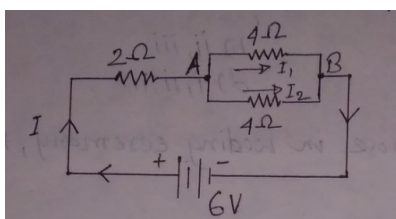
**30.** For the circuit of the stem -

- i. The current flow is 9.9A
- ii. The fuse is suitable of 12A
- iii. Equivalent resistance is  $22.22\Omega$

Which of the following is correct?

- a) i and ii
- b) ii and iii
- c) i and iii
- d) i, ii and iii

**Follow the circuit and answer the questions no. 31 and 32**



**31.** What is the voltage between point A and B?

- a) 2v
- b) 3v
- c) 4v
- d) 6v

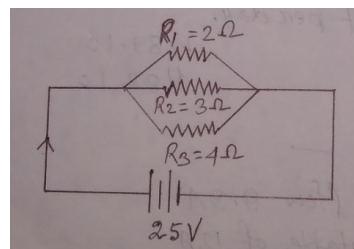
**32.** In case of current flowing in the circuit of above stem -

- i.  $I = I_1 = I_2$
- ii.  $I_1 = I_2$
- iii.  $I > I_2$

Which one is correct?

- a) i and ii
- b) ii and iii
- c) i and iii
- d) i, ii and iii

**Follow the circuit and answer the questions no. 33 and 34**



**33.** What is the equivalent resistance in ohm?

- a) 1.083
- b) 1.83
- c) 1.00
- d) 0.923

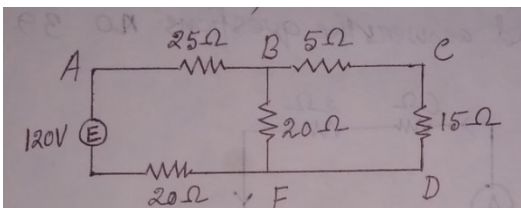
**34.** If all the resistances are connected in series combination then the electric current -

- i. will decreased
- ii. will increased
- iii. will remain unchanged

Which one is correct?

- a) i
- b) ii
- c) iii
- d) i, ii and iii

Follow the circuit carefully and answer the questions no. 35 and 36



**35.** What is the resistance across AF?

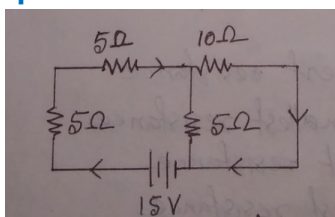
- $40\Omega$
- $35\Omega$
- $30\Omega$
- $25\Omega$

**36.** Calculate the current flowing through

the circuit -

- 0.12A
- 0.20A
- 2.2A
- 2.8A

Follow the circuit carefully and answer the questions no. 37 and 38



**37.** What is the equivalent resistance of the circuit?

- $7.5\Omega$
- $13.33\Omega$
- $17.5\Omega$
- $25\Omega$

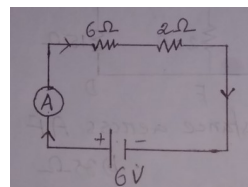
**38.** If  $10\Omega$  resistance is removed from the circuit, then -

- flow of current will be decreased
- equivalent resistance will be increased
- potential difference of the two terminals of each resistance will be equal.

Which one is correct?

- i and ii
- ii and iii
- i and iii
- i, ii and iii

Follow the circuit carefully and answer the questions no. 39 and 40.



**39.** What is the reading of the ammeter in ampere?

- 4
- 3
- 1.33
- 0.75

**40.** If all resistors are connected in parallel combination and then what will be the value of equivalent resistance?

- larger than the largest resistance
- smaller than the smallest resistance
- equal to the largest resistance
- equal to the smallest resistance



**CHAPTER 12 : MAGNETIC EFFECTS OF CURRENT****Cognitive Questions (Mark 1)****1. What is electromagnetic induction?**

Ans.: During the time of changing the magnetic field in a coil of wire, the generation of voltage and current in the coil is called electromagnetic induction.

**2. What is solenoid?**

Ans.: Solenoid is a cylindrical coil of wire which creates magnetic field like a bar magnet when electricity flows in it.

**3. What is the magnetic effect of current?**

Ans.: When current flows through a conductor, a magnetic field is produced around it which is called the magnetic effect of current.

**4. Who invented the magnetic effect of current?**

Ans.: Oersted invented the magnetic effect of current.

**5. What is electric motor?**

Ans.: An electric motor is a motor which transforms electrical energy into mechanical energy.

**6. What is generator?**

Ans.: The machine which transforms mechanical energy into electrical energy is called generator.

**Analytical Question (Mark-2)****1. How can you increase the strength of an electromagnet?**

Ans.: The strength of an electromagnet can be increased in following ways -

- i. By using soft iron core.
- ii. By increasing flow of current.
- iii. By increasing number of coil of solenoid.
- iv. By bending the iron rod in the form of alphabet 'U' and keeping two ends of 'U' as close as possible.

## 2. What do you mean by induce current and induce voltage?

Ans.: The process of creating electric current by changing the distance of the circuit which can create voltage temporarily to another closed circuit is called electromagnetic induction.

This voltage is known as an induced voltage and the current is known as an induced current.

## 3. Why motor is called the opposite instrument of generator?

Ans.: Even though the structure of motor and a generator is same, since their type of work is different. So a motor is also called the opposite instrument of a generator. Motor changes electric energy to mechanical energy. On the other hand, generator changes mechanical energy to electric energy. Again, motor is made by using the effect of magnetic field on a conducting wire. On the other hand, generator is made based on the law of electromagnetic induction.

## 4. Why electric motor is used in electric fan? - Explain.

Ans.: In an electric motor there is an armature capable of rotation which is surrounded by several turns of coil. This armature is placed inside a permanent magnet. When electricity is passed through the coil, the current passing through the coil creates a magnetic field. The armature rotates due to the interaction of this induced magnetic field and the magnetic field of the permanent magnet.

If this armature is connected to a shaft, it will also rotate. Several arms are then connected to the shaft to build electric fans. Thus electric fan rotates when electricity is supplied to the motor connected to it.

## 5. How can we increase induced current?

Ans.: Induced current can be increased in the following ways:

- i. Increasing the strength of magnet.
- ii. Increasing the number of turns of coil.
- iii. Moving the magnet more faster.

## 6. Why is electric current reduced for transmission of electricity over long distances?

Ans.: In case of transmitting electricity over long distances, electric current is reduced due to energy loss from heat and system loss of electricity. The more current flows in the lines used to send electricity over long distances, the more it heats up. This heat energy spreads to the surrounding air. Electricity is used and wasted to create heat energy. Besides, the more the lines heat up, their resistances increase as well. This is why electric current is reduced for transmission of electricity over long distances.

### 7. Why transformer is used in transmitting electricity?

Ans.: A transformer acts as a medium of step up or down voltage which is required to efficiently transfer electric power over long distances.. To transmit a fixed amount of power at a higher voltage will give us less of current flowing through the transmission wires. At power station, step up transformers are used to produce very high voltage needed to transmit electricity through the national grid power lines. These high voltages are too dangerous to use in home, so step down transformers are used locally to reduce the voltage to safe levels. So transformers are used in transmitting electricity.

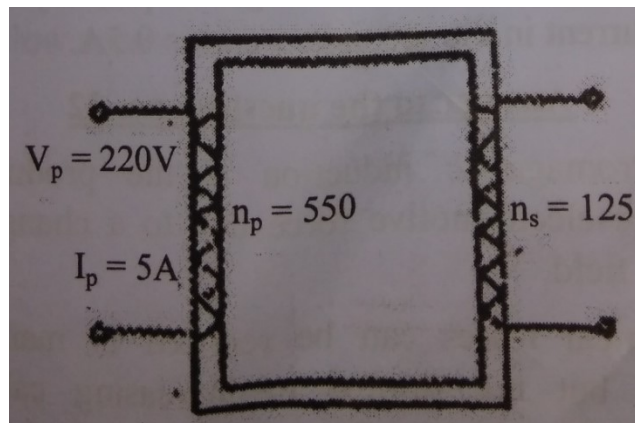
### 8. Which transformer is used for current flowing and why? Explain.

Ans.: Step up transformer is used for current flowing. Because this transformer converts the high potential less electric current into low potential high electric current. Since, in the residential areas, sufficient current is required at a low voltage. Step down transformer is used here for supplying current.

### Creative Questions

(Solve Yourself)

1. Observe the following figure carefully and answer the questions.

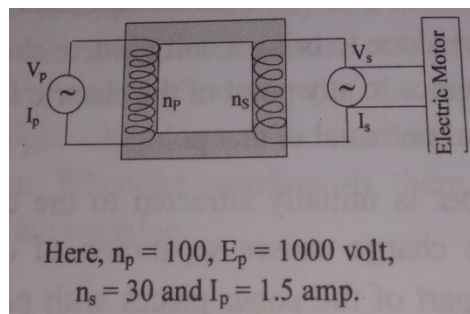


- Calculate the voltage of secondary coil.
- From the stem, mathematically show that the total power in the primary coil is equal to that of the secondary coil.

**2.** The ratio of the number of turns of the primary and secondary coil of a transformer is 1:50. The electric current and voltage of the primary coil is 5A and 220V respectively.

- Find  $E_p : E_s$  according to the stem.
- From the stem mathematically show that the electric power of the primary and secondary coil of the transformer remains constant.

**3.** 2HP electric motor is connected by secondary coil of a step down transformer. Below the level diagram of the transformer:



- Determine the resistance of the principal coil.
- Whether it is capable to run the electric motor by the transformer that mentioned in the stem? analyze mathematically.

**4.** The number of turns of primary and secondary coil in a transformer are 500 and 2000 respectively. The voltage of the secondary coil is 800V. The current passing through the primary coil is 4A.

- Calculate the voltage in the primary coil and current in the secondary coil of the given stem.
- Is it possible to operate an electric motor of 1KW connected with the secondary coil? Explain mathematically.