Provincial Educational Department – Sabaragamuwa – Weekly School

Subject - Science

Week - October 4 - 8

Grade - 11

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Direct current motor

- Equipment operated by direct current motors.

  1. …… 2. …….. 3. …….

- The diagram shows an apparatus made by grade 11 students to demonstrate the action of a direct current motor.

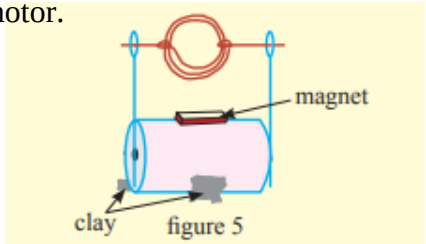


figure 5

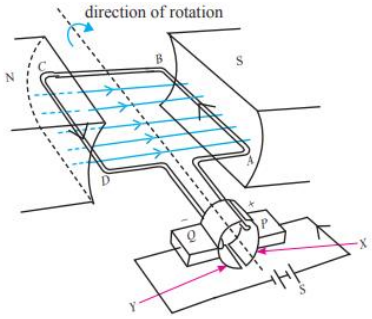
Here, an insulated copper coil is inserted through the needle hole and the insulation is removed in half on both sides of the wire. The magnet is placed on the dry cell.

- What are the observations you can see?..
- Briefly describe the action that takes place in the apparatus to get that observation.
  ……..
- What is the reason to remove the insulation in half on both sides of the wire?
  ……..

Main parts and the functions of a direct current motor. Complete the table below

Part	Function
Armature	……
Magnetic poles	……
……	Changing the direction of the current.

Demonstrating the action of a direct current motor.



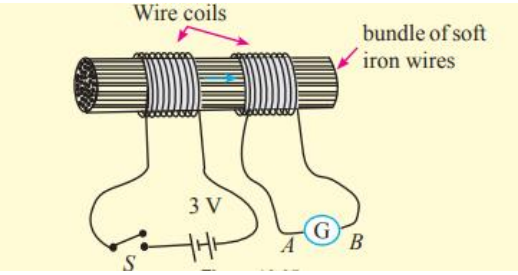
- here, when the current is supplied by the batteries, current flows from the + terminal through the p brush to the x split ring and then to the y split ring in the direction of …… and away from ……
- Then, is applied to AB and …….. is applied to the CD part and this pair of forces causes the …… to rotate clockwise.
- By now the coil and …….. have rotated 180^0 .At the same time the position of the split rings …….
- Then the current enters the …… split ring through the p brush and the DCBA direction comes from the …… and leaves from Q.
- Then, ……. is applied on AB and …… is applied on CD and ……. armature rotates further.
- When the terminals of the batteries are switched the …….. direction is reversed and the direction of the motion of the …….. also ……
- Write the energy conversion of a direct current motor.

Transformers

- The transformer converts an alternating voltage from one value to another.
- Occasions of use

  1. ……. 2. …….. 3. …….

The action of a transformer



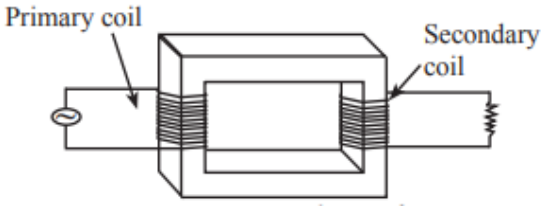
- n apparatus construct to demonstrate the action of a transformer is shown above.
- What is the device connected in between A and B here? ……
- What is the potential difference of the current flowing through the circuit

S switch	Galvanometer deflection	Conclusion
Closing (ON)	There is a deflection to (Right/Left)	A current flows in the second circuit from A to B/ B to A
Continues to be closed	Have a deflection / Haven't a deflection.	A current flows / doesn't flow
Opening (OFF)	There is a deflection in the opposite direction to the first direction (right / Left)	The current flows / doesn't flow in the opposite direction to the first direction.
Continues to be opened.	Haven't a deflection / Have a deflection	Current doesn't flow / Current flows

❖ Select and write the correct answer using the above table.

1. A current in the second circuit …….. (is induced/isn't induced) when the current in the circuit connected to the cell begins to flow.
2. As the current in the first circuit continues to flow …… (so does / so doesn't) the current in the second circuit.
3. At the moment when the current in the first circuit stops flowing again, the current in the second circuit …… (is induced in the opposite direction to the first direction / is induced in the same direction)
4. Once the current in the first circuit stops flowing, the current in the second circuit …….. (continues to flow / is zero)
5. What happens here is that a magnetic field is created before the current flows at the beginning and an electromotive force …….. (is induced / isn't induced) in the second coil.
6. A current is inducing as the current continues to flow. That is because the magnetic field is ……. (different? Constant)
7. At the moment, when the current stops flowing again, a current is induced. An induction of the electromotive force in the second coil due to the variation of the magnetic field is the action of the …… (transformer / cell)
8. Accordingly, when an alternating potential difference is applied to the first coil instead of a battery an alternating potential difference of the …… (1^{st} coil / 2^{nd} coil) is always induced.
9. Likewise, a transformer is a connection of a magnet connected to 2 coils and it always operate only for …… (alternating potential difference / direct current)
10. Draw the symbol of a transformer
11. Name the coils and the soft iron core.

Designing transformers



Primary coil	Secondary coil
Number of turns Np	Number of turns Ns
Electromotive force Vp	Induced electromotive force Vs

Filling the blanks using the correct answer.

❖ The coil that supplies electrical energy to the transformer is called the …… coil or supplier.

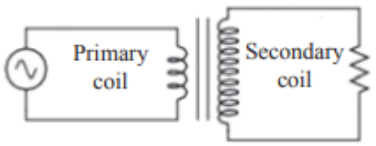
❖ The coil that draws energy out is the …….. coil or ……

❖ The relationship between the number of turns and the potential difference of a transformer can be shown as follows.

$$\frac{\text{Number of turns in the primary coil}}{\text{.....}} = \frac{\text{.....}}{\text{The potential difference of the secondary coil.}}$$

❖ Accordingly, write it in symbols in the following box.

Fill the table.

Step-up transformer	**Step- down transformer**
1. 	
2. The number of turns in the primary coil is low.	
3.	The number of turns in the secondary coil is low.

❖ Occasions where transformers are used

1. In the distribution of electricity generated in power plants.
2. .....
3. .....

❖ The energy relationship of a transformer.

1. State the assumption made when the efficiency of a transformer is considered to be 100%
2. If the efficiency is 100%, what should the power of the primary be equal to ?
3. Power = Potential difference x Current

According to the above relation, show the relationship between the power of the primary and the power of the secondary.