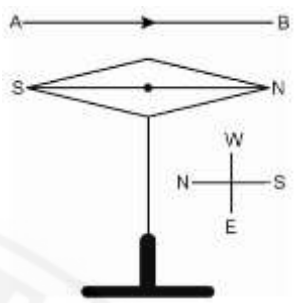
DPP – 1 Electromagnetism

1. Diagram shows a freely suspended magnetic needle. A copper wire is held parallel to the axis of magnetic needle.



a. Describe the directions in which the north pole of the needle will move in the following situations.

(i) When conductor is above needle and the current flows from A to B.

(ii) When conductor is below needle and the current flows from B to A.

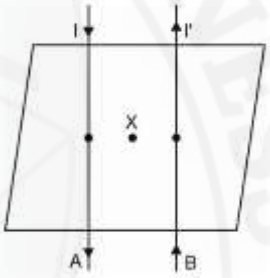
b. Why does the needle move in the above situations?

c. Name and state the law which will determine the direction of motion of magnetic needle.

2. Describe a set up for plotting magnetic field lines in a straight conductor carrying current.

3. Draw a diagram showing magnetic field lines due to a straight wire carrying current.

4. Two straight conductors A and B, carrying strong equal currents in opposite directions, pass through a cardboard, as shown in the diagram.



Copy the diagram and sketch separately the lines of force produced by each current. Show the direction of magnetic field at X. What will be the effect of magnetic field at X, if the current in B is reversed?

Explain why, the lines of force at distance may differ in shape from those in the immediate vicinity of conductors.

5. State three characteristics of the magnetic field produced by a straight current carrying conductor.

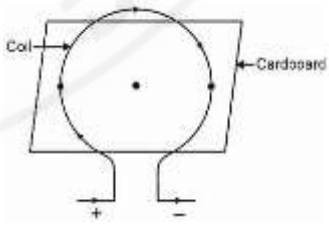
6. Describe a set up for plotting magnetic field lines in a circular loop carrying current.

7. A wire, bent into a circle, carries current in an anticlockwise direction. What polarity does this face of coil exhibit?

8. What is direction of magnetic field at the center of coil carrying current in:

(i) clockwise, **(ii)** anticlockwise direction?

9. **(a)** Copy the diagram given and draw the lines of the magnetic field produced due to the flow of current.



(b) State one way of increasing the magnetic strength of the coil.

(c) Give three characteristics of magnetic lines of force in **(a)**.

10. State the rule for finding the direction of magnetic field lines around a conductor carrying current.

DPP – 2 Electromagnetism

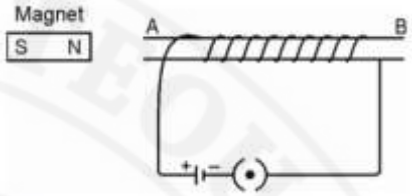
1. **(a)** What is a solenoid?

(b) Draw magnetic field around solenoid, showing clearly the magnetic polarities and the direction of magnetic lines of force.

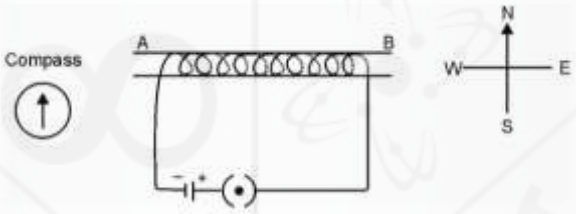
(c) If the solenoid is suspended freely, in which direction is it likely to point?

(d) State three ways of increasing the magnetic strength of a solenoid.

2. The diagram shows a small magnet placed near a solenoid. When current is switched on in the solenoid, will the magnet be attracted or repelled? Give a reason for your answer.



3. The diagram below shows a spiral coil wound on a hollow cardboard tube. A magnetic compass is placed close to it. When the current flows by closing the key, how will the compass needle be affected? State two ways in which the magnetic field due to the coil can be made stronger.



4. Why does a current carrying freely suspended solenoid rest along a particular direction?

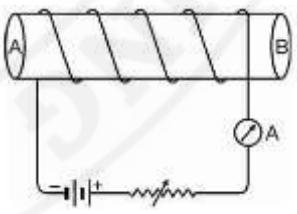
5. You are required to make an electromagnet from a U-shaped soft iron bar. Draw a circuit diagram to represent the process. In your diagram show the electric cell, insulted copper coil, U-shaped iron bar and switch. Label the poles of electromagnet.

6. **(a)** What do you understand by the term electromagnet?

(b) State three ways of increasing strength of an electromagnet.

(c) State three practical applications of electromagnets.

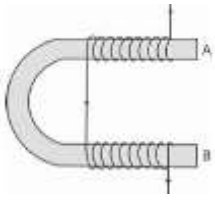
7. Diagram shows a circuit, containing a coil, wound on a long and thin hollow cardboard tube.



(i) Copy the diagram and show the polarity acquired by each face of the solenoid.

(ii) Draw the magnetic lines of force inside the coil and show their direction.

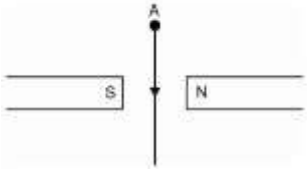
(iii) Mention two methods to increase magnetic strength of magnetic lines of force inside the coil.



8. State two differences between an electromagnet and permanent magnet.

9. Figure shows the current flowing in the coil of wire wound around the soft iron horse-shoe core. State the polarities developed in the ends A and B.

10. **(a)** A freely suspended copper conductor is held between the pole pieces of a magnet, as shown in the diagram. State whether the conductor will move into the plane of paper or out of the plane of paper.

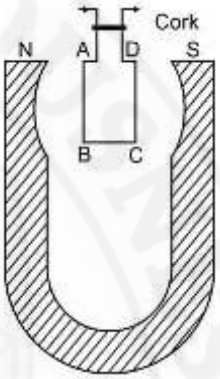


(b) Why does the conductor move?

(c) State the rule which determines the motion of the conductor.

(d) State three factors which determine the force acting on the conductor.

11. The diagram shows a rectangular coil ABCD, suspended freely between the concave pole pieces of a permanent horse-shoe magnet, such that the plane of coil is parallel to magnetic field.



(a) State your observation when the current is switched on.

(b) Give an explanation for your observation in (a).

(c) State the rule which will help you to find the motion of rotation of the coil.

(d) In which position will the coil ultimately come to rest?

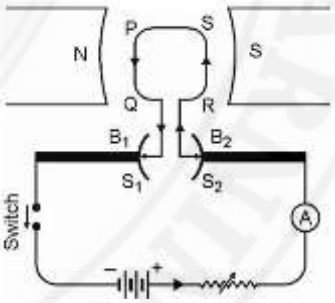
(e) State four ways of increasing the magnitude of the force acting on the coil.

12. What is an electric motor? State its principle.

13. What energy conversions take place during the working of a d.c. motor.

14. Complete the following sentence: _____ energy is converted into _____ energy by an electric motor.

15. **(a)** The diagram shows a simple form of D.C. motor. State the observation in ammeter A, after switch is put on.



(b) What is the cause of the above observation?

(c) State the direction of rotation of the coil.

(d) How do you determine the direction of rotation of the coil?

16. **(a)** State the function of the following parts in D.C. motor :

(1) Insulated copper coil. (2) Soft iron core.

(3) Split ring commutator. (4) Carbon brushes.

(b) In which positions the deflecting couple acting on coil is:

(1) Maximum. (2) Minimum.

(c) How is the jerky motion of the coil turned into smooth circular motion?

(d) State three ways of making motor more powerful.

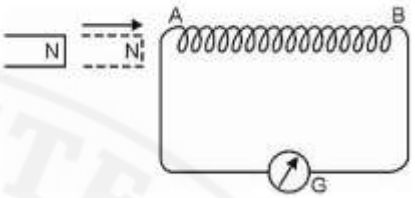
17. Name two appliances in which electric motor is used.

DPP – 3 Electromagnetism

1. What do you understand by the following terms:

(a) Electromagnetic induction? **(b)** Induced e.m.f?

2. The diagram shows a coil AB, connected to centre zero galvanometer G. The galvanometer shows a deflection to right when the north pole of a powerful magnet is moved to right as shown.



(a) Explain why deflection occurs in the galvanometer.

(b) Does the direction of current appear clock-wise or anticlockwise, when viewed from end A?

(c) State the observation in G when the coil is moved away from N.

(d) State the observation in G when both coil and the magnet are moved to right, with the same speed.

3. What kind of energy change takes place when a magnet is moved inside a coil having a galvanometer at its ends? Name the phenomenon.

4. Describe briefly one way of producing induced current. State one factor that determines the magnitude of induced e.m.f.

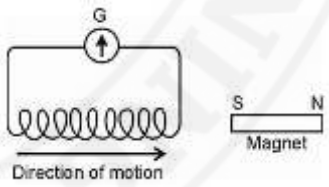
5. State Fleming's right hand rule.

6. What is lenz's law?

7. Why is it more difficult to move a magnet into the coil which has large number of turns?

8. Explain why an induced current must flow in such a direction, so as to oppose the change producing it.

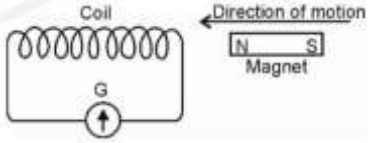
9. The diagram shows a coil of several turns of copper wire connected to a sensitive centre zero galvanometer G near a bar magnet NS. The coil is free to move.



(i) Describe the observation, if the coil is rapidly moved in the direction of arrow.

(ii) How would the observation be altered, if (a) coil has twice as many turns, (b) coil is made to move three times faster?

10. The diagram shows a fixed coil of several turns connected to a centre zero galvanometer G and a magnet NS which can move.



(a) Describe the observation in the galvanometer if

(i) the magnet is moved rapidly in the direction of arrow,

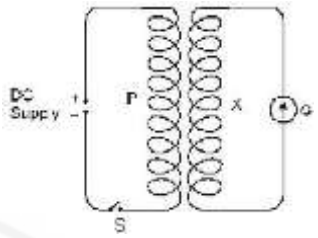
(ii) the magnet is kept still after it has moved into the coil,

(iii) the magnet is then rapidly pulled out of the coil.

(b) How would the observation in (a) (i) alter, if more powerful magnet is used?

DPP – 4 Electromagnetism

1. The diagram below shows a coil X connected to centre zero galvanometer G and a coil P connected to d.c. supply through switch S.



Describe your observations when the switch S is

(i) closed suddenly,

(ii) then kept closed,

(iii) finally opened.

Name and state the law which explains the above observation.

2. For what purpose are transformers used? Can they be used with direct current source?

3. How is e.m.f. in primary and secondary coils of a transformer related with the number of turns in these coils?

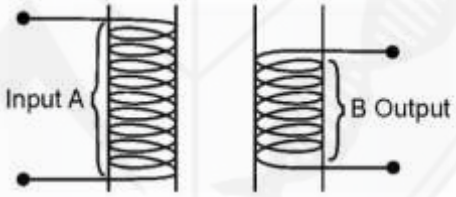
4. Draw a labelled diagram to show various components of a step-up transformer.

5. **(a)** Draw a labelled diagram of a device you would use to transform 200 V a.c. to 15 V. a.c. Name the device and explain how it works.

(b) **(i)** Give two uses of this device.

(ii) State three characteristics of its primary coil with respect to secondary coil.

6. The figure below shows a transformer and name of its parts A and B. Complete the diagram and name the parts A and B. Name the part you have drawn to complete the diagram. What is the material of this part? Is this transformer step up or step-down and why?



7. The secondary windings of a transformer in which voltage is stepped down are usually made of thicker wire than the primary. Explain, why?

8. Why is the iron core of a transformer made laminated (thin sheets), instead of being one solid piece?

9. Fill in the blank spaces with appropriate words.

(i) In a step-up transformer the number of turns in the primary are _____ than number of turns in the secondary.

(ii) The transformer is used in _____ current circuits.

10. What is the function of a transformer in an a.c. circuit? How does the input and output powers of a transformer compare? Name two causes of energy loss in a transformer.

11. What energy losses take place in the core of a transformer and how are they minimized?

12. Give one point of difference between a step-up transformer and a step-down transformer.

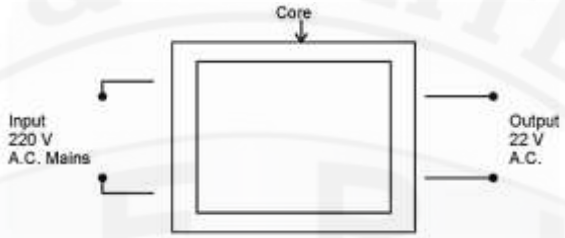
13. The diagram below shows a core of a transformer and its input and output connection.

(a) State the material used for the core and describe its structure.

(b) Use the given data in the diagram to calculate the turn ratio for the transformer.

(c) Complete the diagram of the transformer and connections by labelling all parts added by you.

(d) If a current of 2A is taken from the output, calculate the current in the input circuit. (Assume transformer is ideal).



14. A primary coil of 800 turns is connected to 220 V a.c. mains supply and the secondary coil has 8 turns. What will be the output voltage?

15. A transformer is designed to work from a 240 V a.c. mains and to give a supply of 8 V to ring a house bell. The primary coil has 4800 turns. How many turns would you expect in the secondary?

16. **(a)** What is an electric generator?

(b) Draw a neat and labelled diagram of a.c. generator?

(c) What is the effect of increasing the speed of rotation of coil in a generator?

(d) What energy conversion takes place in a generator?

(e) What is the magnitude of e.m.f. induced in the coil, when its plane becomes parallel to magnetic field?

17. **(a)** An a.c. generator, running at a constant speed is connected to an external circuit, produces alternating current of 50 Hz. Draw graph to show how the current in external circuit varies with time.

(b) Why is the e.m.f. produced by generator zero at certain instant and maximum at some other instant when coil is rotating at same speed?

(c) When resistance in external circuit is decreased, more energy is required to drive the generator at the same speed. Why?

(d) State four ways of increasing the magnitude of induced current produced by generator.

18. In an a.c. generator the speed at which the coil rotates is doubled. How would this affect:

(a) the frequency of output voltage,

(b) the maximum output voltage?

19. Why energy conversion takes place in a generator?

20. State two differences between d.c. motor and a.c. generator.