A. Tick (✔) the most appropriate answer.

1. The magnetic south pole of earth is situated near:
   (a) geographic south pole  (b) geographic north pole
   (c) geographic east       (d) geographic west

2. When a straight conductor carrying current is held over a magnetic needle, such that current flows from north to south then north of needle points towards:
   (a) East       (b) West     (c) North     (d) South

3. The direction of magnetic lines of force around a straight conductor, pointing vertically downward, such the current flows in vertically upward direction is:
   (a) clockwise
   (b) anti-clockwise
   (c) at one end clockwise and other end anti-clockwise
   (d) none of these

4. The core of transformer is made of:
   (a) soft iron    (b) steel    (c) copper    (d) aluminium

5. An electric generator converts:
   (a) mechanical energy into chemical energy
   (b) mechanical energy into magnetic energy
   (c) mechanical energy into electrical energy
   (d) electrical energy into mechanical energy

6. Generators produced electricity on the principle of:
   (a) magnets have attractive property
   (b) conductors carrying current behave like a magnet
   (c) electromagnetic induction
   (d) none of these

7. The strength of magnetic field in a solenoid will be maximum, if it has:
   (a) 100 turns   (b) 75 turns   (c) 5 turns    (d) 20 turns
8. The mechanical energy produced in an electric motor will be maximum, if the current flowing through its coil is:
   (a) 2 ampere  (b) 12 ampere  (c) 6 ampere  (d) 8 ampere
9. A freely suspended magnetic needle always came to rest in:
   (a) north-east direction  (b) north-west direction  
   (c) north-south direction  (d) south-west direction
10. An electric device used to stabilise voltage is:
    (a) dynamo  (b) transformer  (c) voltmeter  (d) ammeter
11. Which is not a magnetic material?
    (a) Iron  (b) Cobalt  (c) Zinc  (d) Nickel
12. Which is used to make a permanent magnet?
    (a) Steel  (b) Iron  (c) Nickel  (d) Aluminium
13. If the north poles of two magnets are placed near one another, there is a:
    (a) attraction between them  (b) repulsion between them  
    (c) no interaction between them  (d) none of these
14. Magnetic field outside a magnet runs from:
    (a) south pole to north pole  
    (b) north pole to south pole  
    (c) neither north pole nor the south pole  
    (d) any of the pole
15. When an electric current is passed through a current carrying coil, the coil:
    (a) behaves like a magnet  
    (b) does not behave like a magnet  
    (c) sometimes behaves like a magnet but sometimes does not  
    (d) none of these

   Ans. 1. (b)  2. (b)  3. (a)  4. (a)  5. (c)  6. (c)  
   7. (a)  8. (b)  9. (c)  10. (b)  11. (c)  12. (a)  
   13. (b)  14. (b)  15. (a)

II. Complete the following sentences.
   1. The space around a magnet where its influence can be felt is called
      ____________________.

Class-VIII Physics  2  Question Bank
2. A closed ______________ curve in a magnetic field is called magnetic line of force.
3. The magnetic north pole of the earth is towards the geographic ______________.
4. Steel is used for making ______________ magnets.
5. In a step-up transformer the ______________ coil is thicker, less heavily insulated and has less number of turns.
6. The induced current produced in a closed coil is always ______________ in nature.
7. In an electric bell a flat ______________ spring brings the armature back to its initial position.
8. When the face of the coil towards the observer seems to carry current in ______________ direction, north polarity is induced.
9. An ______________ is employed in electric bell.
10. The magnetic field set in a straight wire carrying current is always at a ______________ angle to the flow of current.
11. Loadstone is an oxide of ______________.
12. A freely suspended magnet always comes to rest in ______________.
13. A magnetised iron piece is called ______________.
14. The region around a magnet where its magnetic effect is felt is called the ______________ of the magnet.
15. The earth behaves like a ______________.
16. A magnetic compass makes use of the ______________ property of freely suspended magnet.
17. ______________ discovered that a wire carrying an electric current was able to deflect a compass needle.
18. ______________ rule is used to identify the direction of magnetic field around a current carrying wire.
19. A coil of wire carrying electric current behaves like a ______________.
20. A solenoid with a soft iron core is called ______________.
21. Electricity and magnetism are two aspects of ______________ force.
22. Current that flows in only one direction is called ______________.
23. A dynamo is a small ______________.
24. _________ is used to change the voltage of alternating current.
25. Electric motor converts _________ energy to _________ energy.
26. The parts of the magnet where the magnetic force is the strongest are called the _________ of the magnet.
27. A south pole attracts a _________ pole and repels a _________ pole.
28. _________ is used to make a temporary magnet.
29. Like magnetic poles _________ each other whereas unlike magnetic poles _________ each other.
30. A _________ is useful for finding the direction in an unknown place.
31. Magnetic poles always exist in _________.
32. The degree of induced magnetism is directly proportional to the _________ of inducing magnet.
33. _________ is the phenomenon related to attractive and directive properties of magnets.
34. Producing magnetism in an unmagnetised material by placing a magnet closer to it is called _________.
35. A long coil made up of a number of turns of an insulated wire is called _________.
36. A coil wound over a soft iron piece is usually called an _________.

31. pairs  32. strength  33. magnetism
34. magnetic induction  35. solenoid  36. electromagnet

III. Statements given below are incorrect. Write the correct statements.

1. The primary coil of a step-down transformer has less number of turns.
   Ans. The primary coil of a step-up transformer has less number of turns.

2. Ampere’s swimming rule describes the direction of magnetic lines of force in a straight conductor.
   Ans. Ampere’s swimming rule describes the direction of movement of magnetic lines of force in a straight conductor.

3. Attraction is the surest test of magnetism.
   Ans. Repulsion is the surest test of magnetism.

4. A step-down transformer has thinner primary coil which is less heavily insulated.
   Ans. A step-up transformer has thinner primary coil which is less heavily insulated.

5. In an electric motor the mechanical energy is converted into electrical energy.
   Ans. In an electric motor the electrical energy is converted into mechanical energy.

6. The earth’s magnetic strength is weakest near the poles.
   Ans. The earth’s magnetic strength is strongest near the poles.

7. An induced current is produced in a coil, even when its ends are not closed.
   Ans. An induced current is produced in the coil when its ends are closed.

8. The magnitude of induced e.m.f. increases with the decrease in number of turns in a closed coil.
   Ans. The magnitude of induced e.m.f. increases with the increase in number of turns in a closed coil.

9. The magnetic lines of force are always parallel to the straight conductor carrying current.
   Ans. The magnetic lines of force are always in the form of concentric
circles at right angle to the straight conductor carrying current.

10. A steel bar placed in a solenoid becomes temporary magnet.

Ans. A steel bar placed in a solenoid becomes permanent magnet.

11. A steel core placed in a solenoid acts as electromagnet.

Ans. A steel core placed in a solenoid becomes permanent magnet.

12. Like poles of magnets always attract one another.

Ans. Like poles of magnets always repel one another.

13. Magnetic south pole of the Earth is towards its geographic south pole.

Ans. Magnetic south pole of the Earth is towards its geographic north pole.

14. Transformers can change high voltage DC current to low voltage DC current.

Ans. Transformers can change high voltage AC current to low voltage AC current.

15. An electromagnet is permanent in nature.

Ans. An electromagnet is temporary in nature.

16. The strength of magnetic field of solenoid increases with the decrease in number of turns in the coil.

Ans. The strength of magnetic field of a solenoid increases with the increase in number of turns in the coil.

17. A permanent magnet is used in an electric bell.

Ans. An electromagnet is used in an electric bell.

18. A step-up transformer decreases the AC voltage.

Ans. A step-up transformer increases the AC voltage.

19. A magnet increases its magnetism on heating.

Ans. A magnet loses its magnetism on heating.

20. A dynamo is a device in which electrical energy is converted into mechanical energy.

Ans. A dynamo is a device in which mechanical energy is converted into electrical energy.

IV. Write short notes on.

1. Magnetic lines of force.
Ans. **Magnetic lines of force:** Magnetic lines of force are closed continuous curve in a magnetic field along which the north pole will move if free to do so, and its direction is given by the direction in which free north pole will point.

2. Electromagnetic induction.

Ans. **Electromagnetic Induction:** The phenomenon due to which a changing magnetic field within a closed copper coil induces an alternating electric current in the coil, is called electromagnetic induction.

3. Electric bell.

Ans. **Electric Bell:** In an electric bell, continuous magnetisation and demagnetisation of electromagnet take place, with the result that the hammer continuously strikes against the gong.

4. Dynamo.

Ans. **Dynamo:** A dynamo is a small generator in which a coil of wire is moved in the magnetic field of a magnet to produce electric current.

5. Electric Motor

Ans. **Electric motor:** In an electric motor the mechanical energy is produced because of the interaction of magnetic field due to the permanent radial magnet and the magnetic field produced in the coil due to flow of current.

V. **Differentiate between the following.**

1. Magnetism and magnetic field.

Ans. The property of magnets to attract certain other materials i.e. magnetic substances like iron, nickel, cobalt etc, is called magnetism while the region around a magnet where its magnetic effect can be felt is called magnetic field.

2. Solenoid and electromagnetic induction.

Ans. An insulated copper coil, whose length is more than its diameter and which behaves like a magnet when the current flows through it, is called a solenoid. And the phenomenon due to which a changing magnetic field within a closed coil induces an alternating current in the coil, is called electromagnetic induction.
3. Direct current and alternating current.
   **Ans.** When a current flows in an electric circuit in one particular direction and does not change its magnitude and direction, for any duration of time, it is said to be direct current. The current produced by cells and storage battery is direct current. When a current changes its magnitude and direction after fixed interval of time in particular circuit, it is said to be alternating current. The current produced by emergency generator or in hydroelectric power houses is alternating current.

4. Generator and motor
   **Ans.**

<table>
<thead>
<tr>
<th>Generator</th>
<th>Motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In a generator, the mechanical energy from any source is converted into electrical energy.</td>
<td>In a motor, electrical energy is converted to mechanical energy.</td>
</tr>
<tr>
<td>2. In a generator when a closed coil rotates rapidly in a strong magnetic field, then an induced alternating current is generated.</td>
<td>In a motor, the mechanical energy is produced because of the interaction of magnetic field due to permanent radial magnet and the field produced in the coil due to the flow of current.</td>
</tr>
</tbody>
</table>

5. Step-up transformer and Step-down transformer.
   **Ans.** The device which steps up the line voltage is called step-up transformer and the device which steps down the line voltage is called step-down transformer.

VI. Answer the following questions.

1. What do you understand by the term magnetic field?
   **Ans.** The area around a magnet in which its influence can be felt is called magnetic field.

2. (a) What do you understand by the term magnetic lines of force?
   (b) State four properties of magnetic lines of force.
   **Ans.** (a) Magnetic lines of force are closed continuous curves in a magnetic field along which the north pole will move if free to do
so and its direction is given by the direction in which free north pole will point.

(b) Properties of magnetic lines of force:
   (i) They are closed continuous curves.
   (ii) They travel from north to south outside the magnet and from south to north inside the magnet.
   (iii) They contract laterally, that is, they bend along the length of magnet.
   (iv) They mutually repel each other.
   (v) They never intersect each other.

3. By drawing a neat diagram show the magnetic field around (a) a bar magnet and (b) a horse-shoe magnet.

Ans.

4. Draw a diagram showing clearly (i) the magnetic north and south poles of the earth (ii) geographic north and south poles of the earth and (iii) magnetic field around the earth.

Ans.
5. Where is the earth’s magnetic field (i) strongest and (ii) weakest?
   Ans. Earth’s magnetic field is strongest near the magnetic north and south pole and weakest near the equator.

6. Why does a freely suspended magnetic needle point in geographic north-south direction? Name a device which is based on the above phenomenon.
   Ans. A freely suspended magnetic needle points in geographic north-south direction because earth behaves like a giant magnet with its north pole near the geographic south pole and its south pole near geographic north pole. So, the north pole of a suspended magnet turns towards geographic north pole and south pole of the magnet turns towards geographic south pole. Magnetic compass is based on the above phenomenon.

7. Name and state the rule which tells about the movement of freely suspended magnetic needle when a conductor carrying current is held parallel to the axis of needle.
   Ans. Ampere’s swimming rule,
   According to Ampere’s swimming rule, if a swimmer swimming in the direction of current and looking at the magnetic needle such that current enters from his feet and leaves from his head. Then the direction in which the left hand of swimmer points, gives the direction of movement of north pole of freely suspended magnetic needle.

8. State four characteristics of magnetic field set up around a straight current carrying conductor.
Ans. Characteristics of magnetic field set up around a straight conductor carrying current:
(a) The magnetic lines of force are in the form of concentric circles.
(b) The plane of magnetic lines of force and hence, magnetic field is at right angle to the plane of conductor carrying current.
(c) The direction of magnetic lines of force reverses with the change in the direction of flow of current.
(d) On increasing the magnitude of current in a conductor, the number of magnetic lines of force increases.

9. How can you increase the strength of magnetic field around a conductor carrying current?
Ans. We can increase the strength of magnetic field around a conductor carrying current by increasing the strength of current by which the number of magnetic lines of force around the conductor increases. This in turn increases the magnetic strength of the conductor.

10. Name and state the rule which gives the direction of magnetic lines of force around a straight conductor.
Ans. Right hand thumb rule or Right hand palm rule is used for determining the direction of force around straight conductor. According to this rule, if you are holding the conductor with the palm of your right hand, such that the thumb points in the direction of flow of current. Then the direction in which fingers curl around the conductor, gives the direction of magnetic lines of force.

11. By drawing a neat diagram show the magnetic field around a coil carrying current.
12. Give five characteristics of magnetic field set up by a coil carrying current.

**Ans.** Characteristics of magnetic field set up by a coil carrying current are:

(a) Magnetic lines of force are circular around the points where the current enters or leaves circular coil.

(b) Within the space enclosed by the coil the magnetic lines of force are in same direction.

(c) Near the centre of coil the magnetic lines of force are parallel. When the magnetic lines of force are parallel the magnetic field is said to be uniform.

(d) The magnetic lines of force are at right angles to the plane of coil. It means if coil is in vertical plane, the magnetic lines of force are in horizontal plane.

(e) With the increase in strength of current in coil, the magnetic lines of force increase. This, in turn increases the strength of magnetic field.

13. (a) What is solenoid?

(b) Draw a magnetic field around a solenoid.

**Ans.** (a) An insulated copper coil wound around some cylindrical cardboard or plastic tube, such that its length is greater than its diameter, behaves like a magnet when electric current flows through it is called solenoid.
13. (b) Magnetic field around a solenoid.

14. (a) How can you tell the magnetic polarity at the ends of solenoid, without using any magnetic needle?
(b) State four ways of increasing magnetic strength of solenoid.

**Ans.** (a) When an electric current is passed through the solenoid, then each turn of the coil behaves like a magnet. If the current is flowing into the coil in clockwise direction, the left hand side of each turn of the coil acts as south pole, whereas right hand side of each turn of the coil acts as north pole.
(b) The four ways of increasing magnetic strength of a solenoid are:
   (i) By increasing the number of turns in the solenoid.
   (ii) By increasing diameter of the turns of the solenoid.
   (iii) By increasing magnitude of current.
   (iv) By using laminated soft iron core.

15. Solenoid can be used for making permanent magnets. Explain how this is done?

**Ans.** Solenoid can be used for making permanent magnet. If instead of soft iron, a bar of steel is placed in solenoid, then it changes to permanent magnet.

16. State four uses of electromagnets.

**Ans.** Uses of electromagnets:
   (a) They are used in electrical appliances, such as electric bell, electric fan, electric motors, etc.
(b) They are used in electric generators where very strong magnetic field is required.
(c) They are used for preparing strong permanent magnets.
(d) They are used in television for deflecting electron beam of the picture tube.

17. Why are the contact points of electric bell made of silver-cadmium alloy?

Ans. The contact points of electric bell are made of silver-cadmium alloy to prevent oxidation due to sparkling because this alloy does not get oxidised easily.

18. Draw a neat and labelled diagram of an electric bell.

Ans. Diagram of electric bell

![Diagram of an electric bell]

19. What do you understand by the following terms?

(i) electromagnetic induction
(ii) induced current.

Ans. (i) **Electromagnetic induction**: The phenomenon due to which a changing magnetic field within a closed coil induces an alternating current in the coil, is called electromagnetic induction.

(ii) **Induced current**: The alternating current produced in a closed coil, when magnetic lines of force rapidly change within it, is called induced current.
20. What is the nature of induced current?
   **Ans.** Induced current is the alternating current which changes its magnitude and direction after fixed internal of time in a closed circuit.

21. (a) What is an electromagnet?
    (b) How can you convert a solenoid into an electromagnet?
   **Ans.** (a) An electromagnet is a solenoid with a soft iron core. It is a temporary strong magnet and works on the principle of the magnetic effect of electric current.
    (b) When a solenoid is wound on soft iron, then due to magnetic induction, it gets highly magnetised. Thus, the strength of magnetic field strongly increases. In such a situation solenoid in called electromagnet.

22. How can you increase the strength of an electromagnet? State four ways.
   **Ans.** The magnetic strength of an electromagnet can be increased by increasing:
   (i) number of turns in the solenoid
   (ii) diameter of the turns of the solenoid
   (iii) magnitude of current and
   (iv) using laminated soft iron core

23. State three factors which determine the magnitude of induced current in a closed coil.
   **Ans.** The three factors which determine the magnitude of induced current in a closed coil are
   (i) the strength of inducing magnet
   (ii) the number of turns in the closed coil.
   (iii) the rate which magnetic lines of force change within the coil.

24. What is a transformer?
   **Ans.** Transformer is an electric device which steps up or steps down the line voltage. The device which steps up the line voltage is called step-up transformer and the device which steps down the line voltage is called step-down transformer.

25. Draw a neat and labelled diagram of step-up transformer.
26. How can you tell whether a particular substance is magnetic or non-magnetic?

Ans. If the substance is attracted by a magnet, it is magnetic and, if the substance is not attracted by a magnet, it is non-magnetic.

27. What are magnetic materials? Name some of them.

Ans. The materials which are attracted by the magnet are called magnetic materials. Iron, cobalt, nickel etc. are magnetic materials.

28. Classify the following substances as magnetic or non-magnetic:
   iron, phosphorus, plastic, copper, zinc, cobalt, soil, water, aluminium, paper, nickel, mercury, silver.

Ans. Magnetic substances – iron, cobalt, nickel,
   Non magnetic substances – phosphorus, plastic, copper, zinc, soil, water, aluminium, paper, mercury, silver.

29. If you take a bar magnet and cut it into four pieces, how many magnetic poles will be there?

Ans. If we take a bar magnet and cut it into four pieces, then each piece will have its separate north and south pole.

30. Mention two uses of magnetic compass.

Ans. (a) Magnetic compass is used by navigators and sailors to find the direction in which their ship or aeroplane is going.
   (b) It is used to determine the direction of magnetic field around a magnet.

31. How will you determine polarity of a solenoid?

Ans. The end of the solenoid will be of north polarity, if the current is flowing in anticlockwise direction and will be of south polarity, if the current is flowing in the clockwise direction.
32. Name two devices that use electromagnetic induction.
   Ans. Electric generator and transformer.

33. List some characteristics of magnets?
   Ans. Characteristics of magnets:
       (a) A freely suspended magnet always points towards north-south direction.
       (b) Like poles repel and unlike poles attract each other.
       (c) Magnetic poles always exist in pairs.
       (d) A magnet loses its properties on heating.

34. Name various types of magnets on the basis of their shapes.
   Ans. Bar magnet, cylindrical magnet, horse-shoe magnet etc.

35. Name the two methods of making magnets.
   Ans. The two methods of making magnets are:
       (a) Single touch method
       (b) Electrical method

36. (a) What is the principle of electric generator?
    (b) What kind of energy is used in it?
    (c) Draw a neat and labelled diagram of a generator.
   Ans. (a) Electric generator is based on the principle of electromagnetic induction.
        (b) In an electric generator mechanical energy is changed into electrical energy.
        (c) Diagram of an electric generator.