Summative Assessment - Term II 2025 - 26

PHYSICS MODEL QUESTION PAPER

Standard: X Time: 1½ hour

Total Score: 40

Instructions

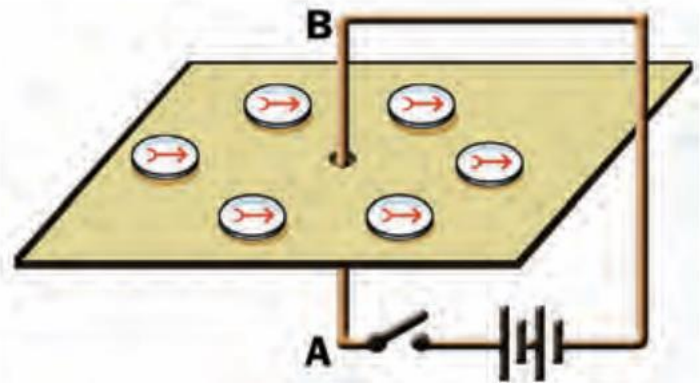
• The first 15 minutes is cool-off time. This time is meant for reading the questions and planning your answers.
• This question paper includes 18 questions in sections A, B, C, D.
• Questions 5, 11, 13, 14 and 18 contain choices.

Section-A
Write down the correct answer by choosing from the given options for questions 1 to 4. Each question carries 1 score. (4 x 1 = 4)

1. A current-carrying straight conductor is placed near a pivoted magnetic needle. When current flows from north to south, the north pole of the needle deflects to the west. This observation is related to:
   a) Faraday's law of induction
   b) Oersted's experiment on magnetic effect of current
   c) Ampere's circuital law
   d) Lenz's law

2. Statement: A magnetic field is formed around a current-carrying conductor.
   Reason: The direction of the magnetic field can be determined using the right-hand thumb rule.
   a) Statement and reason are correct; the reason explains the statement
   b) Statement and reason are correct; however, the reason does not explain the statement.
   c) Both the statement and the reason are incorrect.
   d) Statement is correct; reason is incorrect

3. In the figure, a current-carrying wire is passed through a cardboard with magnetic compasses arranged around it.



What type of magnetic field lines are formed?
a) Straight lines parallel to the wire
b) Concentric circles around the wire
c) Elliptical loops
d) Irregular curves

4. For a current-carrying coil, if the current flows clockwise when viewed from one side, some statements are given:
i. The side acts as a south pole.
ii. The magnetic flux lines enter into the coil on that side.
iii. The side acts as a north pole.
iv. The magnetic flux lines come out of the coil on that side.
Pick out the correct option from the following.
a) i and ii
b) i and iv
c) ii and iii
d) iii and iv

Section- B

Write down the answers to the questions 5 to 11. Questions 5 and 11 have choices. Each question carries 2 score. (7 x 2 = 14)

5. A. A straight conductor carries current from A to B. Using the right-hand thumb rule, explain the direction of the magnetic field around it. (2)

OR

5. B. In Ampere's swimming rule, if a person swims in the direction of current facing a magnetic needle, the north pole deflects to the left.
a) What does this indicate about the magnetic field direction?
b) Give one application of this rule in daily life

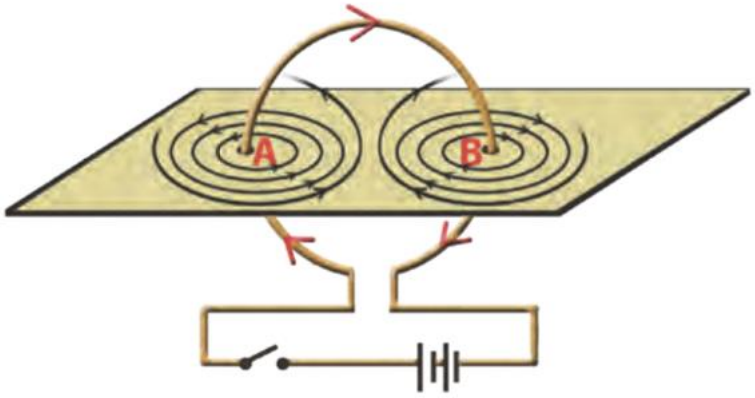
6. A pivoted magnetic needle is placed near a bar magnet.
a) What happens to the needle? Why?
b) If the bar magnet is replaced by a current-carrying wire, what change do you expect?

7. Electromagnetic induction is used in generators.
a) What is electromagnetic induction?
b) Name one device where this principle is applied to produce electricity from mechanical energy.

8. A coil with 100 turns has a current of 2 A flowing through it. If the magnetic field strength at the center is to be calculated, but instead, the current is reversed. How does the direction of the field change? Explain briefly. (2)

9. What is the magnetic effect of electric current? Give one real-life application, , and explain how it works. (2)

10. The figure shows a solenoid with current flowing through it.



a) What is the reason for the magnetic field inside the solenoid being uniform?
b) Which rule can be used to find the polarity of its ends?

11. A. A conductor is moved perpendicular to a magnetic field. Draw a simple diagram showing induced current and explain the direction using Fleming's right-hand rule. (2)

OR

B. The length of a conductor in a magnetic field is 20 cm, moving at 5 m/s perpendicular to a 0.5 T field. Using a suitable scale, draw a diagram and find the induced emf (assume necessary values if needed).

Section- C

Write down the answers to questions 12 to 17. Questions 13 and 14 have choices. Each question carries 3 score. (6 x 3 = 18)

12. The factors affecting the strength of an electromagnet are: number of turns, current, and core material.
a) Arrange in order of increasing magnetic field strength: iron core, air core, soft iron core.
b) Which factor is most useful in lifting heavy objects in cranes? Explain.
c) Give one application in medical field (e.g., electromagnets in MRI).

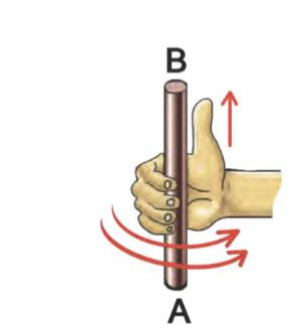
13. A. In an experiment with a current-carrying wire above a magnetic needle:
a) When current flows from A to B, the needle deflects clockwise. Justify.
b) If the wire is placed below, explain the change in deflection.
c) Calculate the time for one deflection cycle if frequency is 50 Hz (application in AC circuits).

OR

13. B. Oersted's experiment demonstrates the magnetic effect of electric current.
a) Describe the setup and what happens to the magnetic needle when current flows from A to B above it. b) Explain the change if the current direction is

reversed. c) What is the application of this in deflection instruments like galvanometers?

14. A. In the figure, a current-carrying loop is shown.



(a) Identify the rule used to find field direction and draw its shape.
b) Draw the magnetic field lines for the loop.

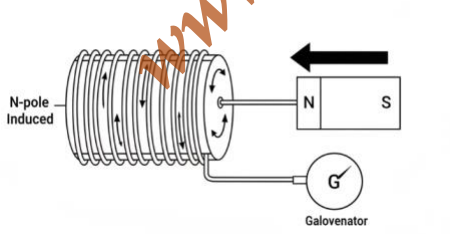
OR

B. Electromagnets are used in electric bells.
a) Where should the current be passed to make the armature attract?
b) Draw the diagram of an electric bell and explain its working.

14. A conductor of length 0.5 m moves at 10 m/s in a 2 T field.
a) If induced emf is 10 V, find the angle (assume perpendicular for max).
b) Can this be used in a bicycle dynamo? Justify.

15. Transformers are used in power distribution.
a) If a step-up transformer has primary 100 turns and secondary 500 turns, what is the voltage ratio?
b) Explain how it steps up voltage with application in long-distance transmission.

16. The figure shows induced emf in a coil due to a moving magnet.



a) In which direction is the induced current?
b) What is the polarity of the coil end facing the magnet?

Section- D

Answer any one of the two questions. Each question carries 4 score. (4 x 1 = 4)

18. A. A solenoid is connected to a battery. A tuning fork of 256 Hz is brought near it after current flows.
a) The sound intensity increases due to resonance. Reason?

b) When current increases, vibration amplitude rises. Frequency of air column?
c) To hear louder sound again, use higher or lower frequency fork? Justify
d) Nearby iron rod vibrates. Its natural frequency?

OR

18. B. A worker in a factory hears various machine sounds: 100 Hz, 15 Hz, 500 Hz, 18000 Hz, 25000 Hz, 1000 Hz.
a) Which frequencies are audible?
b) What is the human audible range?
c) Name for sounds below lower limit (infrasound) with one application (e.g., earthquake detection).
d) Two uses of ultrasound (e.g., medical imaging, cleaning).