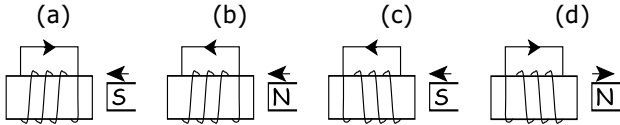
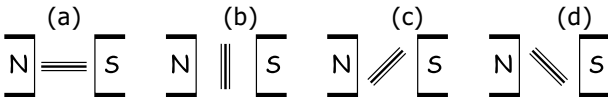


PART A: MULTIPLE CHOICE (10 MARKS)

Choose the best response in each case and place your answer in the appropriate space on your answer sheet.

- In 1819 Oersted demonstrated the ability of a steady current to produce a steady magnetic field. It wasn't until 1831 that ? discovered the basic principle of electromagnetic induction.
(a) Charles Coulomb (b) André Ampère
(c) Gustav Kirchhoff (d) Michael Faraday
- Which of the following affects the magnitude of an induced current ?
① resistance of wire used
② # of turns on induction coil
③ rate of change of inducing magnetic field
④ strength of inducing magnetic field
(a) ①, ② & ③
(b) ②, ③ & ④
(c) ①, ②, ③ & ④
(d) none of the above
- Which diagram below shows the correct direction for the inducing action and the induced electric current flow?

Diagram (a): Coil with current flowing right, magnetic field pointing left (S).
Diagram (b): Coil with current flowing left, magnetic field pointing left (N).
Diagram (c): Coil with current flowing left, magnetic field pointing left (S).
Diagram (d): Coil with current flowing right, magnetic field pointing right (N).
- Which diagram of a generator below shows the position of the wire in which the induced current is a maximum?

Diagram (a): Wire between N and S poles, moving right.
Diagram (b): Wire between N and S poles, moving up.
Diagram (c): Wire between N and S poles, moving down.
Diagram (d): Wire between N and S poles, moving left.
- Experiments show that cathode rays are deflected by a magnetic field. The most reasonable inference from this observation is that cathode rays:
(a) produce X rays.
(b) possess kinetic energy.
(c) carry a charge.
(d) travel in straight lines.
- A step-up transformer is used to change:
(a) direct current to alternating current.
(b) alternating current to direct current.
(c) low voltage to high voltage.
(d) high voltage to low voltage.
- Step-up transformers are not generally used inside the house except for:
(a) doorbells. (b) humidifiers.
(c) small toys. (d) fluorescent lights.
- For long distance transmission, the electric energy from the generators is transformed to:
(a) higher potential difference and lower current.
(b) higher potential difference and higher current.
(c) lower potential difference and lower current.
(d) lower potential difference and higher current.
- A transformer with 500 turns in the primary coil and 60 turns in the secondary coil is connected to a 120 V A.C. electric potential source. What is the electric potential of the secondary coil?
(a) 14.4 V (b) 144 V
(c) 1.44 kV (d) 14.4 kV
- What is the current in the secondary coil above if the current in the source is 240 mA?
(a) 20 A (b) 2.0 A
(c) 200 mA (d) 20 mA

PART B: MATCH (5 MARKS)

Match the definition from the 1st column to the best term in the 2nd column and place the matching letter in the appropriate space on your answer sheet.

- | | |
|--|--------------------------|
| 1. Effect that occurs whenever a changing current in one coil induces a current in a nearby coil. | A) generator |
| 2. A device in which a switch is closed by the action of an electromagnetic. | B) induced field |
| 3. A transformer with fewer windings on the secondary coil. | C) inducing field |
| 4. States that the magnetic field of an induced current always opposes the change in the magnetic field that is causing the induced current. | D) Lenz's law |
| 5. Coil of wire that acts like a magnet when an electric current passes through it. | E) mutual induction |
| | F) relay |
| | G) solenoid |
| | H) step-down transformer |
| | I) step-up transformer |
| | J) turbine |

PART A: MULTIPLE CHOICE (10 MARKS)

1	2	3	4	5	6	7	8	9	10
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PART B: MATCH (5 MARKS)

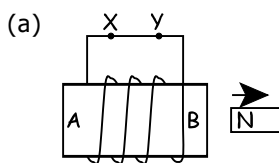
1	2	3	4	5
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PART C: SHORT ANSWER (25 MARKS)

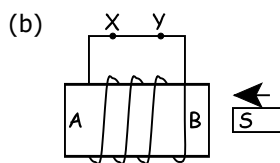
Answer questions 1 to 3 in the space provided. Answer questions 4 and 5 on the back of this sheet.

- {6} 1. When a bar magnet is plunged into a coil of 300 turns at a steady speed of 15 cm/s, the maximum induced potential difference is 25 mV.
- (a) How fast should the bar magnet be inserted into the coil to produce a maximum induced potential difference of 30 mV?
- (b) If the bar magnet is being inserted at a steady speed of 15 cm/s, how many turns should be present in the coil to provide a maximum induced potential difference of 45 mV?

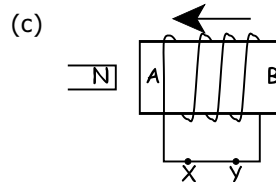
- {4} 2. For each of the inducing actions predict whether the induced current will flow from X through the helix to Y, or from Y through the helix to X.



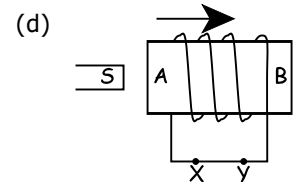
Current: _____



Current: _____



Current: _____



Current: _____

- {3} 3. Complete the following chart (< or >) for a step-down transformer.

Primary Coil	< or >	Secondary Coil
N_p		N_s
V_p		V_s
I_p		I_s

4. A transformer consists of a primary coil of 200 turns and a secondary coil of 2000 turns. The secondary potential difference and current are 30.0 V and 0.700 A.
- {3} (a) What is the primary potential difference?
- {3} (b) What is the primary current?
- {1} (c) What kind of transformer is it?
- {5} 5. Electric energy is generated at a potential difference of 20 kV. It is supplied to a nearby town that requires power of 1.00 MW. The transmission line along which it flows has a resistance of 0.50 Ω . What is the energy loss (in kW) due to heat in the line if the energy is transmitted at 500 kV?