New Syllabus NESA Questions:

1)

What is the role of a transformer at a power station?

A. To reduce heating in the transmission lines by stepping up the current

B. To reduce heating in the transmission lines by stepping up the voltage

C. To increase heating in the transmission lines by stepping up the current

D. To increase heating in the transmission lines by stepping up the voltage

---

2)

The total flux in the core of an electrical machine is 40 mWb and its flux density is 0.5 T.

What is the cross-sectional area of the core?

A. $0.01\ m^2$

B. $0.08\ m^2$

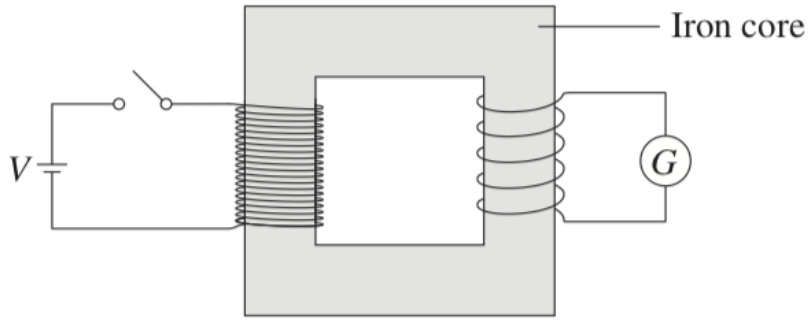
C. $12.5\ m^2$

D. $80\ m^2$

---

3)

The diagram shows an ideal transformer.



When the switch is closed, the pointer on the galvanometer deflects.

How could the size of this deflection be increased?

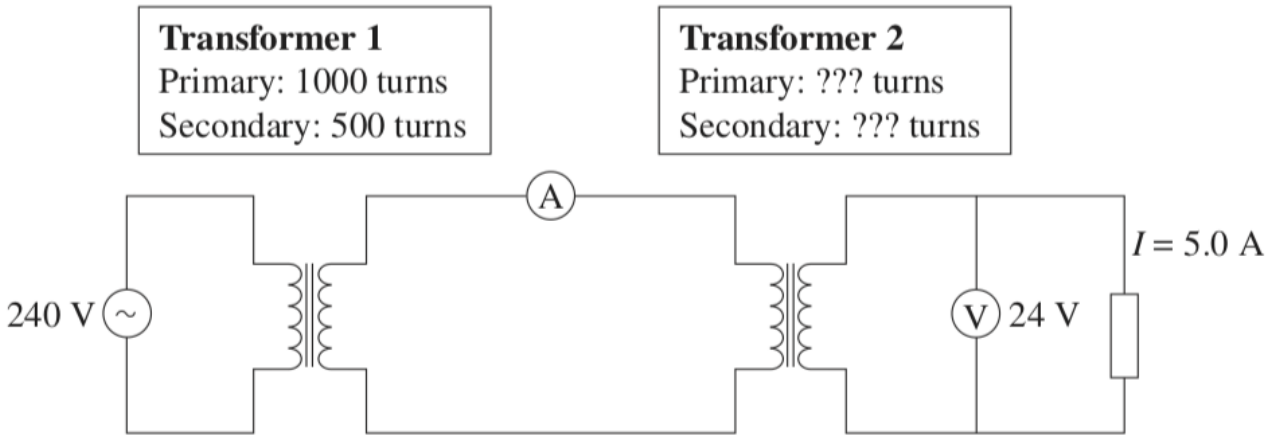
A. Decrease the number of primary coils.

B. Decrease the number of secondary coils.

C. Replace the iron core with a copper core.

D. Place a resistor in series with the galvanometer.

The diagram shows a circuit containing two ideal transformers connected with an ammeter. The current through the load is 5.0 A.



What is the reading on the ammeter?

A. 0.25 A

B. 0.50 A

C. 1.0 A

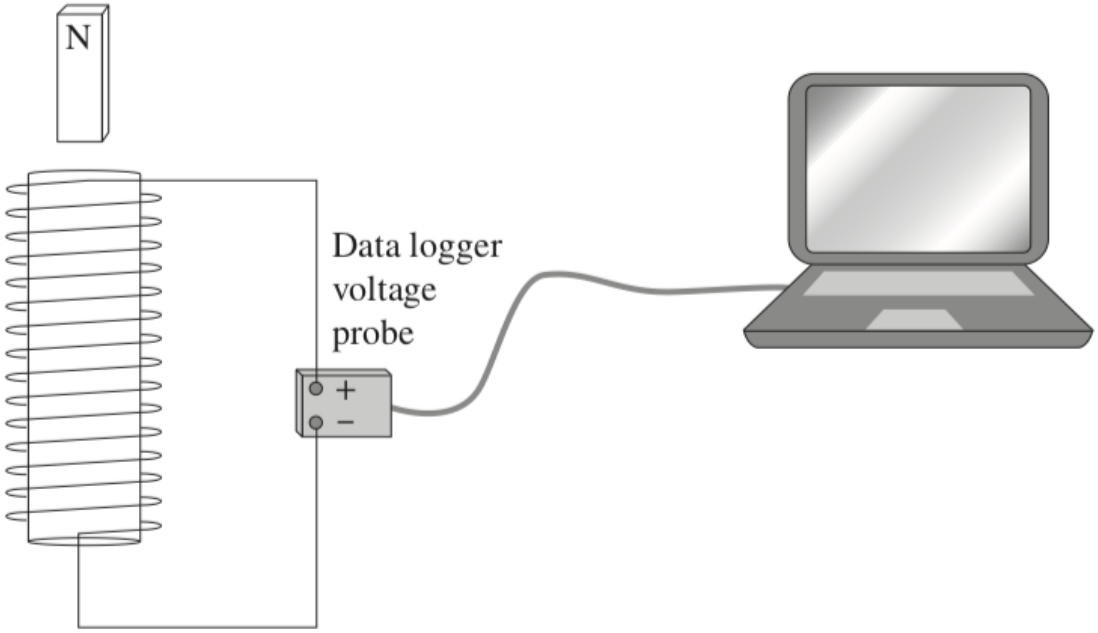
D. 2.5 A

4)

---

5)

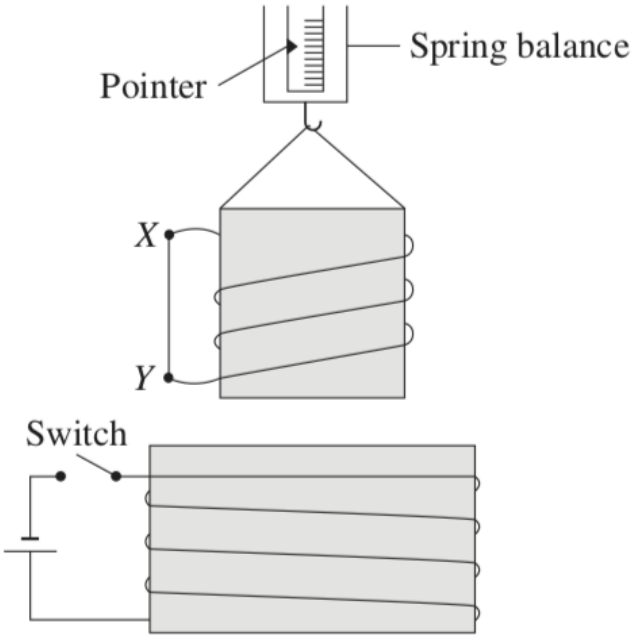
A solenoid was connected to a data logger to measure voltage. A magnet was dropped through the solenoid from above as shown. **3**



On the axes provided, sketch a graph showing the change in voltage as the magnet falls completely through the solenoid.

Past HSC Questions:
2018:

18 An experiment is set up as shown.

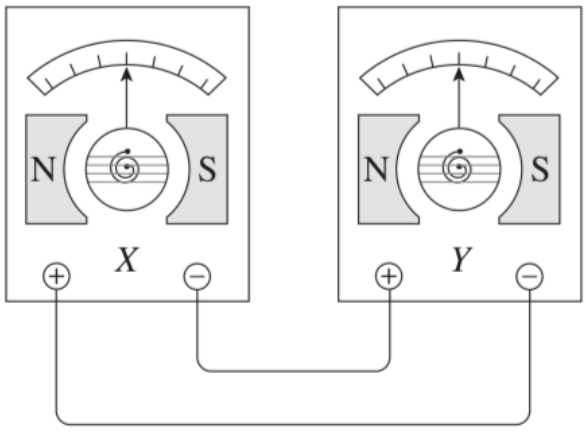


When the switch is closed, the reading on the spring balance changes immediately, then returns to the initial reading.

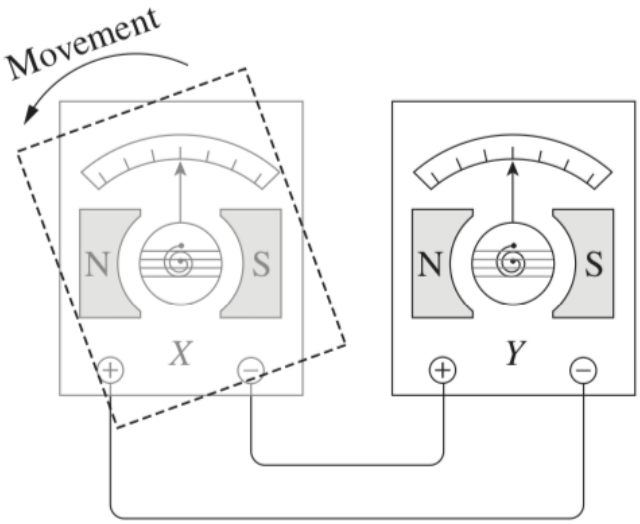
Which row of the table correctly shows the direction of the current through the straight conductor *XY* and the direction in which the pointer on the spring balance initially moves?

	Direction of current through the straight conductor	*Direction in which the pointer initially moves*
A.	From *X* to *Y*	Down
B.	From *X* to *Y*	Up
C.	From *Y* to *X*	Down
D.	From *Y* to *X*	Up

20 Two identical galvanometers *X* and *Y* were connected as shown and placed on a desk.



The meter *X* was then picked up and rotated suddenly anticlockwise to the position shown by the dotted outline, while the meter *Y* remained stationary on the desk.



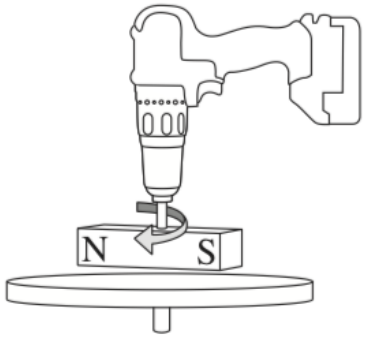
When this action is carried out, the pointers on both meters move relative to the scales on the meters.

Which row of the table correctly identifies the movement of the pointer on *Y* and the reason for its behaviour?

	Movement of pointer	*Reason*
A.	Towards right	The movement of *X* produces a current that flows into the opposite terminal of *Y*.
B.	Towards right	According to Lenz's law the effect produced must oppose the cause of the flux.
C.	Towards left	*Y* behaves as a motor with the current flowing through it from right to left.
D.	Towards left	For every force, there is an equal and opposite force.

Question 22 (6 marks)

(a) A drill spins a magnet above a non-magnetic metal disc which is free to rotate. **3**



Explain the effect of the rotating magnet on the disc.

.....

.....

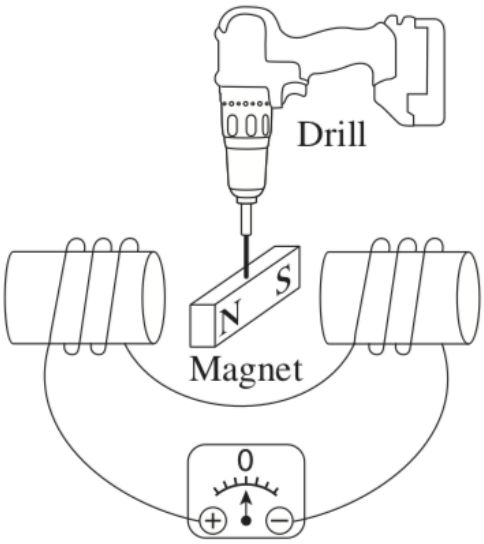
.....

.....

.....

.....

(b) The diagram shows a magnet attached to an electric drill so that it can be rotated between two coils connected to a voltmeter. **3**



The drill starts from rest and gradually speeds up, reaching its full speed after three revolutions.

Sketch a graph showing the induced emf across the coils during the time that it takes the magnet to reach its full speed.

Question 24 (5 marks)

(a) Outline TWO features of high-voltage transmission lines that contribute to the safe transmission of electricity. **2**

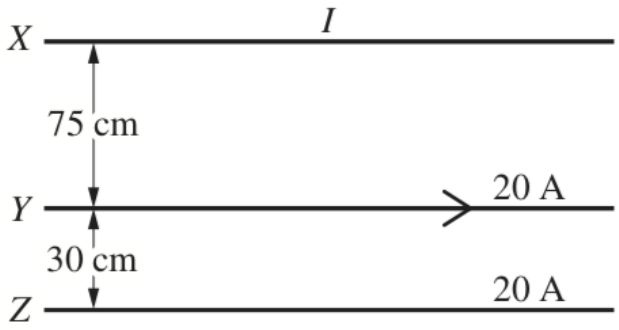
.....

.....

.....

.....

(b) Three parallel wires *X*, *Y* and *Z* all carry electric currents. A force of attraction is produced between *Y* and *Z*. There is zero net force on *Y*. **3**



What is the magnitude and direction of the current in *X*?

.....

.....

.....

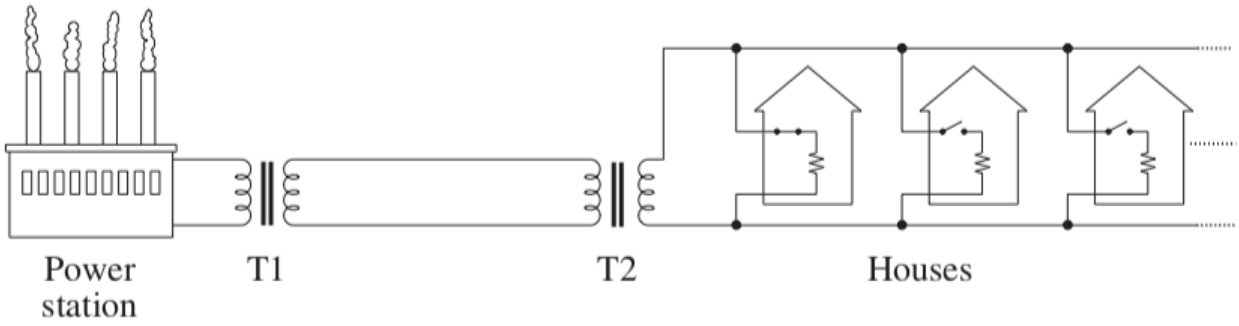
.....

.....

.....

Question 30 (6 marks)

The diagram shows a model of a system used to distribute energy from a power station through transmission lines and transformers to houses. **6**



During the evening peak period there is an increase in the number of electrical appliances being turned on in houses.

Explain the effects of this increased demand on the components of the system, with reference to voltage, current and energy.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

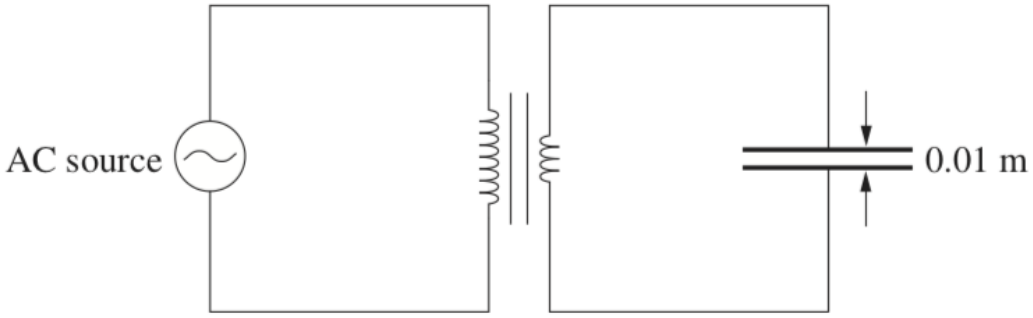
.....

.....

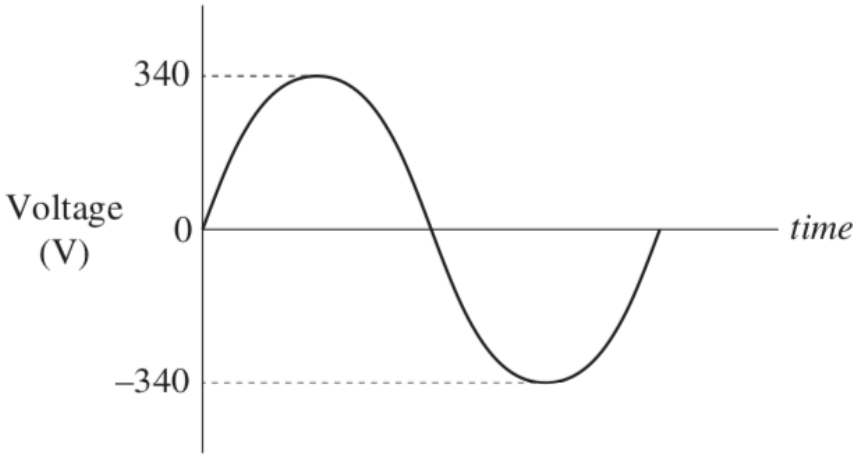
.....

2017:

11 An AC source is connected to a transformer having a primary winding of 900 turns. Connected to the secondary winding of 450 turns is a pair of parallel plates 0.01 m apart.



The AC input is shown in the graph.



What is the maximum field strength (in V m^{-1}) produced between the plates?

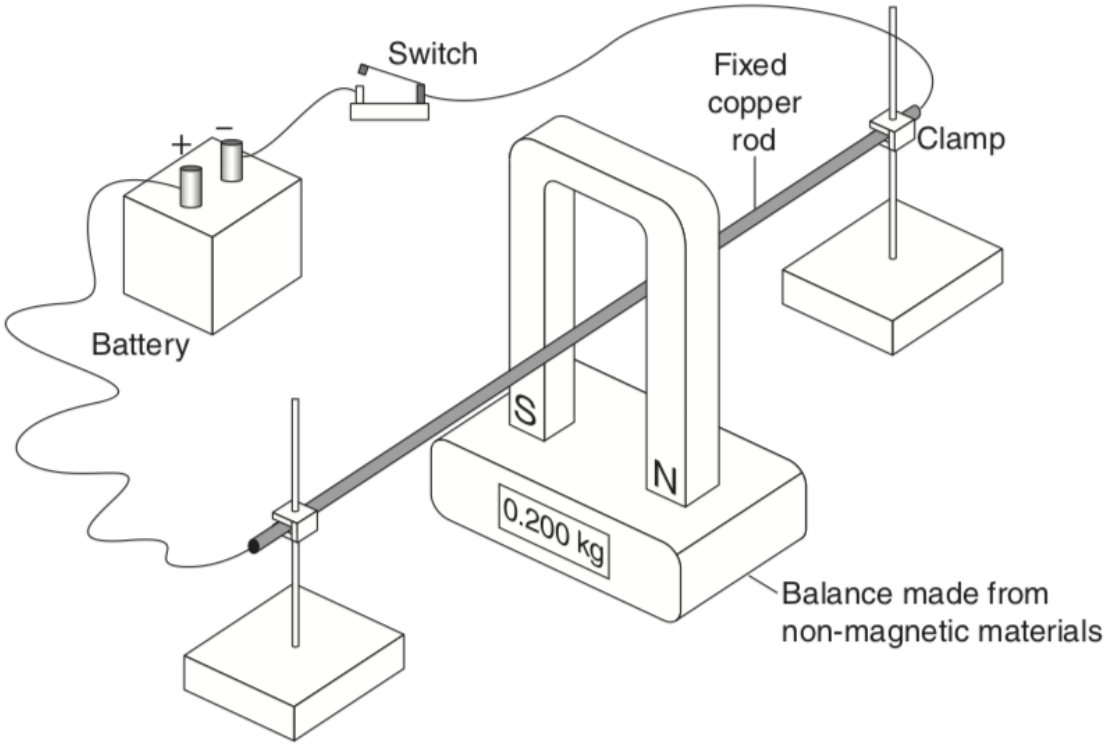
A. 1.7

B. 6.8

C. 1.7×10^4

D. 6.8×10^4

17 A magnet rests on an electronic balance. A rigid copper rod runs horizontally through the magnet, at right angles to the magnetic field. The rod is anchored so that it cannot move.



Which expression can be used to calculate the balance reading when the switch is closed?

A. $0.200\ \text{kg} + BIl$

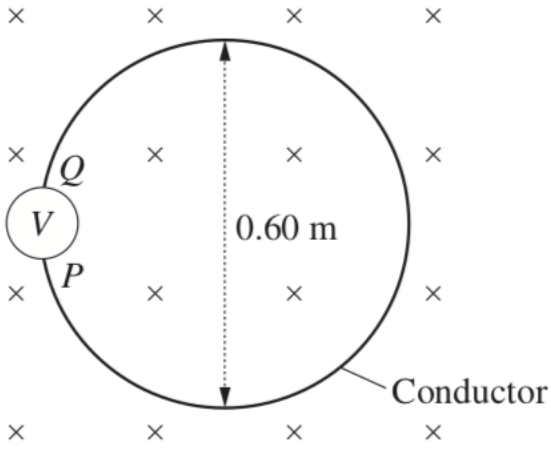
B. $0.200\ \text{kg} + \dfrac{BIl}{9.8}$

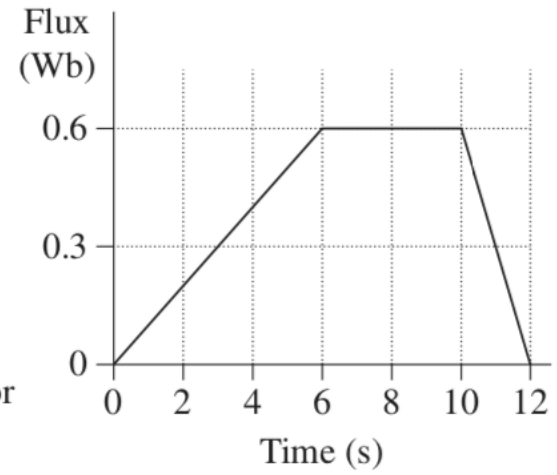
C. $0.200\ \text{kg} - BIl$

D. $0.200\ \text{kg} - \dfrac{BIl}{9.8}$

Question 27 (5 marks)

The diagram shows an electric circuit in a magnetic field directed into the page. The graph shows how the flux through the conductive loop changes over a period of 12 seconds.





(a) Calculate the maximum magnetic field strength within the stationary loop during the 12-second interval. **2**

.....

.....

.....

.....

(b) Calculate the maximum voltage generated in the circuit by the changing flux. In your answer, indicate the polarity of the terminals *P* and *Q* when this occurs. **3**

.....

.....

.....

.....

.....

.....

2016:

1 Some mobile phones are recharged at a power point using a charger that contains a transformer.

What is the purpose of the transformer?

(A) To convert AC at the power point to DC

(B) To convert DC at the power point to AC

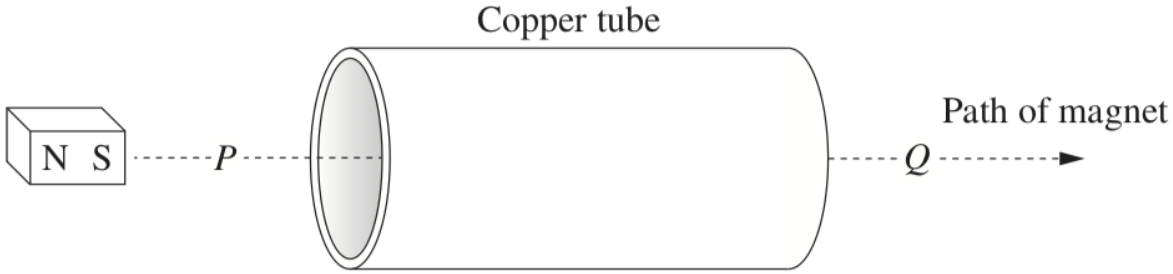
(C) To increase the AC voltage at the power point

(D) To decrease the AC voltage at the power point

---

7 A magnet passes through a copper tube at constant velocity along the path shown.

A current is induced in the tube by the motion of the magnet.



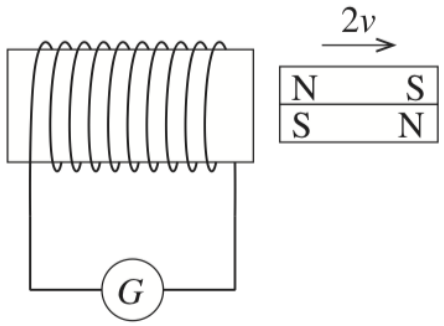
Which row of the table correctly describes the forces acting between the tube and the magnet at points *P* and *Q*?

	Force at P	*Force at Q*
(A)	Attraction	Repulsion
(B)	Repulsion	Attraction
(C)	Attraction	Attraction
(D)	Repulsion	Repulsion

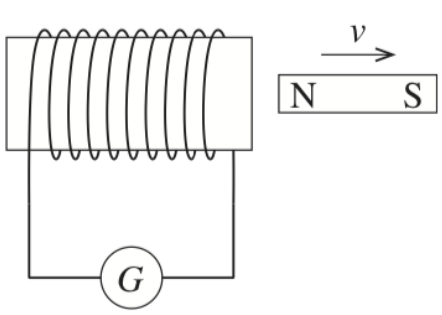
---

8 Which movement of the magnet(s) will produce the greatest deflection of the galvanometer?

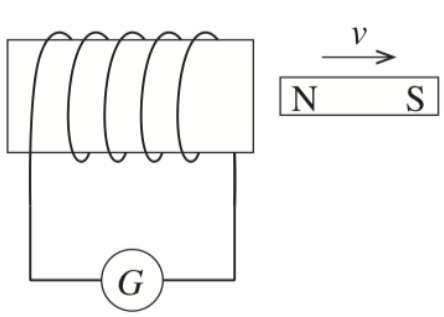
(A)



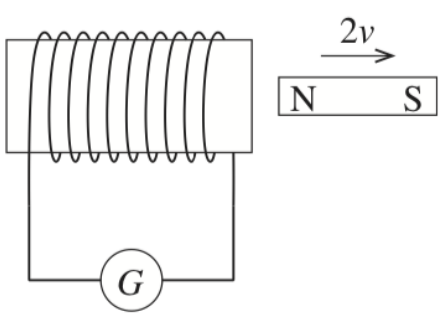
(B)



(C)

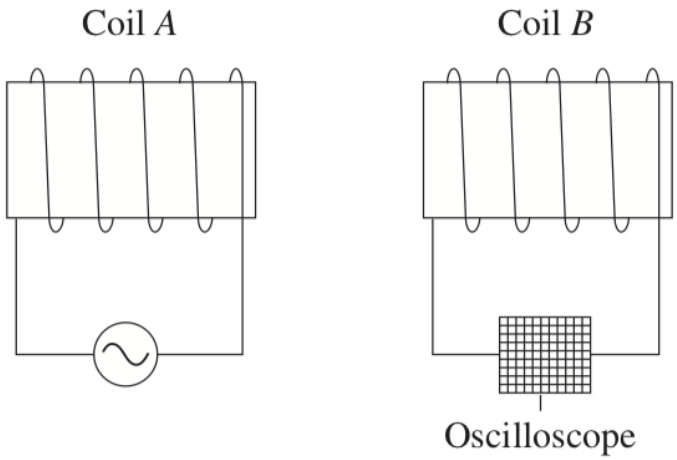


(D)



Question 22 (6 marks)

(a) When an alternating current is passed through coil *A*, a voltage is observed on the oscilloscope connected to coil *B*. **2**



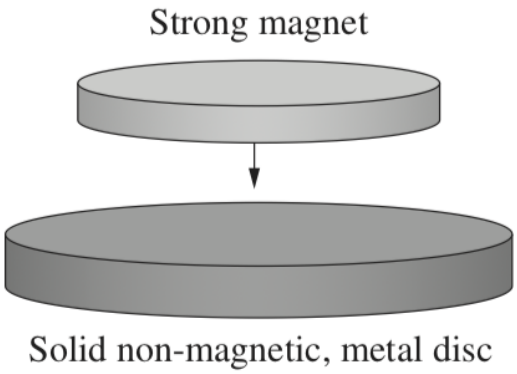
How could a bar magnet be used, instead of coil *A*, to produce a similar pattern on the oscilloscope?

.....

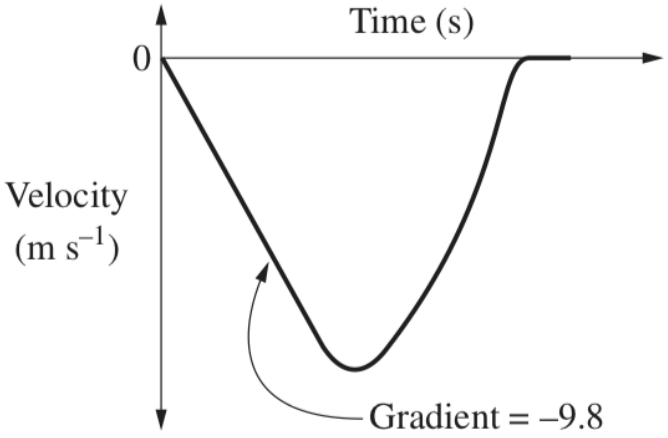
.....

.....

(b) A strong magnet is at rest a few centimetres above a solid metal disc made of a non-magnetic metal. The magnet is then dropped. **4**



The velocity of the magnet is shown in this graph.



Account for the shape of the graph.

.....

.....

.....

.....

.....

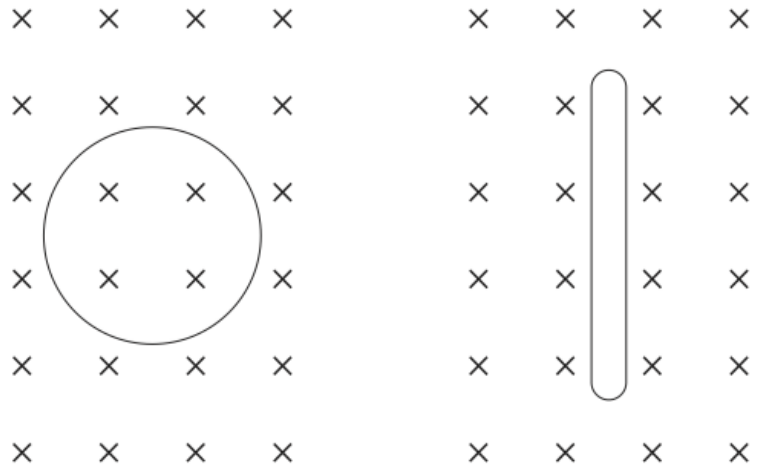
.....

.....

.....

2015:

15 A circular loop of wire is stationary in a magnetic field. The sides are then pushed together to change the shape, as shown in the diagram.



Before After

As the loop is compressed, a current is induced.

Which row of the table shows the direction of the current and explains why it is induced?

	Current direction	*Why the current is induced*
(A)	Clockwise	Change in magnetic flux
(B)	Anticlockwise	Change in magnetic flux
(C)	Clockwise	Change in magnetic flux density
(D)	Anticlockwise	Change in magnetic flux density

Question 25 (6 marks)

(a) Outline the conversion of electrical energy by devices in the home into TWO other forms of energy. **3**

.....

.....

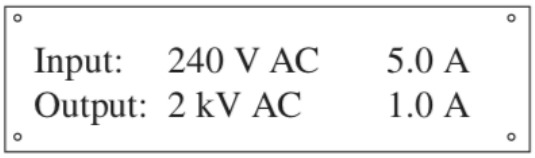
.....

.....

.....

.....

(b) The diagram shows a label on a transformer used in an appliance. **3**



Explain why the information provided on the label is not correct. Support your answer with calculations.

.....

.....

.....

.....

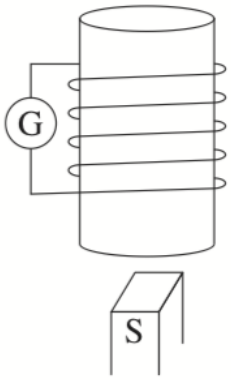
.....

.....

.....

2014:

7 The diagram shows a magnet moving upward into a coil.



Which row of the table correctly identifies the direction of the induced current as viewed from the top, and the direction of the magnetic field inside the coil?

	Current direction	*Magnetic field direction*
(A)	Anticlockwise	↓
(B)	Anticlockwise	↑
(C)	Clockwise	↑
(D)	Clockwise	↓

8 Why is an iron core used in a transformer?

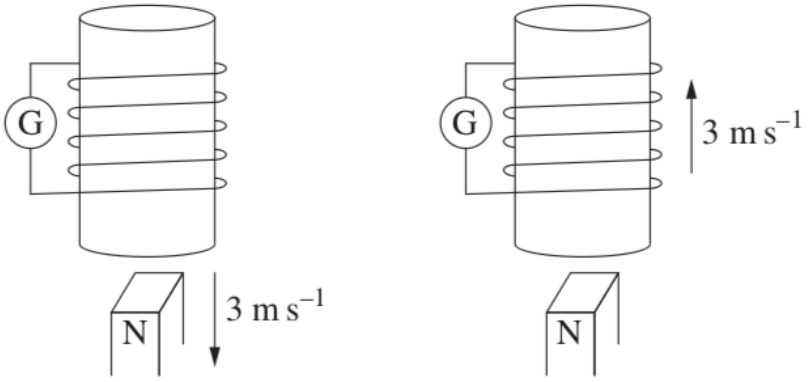
(A) To limit eddy currents

(B) To reduce the heat generated

(C) To separate the magnetic fields

(D) To increase the linkage of the flux

10 The diagram shows two experiments. In *Experiment 1*, the magnet is moved away from the coil. In *Experiment 2*, the coil is moved away from the magnet.



Experiment 1 *Experiment 2*

Why is the same electromotive force (emf) produced in both experiments?

(A) Energy is conserved.

(B) The motor effect generates the same force.

(C) The relative motion between the coil and the magnet is the same.

(D) Both the direction of the magnetic field and the direction of the motion change.

---

13 Which of the following is a consequence of the motor effect?

(A) Rapid heating in an induction cooktop

(B) Minimising energy loss in transmission lines

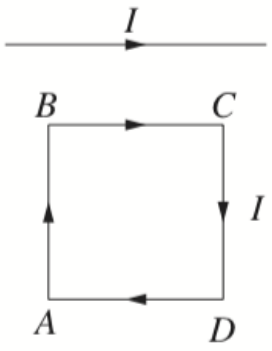
(C) The wire loops of an operating transformer pulling its coils together

(D) A superconductor repelling small magnetic dust particles vertically above it

---

Question 23 (3 marks)

A square current-carrying wire loop is placed near a straight current-carrying conductor, as shown in the diagram. **3**



Explain how the current in the wire loop affects the straight conductor.

.....

.....

.....

.....

.....

.....

.....

.....

Question 24 (5 marks)

The primary winding of a transformer contains 2000 turns. The primary AC voltage is 23 000 volts and the output voltage is 660 000 volts.

(a) Calculate the number of turns on the secondary winding. **2**

.....

.....

.....

.....

(b) If the current in the primary winding of the transformer is 100 A, and the secondary winding has a resistance of 2000 Ω, what is the power loss in the secondary winding, assuming there is no power loss in the primary winding? (Show calculations.) **3**

.....

.....

.....

.....

.....

.....

2013:

1 An investigation is designed to determine the size of the generated current when the strength of a magnet is varied.

Which is the independent variable for this investigation?

(A) Speed of the magnet

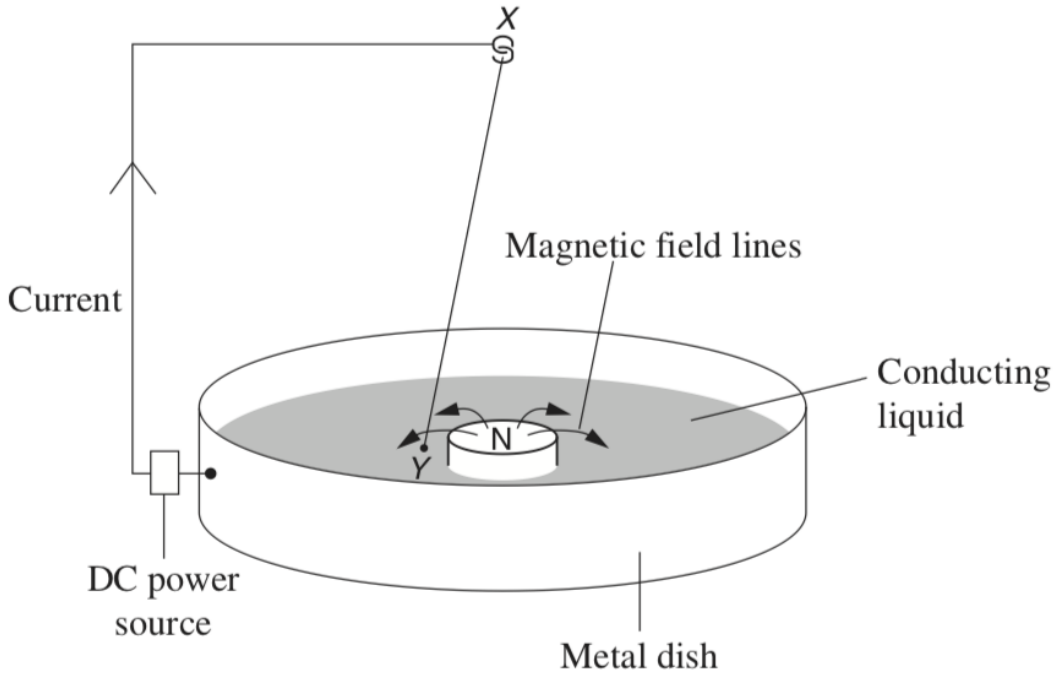
(B) Strength of the magnet

(C) Size of the generated current

(D) Distance between the coil and the magnet

---

3 The diagram shows equipment attached to a battery.



In which direction will the wire *XY* move?

(A) Clockwise

(B) Anticlockwise

(C) Towards the magnet

(D) Away from the magnet

---

7 Eddy currents are a major source of energy loss in an iron core transformer.

What is one way to minimise this energy loss?

(A) Laminate the iron core with an insulator

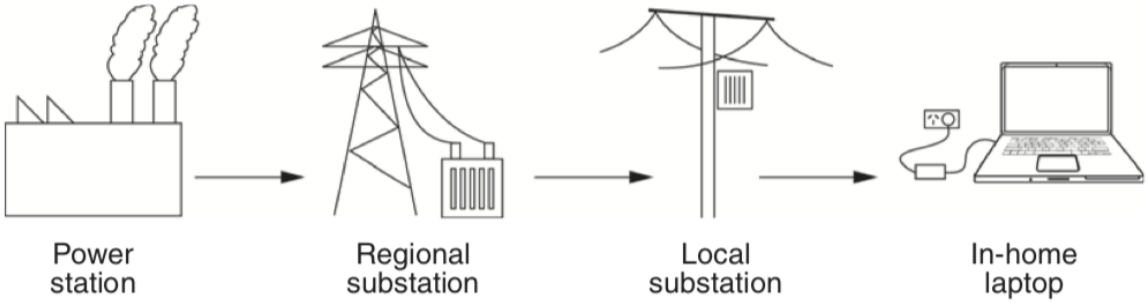
(B) Put fewer turns of wire in the primary coil

(C) Operate the transformer with a higher current

(D) Decrease the distance between the primary and secondary coils

---

10 The diagram represents the transfer of electrical energy from a power station to a laptop computer.



Which flow diagram shows the correct use of transformers in this transfer?

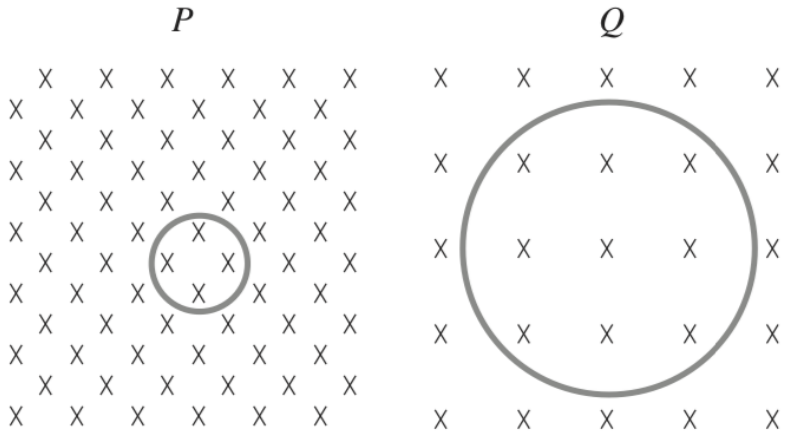
(A) Step-down → Step-up → Step-up → Step-down

(B) Step-down → Step-down → Step-up → Step-up

(C) Step-up → Step-down → Step-down → Step-down

(D) Step-up → Step-up → Step-down → Step-up

13 Different magnetic fields are passing through two copper rings, *P* and *Q*, as shown.



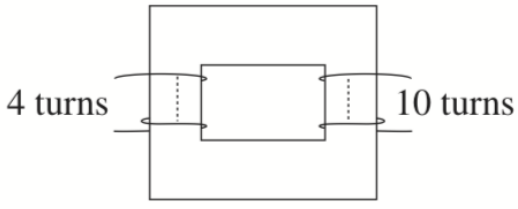
Which row of the table correctly identifies the ring with the greater magnetic flux and the ring with the greater magnetic flux density?

	Greater magnetic flux	*Greater magnetic flux density*
(A)	*P*	*P*
(B)	*Q*	*Q*
(C)	*P*	*Q*
(D)	*Q*	*P*

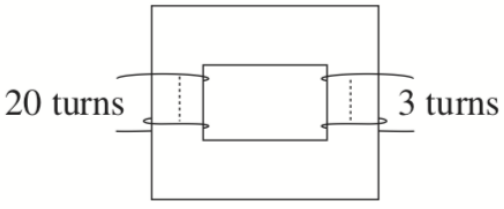
2012:

10 Which of the following ideal transformers could be used to convert an input voltage of 20 volts AC to an output voltage of 2 volts AC?

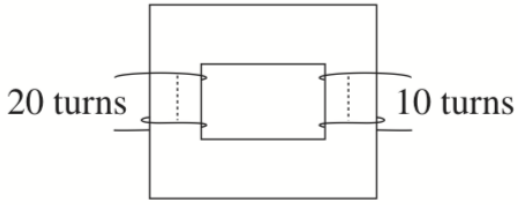
(A)



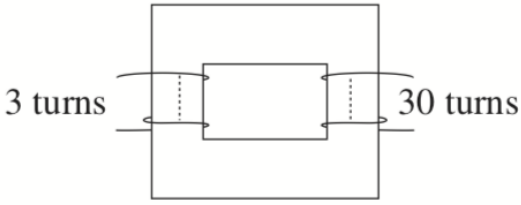
(B)



(C)

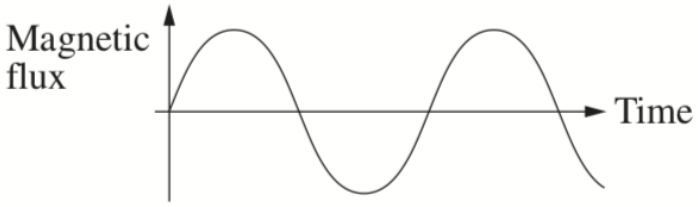


(D)



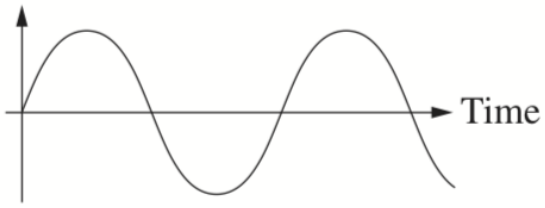
---

14 The graph shows variation in magnetic flux through a coil with time.

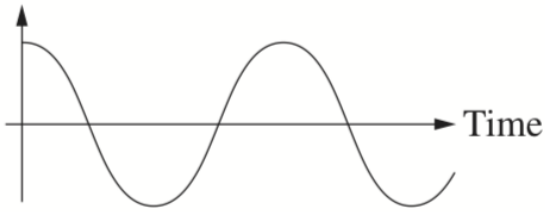


Which graph best represents the corresponding induced emf in the coil?

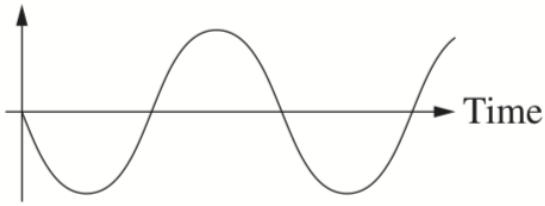
(A)



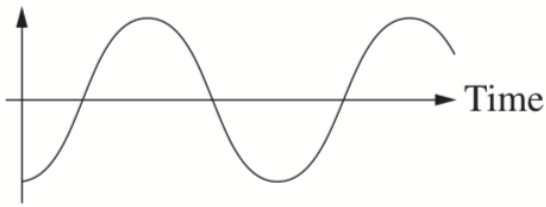
(B)



(C)

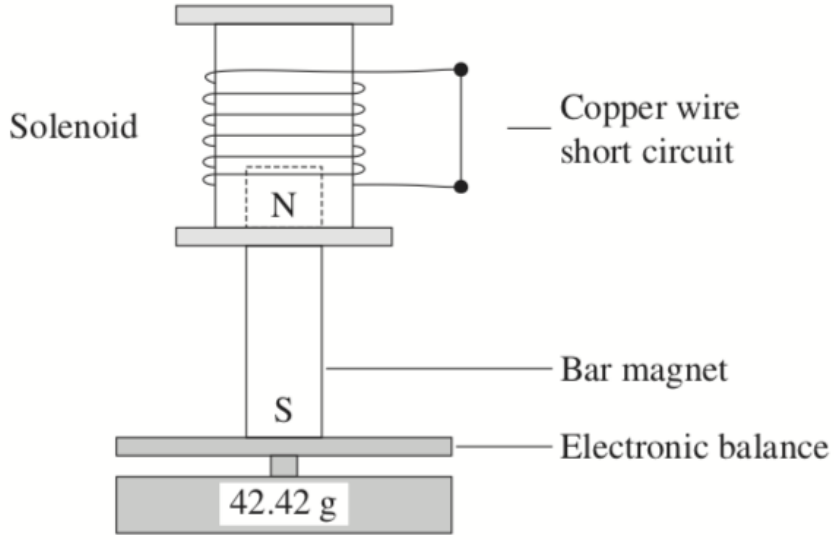


(D)



Question 22 (6 marks)

A bar magnet is placed on a sensitive electronic balance as shown in the diagram. A hollow solenoid is held stationary, such that the magnet is partly within the solenoid.



The solenoid is then lifted straight up without touching the magnet. The reading on the balance is observed to change briefly.

(a) Why does a current flow in the solenoid? **2**

.....

.....

.....

.....

(b) Explain the reason for changes in the reading on the electronic balance as the solenoid is removed. **4**

.....

.....

.....

.....

.....

.....

.....

.....

2011:

5 Which law best applies to the operation of an electrical transformer?

(A) Conservation of Mass

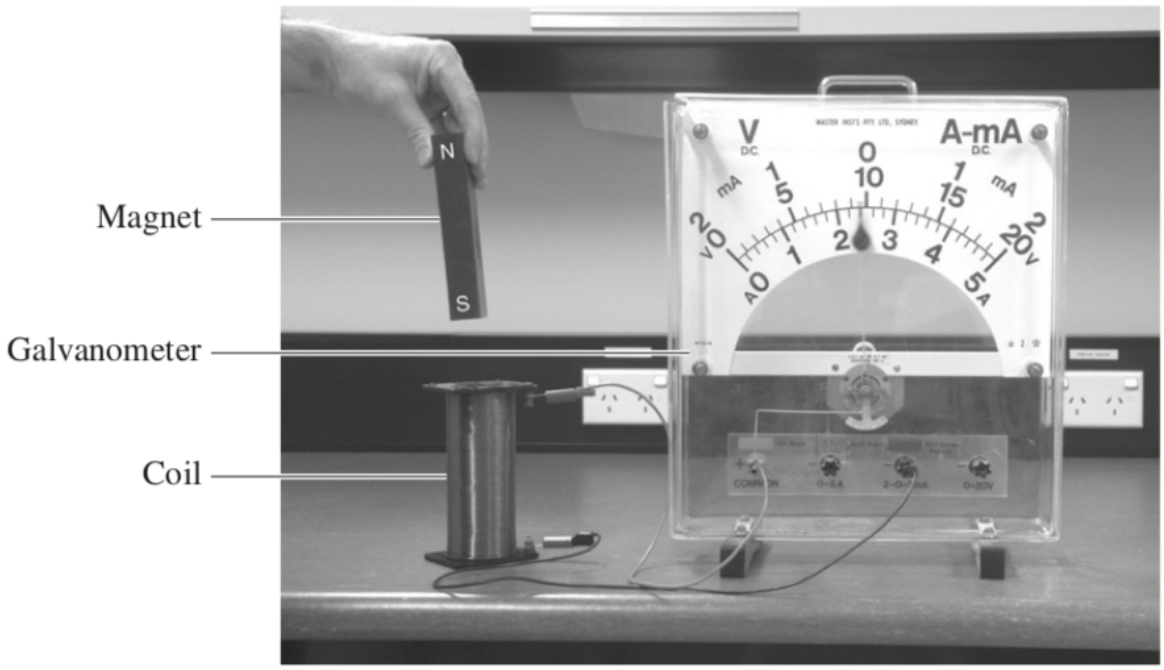
(B) Conservation of Energy

(C) Conservation of Charge

(D) Conservation of Momentum

---

11 A student set up the equipment shown to carry out a first-hand investigation.



What was the student investigating?

(A) Gravity

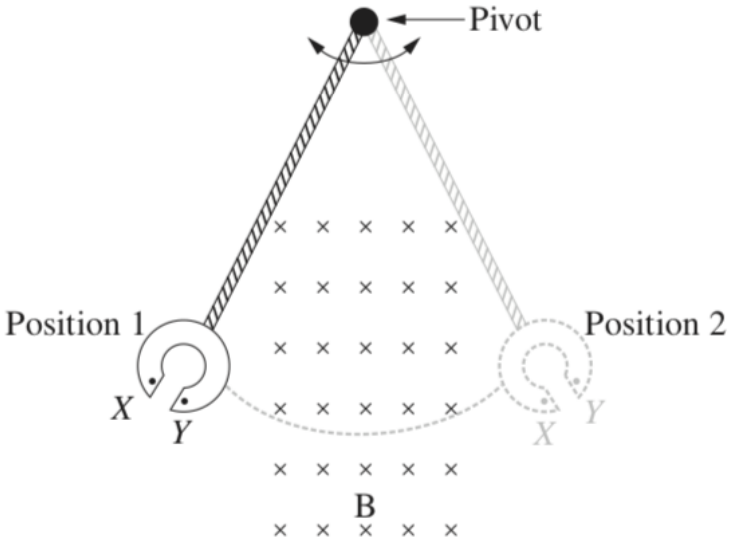
(B) The motor effect

(C) Magnetic levitation

(D) Electromagnetic induction

---

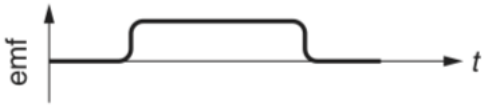
14 A heavy copper split ring is attached by a light insulating rod to a pivot to form a pendulum. A region of uniform magnetic field B is present as shown. As the pendulum swings from Position 1 to Position 2, the induced emf in the ring is measured between points *X* and *Y*.

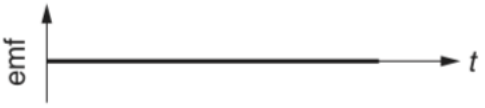


Which graph best represents the measured emf during the time that the pendulum swings from Position 1 to Position 2?

(A) 

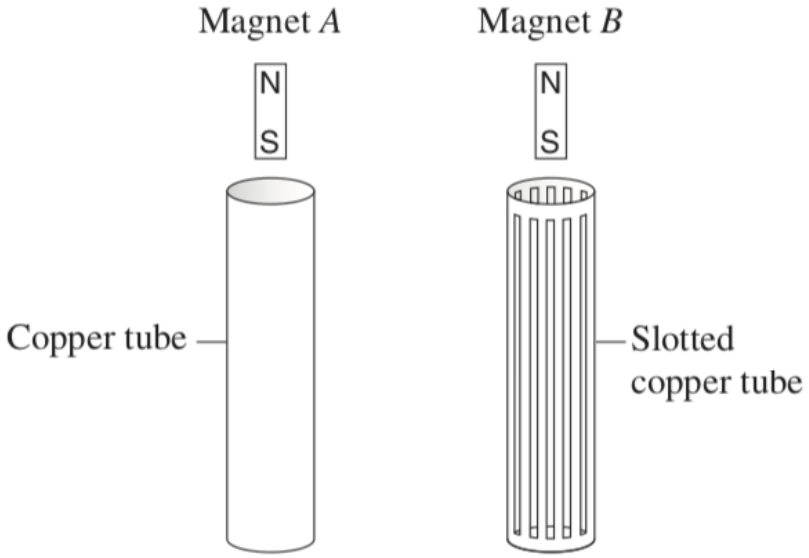
(B) 

(C) 

(D) 

Question 25 (4 marks)

Identical magnets *A* and *B* are suspended above vertical copper tubes as shown in the diagram. **4**



The magnets are dropped at the same time. Each magnet falls straight through its tube without touching the tube walls.

Which magnet leaves its tube first and why?

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Question 26 (9 marks)

(a) Use a flowchart to show how electrical energy is transferred from a power station to its point of use. **3**

2010:

8 While drilling into a tough material, the DC motor in an electric drill is slowed significantly. This causes its coils to overheat.

Why do the coils overheat?

(A) The resistance of the coils increases significantly.

(B) The increased friction on the drill is converted to heat.

(C) The back emf decreases and so the current in the coils increases.

(D) The induced eddy currents increase and so more heat is produced.

---

9 Why is high voltage used to transmit electrical energy from power stations to users?

(A) It helps to protect the system from lightning strikes.

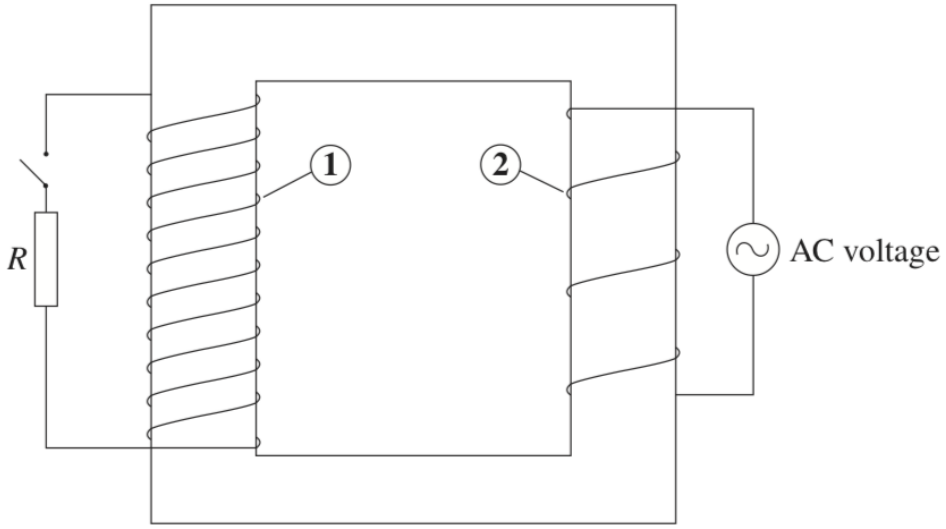
(B) It allows the supporting structures to have smaller insulators.

(C) It minimises the effects of the electrical resistance of the wires.

(D) It ensures that, even with voltage losses, 240 V will still reach the user.

---

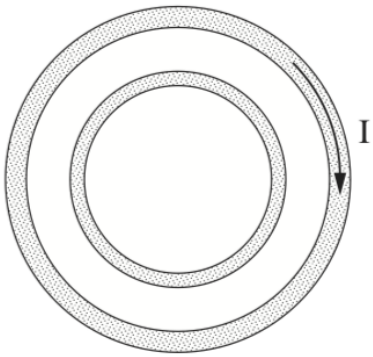
10 The diagram shows a model of a transformer in a circuit.



Which of the following correctly identifies Part 1 and Part 2 and the function of this transformer?

	Part 1	*Part 2*	*Function of transformer*
(A)	Primary coil	Secondary coil	Step-up
(B)	Secondary coil	Primary coil	Step-down
(C)	Primary coil	Secondary coil	Step-down
(D)	Secondary coil	Primary coil	Step-up

11 Two copper rings lie in the same plane as shown.



An increasing current flows clockwise around the outer ring.

What happens in the inner ring?

(A) A decreasing clockwise current flows.

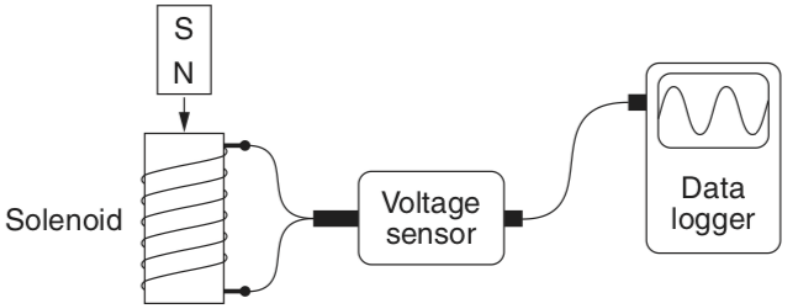
(B) A decreasing anticlockwise current flows.

(C) An increasing clockwise current flows.

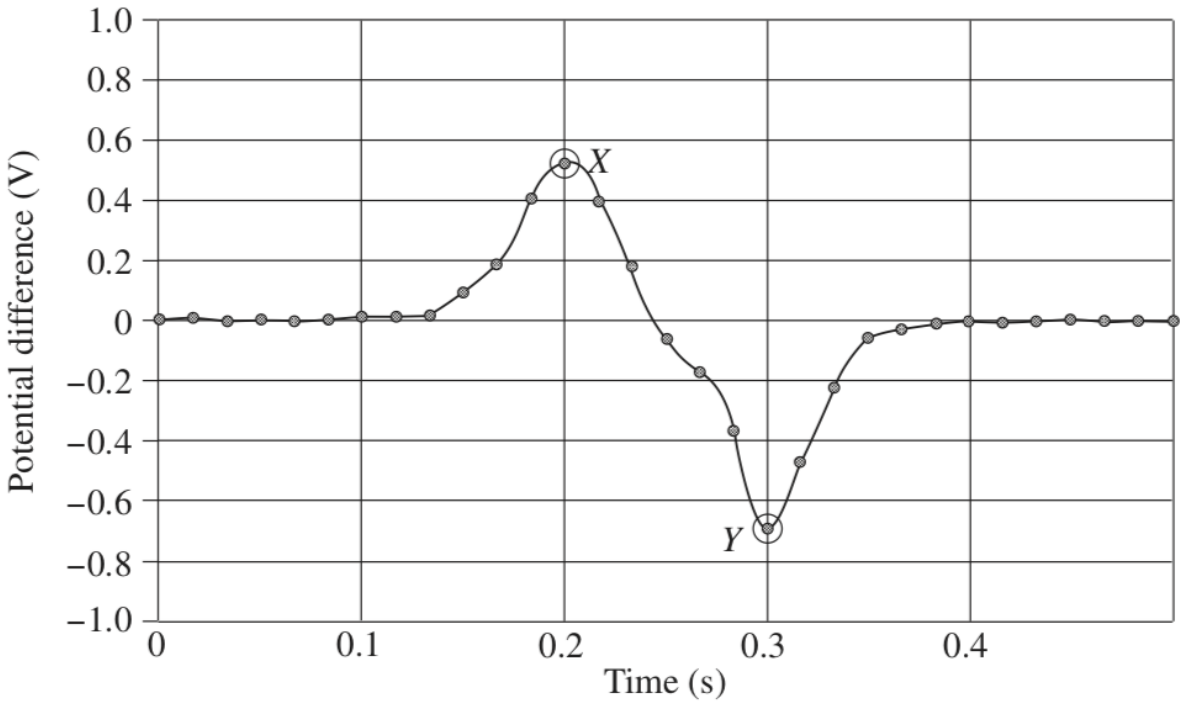
(D) An increasing anticlockwise current flows.

Question 26 (5 marks)

A bar magnet is dropped through the centre of a solenoid connected to a data logger as shown.



The data are recorded in the graph as shown.



(a) Why is the magnitude of the potential difference at *Y* greater than at *X*? **2**

.....

.....

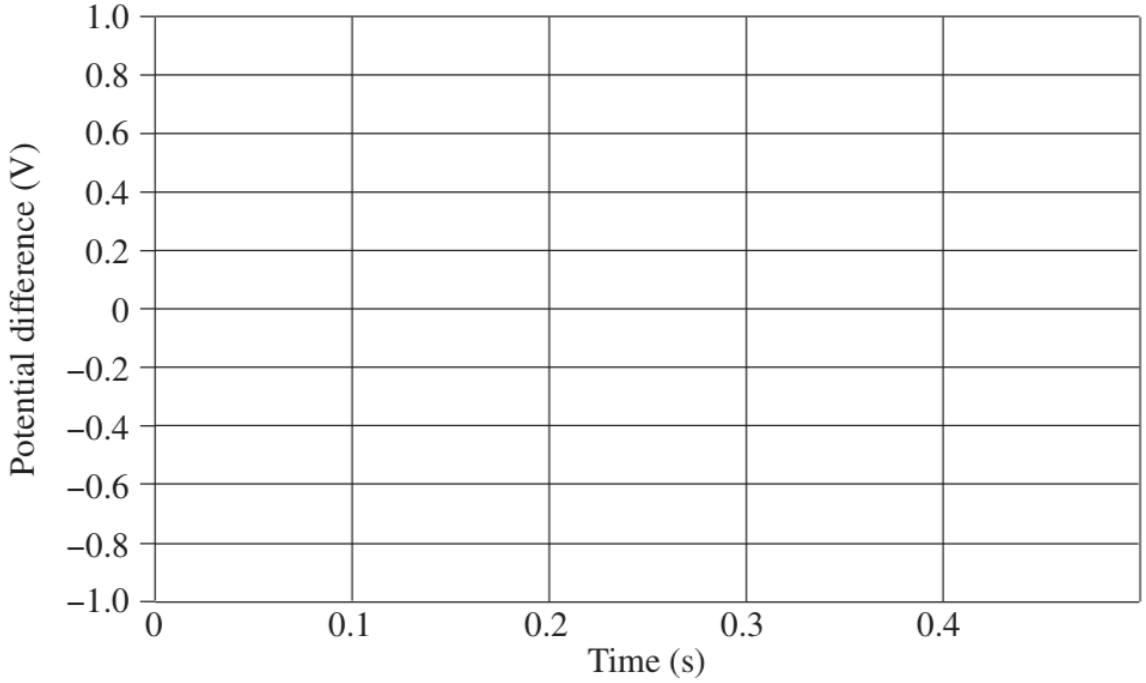
.....

.....

(b) The magnet is dropped again with two changes being made. **3**

1. It is dropped from a greater height.
2. The south pole of the magnet is pointing down.

Sketch a graph that represents the most likely outcome of this new experiment.



2009:

8 What is an essential requirement for the operation of a step-down transformer?

(A) A laminated iron core

(B) A non-conducting core

(C) A magnetic interaction between the primary and secondary coils

(D) An electrical connection between the primary and secondary coils

2008:

Question 22 (3 marks)

Explain why the development of transformers was necessary to enable the large-scale distribution of electrical power. **3**

.....

.....

.....

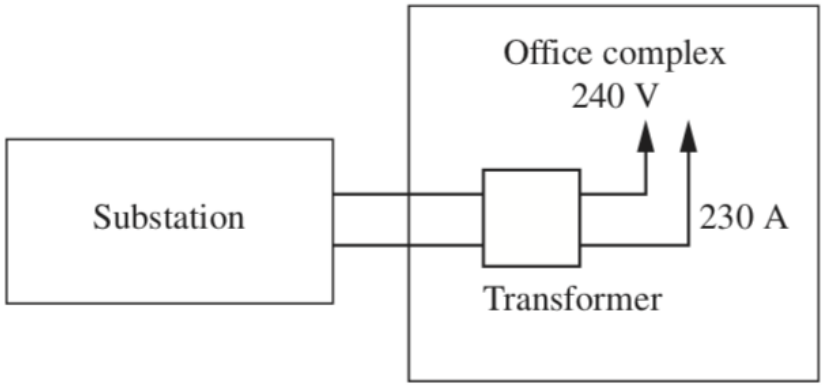
.....

.....

2007:

Question 26 (6 marks)

An electricity substation delivers a current of 10 A at a voltage of 6 kV to an office complex. The office complex uses a transformer to provide a current of 230 A at a voltage of 240 V.



(a) Explain why AC is preferable to DC as an input current for transformers. **2**

.....

.....

.....

.....

(b) Outline possible causes of energy loss in the transformer. **2**

.....

.....

.....

.....

(c) Calculate the energy lost by the transformer in eight hours. **2**

.....

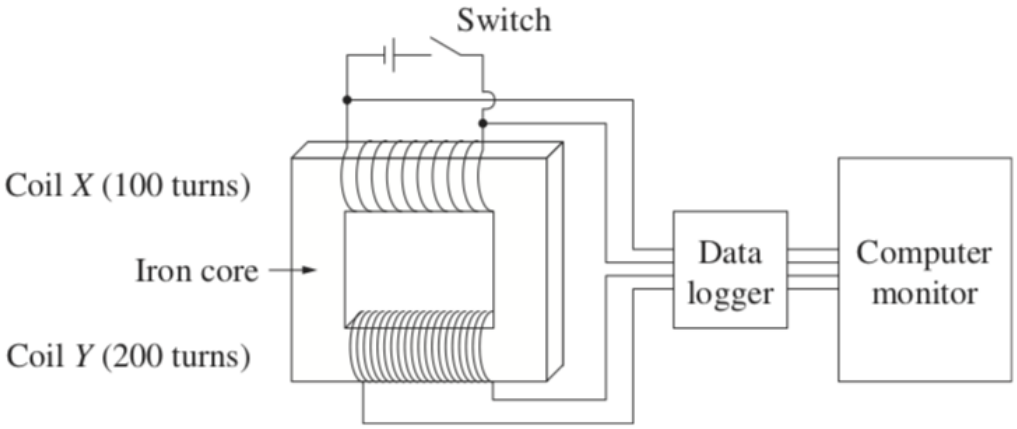
.....

.....

.....

2006:

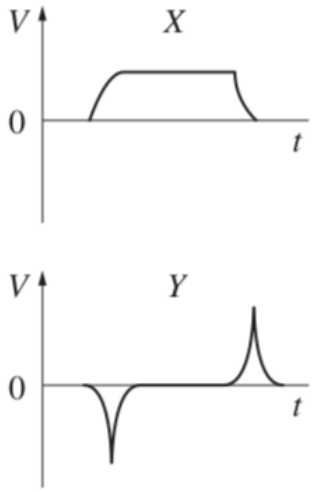
10 The apparatus shown is designed to investigate the operation of a transformer.



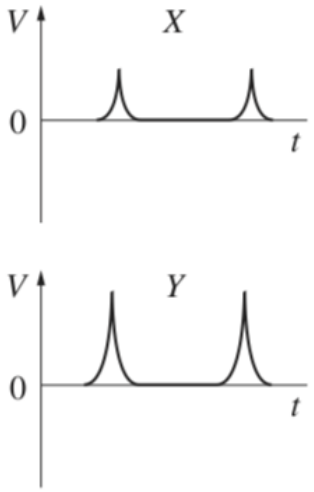
A student closes the switch for a short time, then opens it. The data logger records values of voltage for both coils for the duration of the investigation. The data logger software displays the results as a pair of voltage–time graphs on a computer monitor.

Which pair of graphs best depicts the student's results?

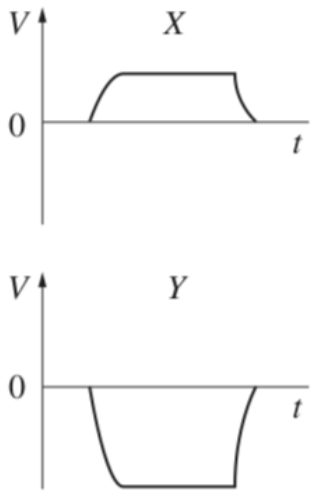
(A)



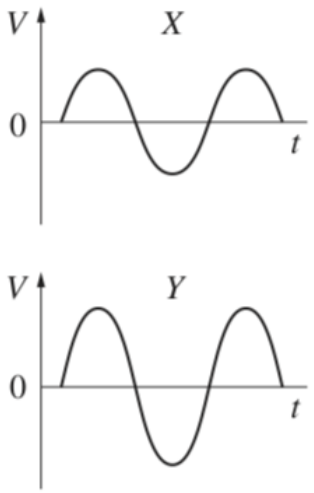
(B)



(C)



(D)



Question 22 (5 marks)

A student drops a bar magnet onto a large block of copper resting on the floor. The magnet falls towards the copper, slowing down as it comes close, then landing gently.

(a) Explain the physics responsible for this observation. **3**

.....

.....

.....

.....

.....

.....

Question 24 (3 marks)

Discuss the origins of unwanted heat production in transformers and ways in which these can be overcome. **3**

.....

.....

.....

.....

.....

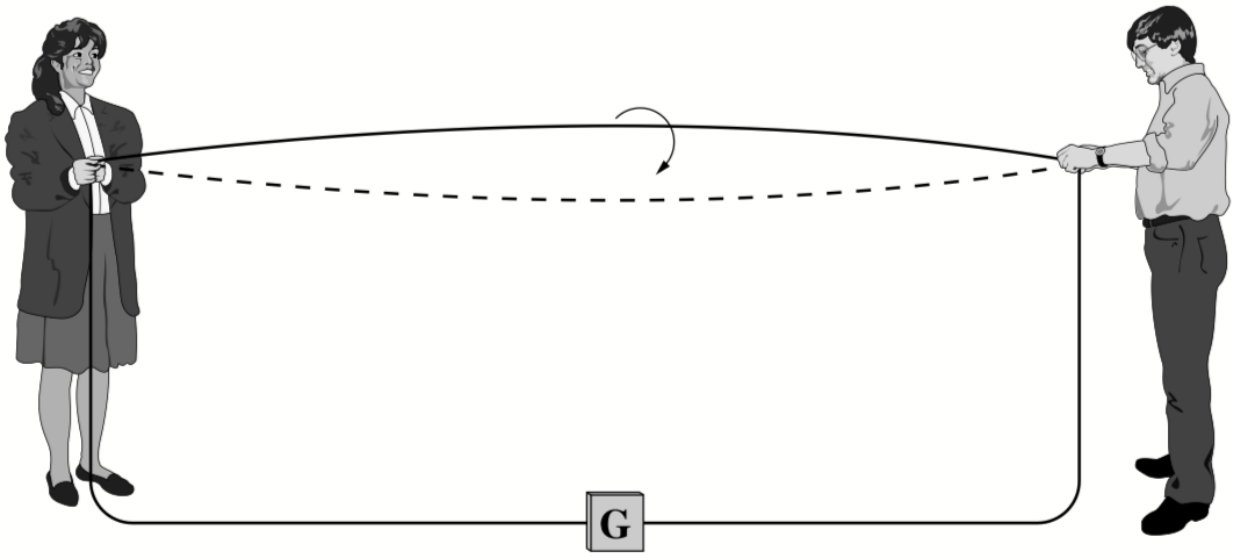
.....

.....

.....

2005:

6 In a particular experiment a long length of copper wire of very low resistance is rotated by two students. The ends of the wire are connected to a galvanometer, G, and a current is detected.



Which of the following is LEAST likely to affect the amount of current produced?

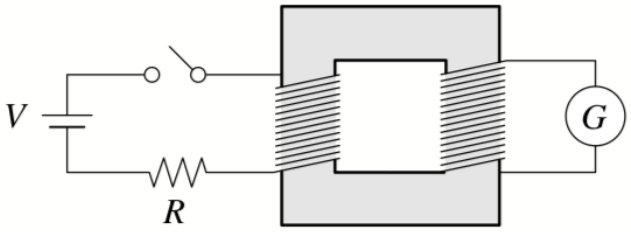
(A) The length of the rotating wire

(B) The thickness of the rotating wire

(C) The speed with which the wire is rotated

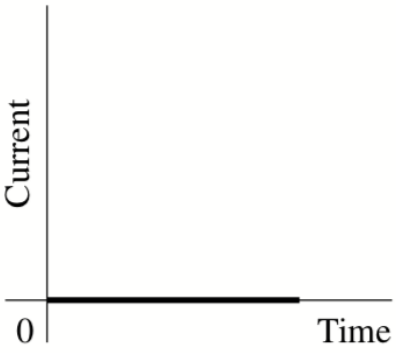
(D) Whether the wire is oriented north-south or east-west

8 The primary coil of a transformer is connected to a battery, a resistor and a switch. The secondary coil is connected to a galvanometer.

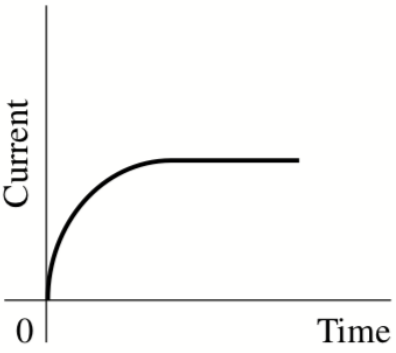


Which of the following graphs best shows the current flow in the galvanometer when the switch is closed?

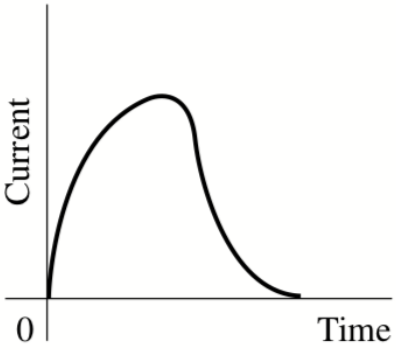
(A)



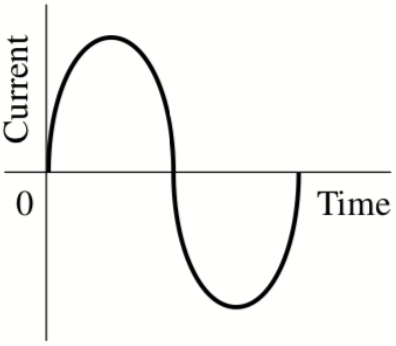
(B)



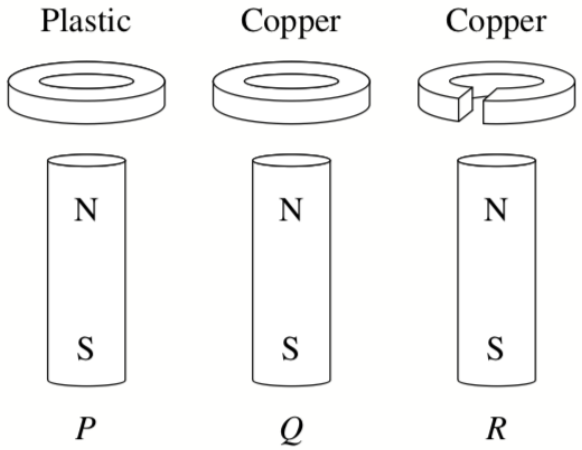
(C)



(D)



9 Three rings are dropped at the same time over identical magnets as shown below.



Which of the following describes the order in which the rings *P*, *Q* and *R* reach the bottom of the magnets?

(A) They arrive in the order *P*, *Q*, *R*.

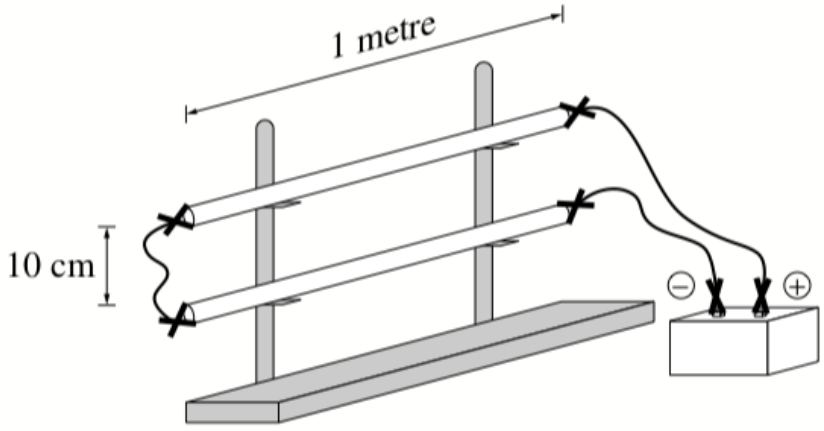
(B) They arrive in the order *P*, *R*, *Q*.

(C) Rings *P* and *R* arrive simultaneously, followed by *Q*.

(D) Rings *Q* and *R* arrive simultaneously, followed by *P*.

Question 21 (6 marks)

Two thin metal tubes one metre long were supported in a vertical wooden rack as shown in the diagram.



The two ends were connected together, then the other two ends were connected briefly to a car battery as shown in the diagram. It was observed that one of the tubes jumped upward as the connection was made.

(a) Explain why only one tube jumped upward. **2**

.....

.....

.....

.....

(b) Each tube has a mass of 1×10^{-2} kg, and the tubes lie on the rack 10 cm apart. **3**

What minimum current flows when one tube jumps?

.....

.....

.....

.....

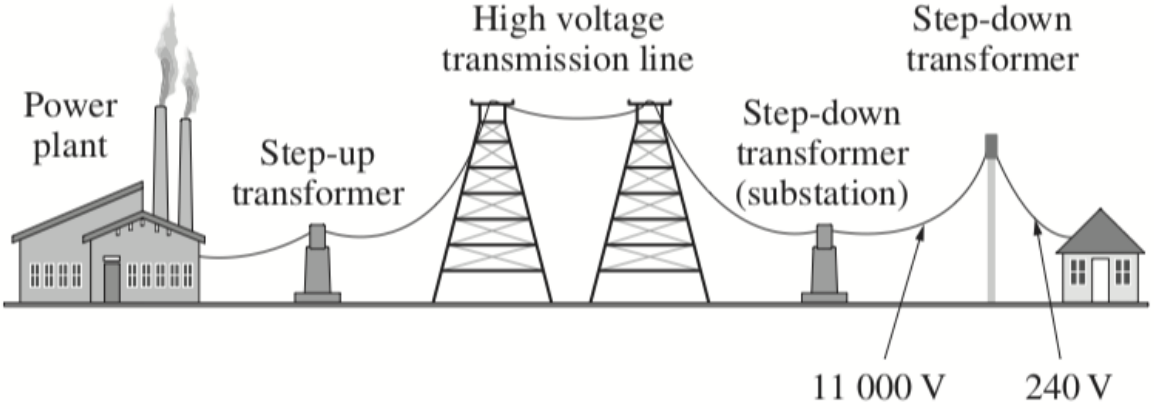
(c) What is the implication of this result for power distribution networks? **1**

.....

.....

Question 22 (5 marks)

A schematic diagram of a system to supply electricity to a house is shown below.



J D Cutnell & K W Johnson, 2001, *Physics*, 5th edn. Reprinted with permission of John Wiley & Sons, Inc.

The step-down transformer in the substation has a turns ratio of 30 : 1.

(a) What is the voltage carried by the high voltage transmission line? **1**

.....

.....

(b) Identify the causes of the two main energy losses in the transmission of electricity between the power plant and the house. **2**

.....

.....

.....

.....

2004:

7 Why do some electrical appliances in the home need a transformer instead of operating directly from mains power?

(A) They require a voltage lower than the mains voltage.

(B) They require a source of energy that is DC rather than AC.

(C) They require an alternating current at a frequency other than 50 Hz.

(D) They consume less energy than a similar device without a transformer.

8 A transformer which has 60 turns in the primary coil is used to convert an input of 3 V into an output of 12 V.

Which description best fits this transformer?

	Type of transformer	*Number of turns in secondary coil*
(A)	Step up	15
(B)	Step down	240
(C)	Step up	240
(D)	Step down	15

2003:

8 A neon sign requires a 6000 V supply for its operation. A transformer allows the neon sign to operate from a 240 V supply.

What is the ratio of the number of secondary turns to the number of primary turns for the transformer?

(A) 1 : 40

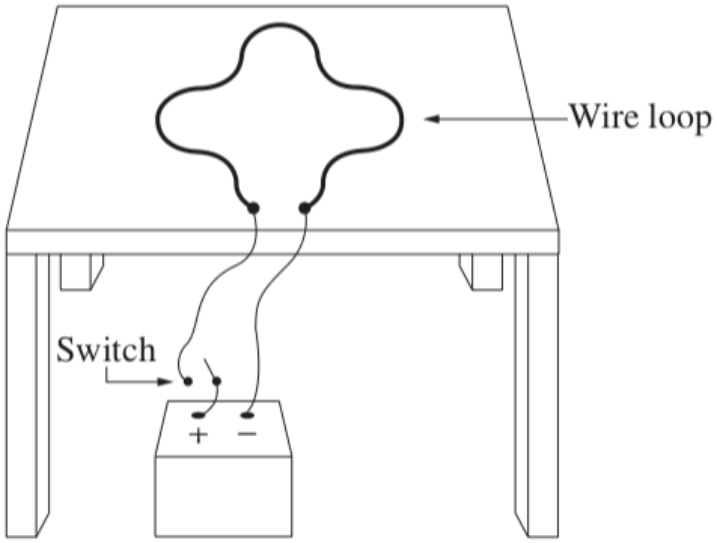
(B) 1 : 25

(C) 25 : 1

(D) 40 : 1

---

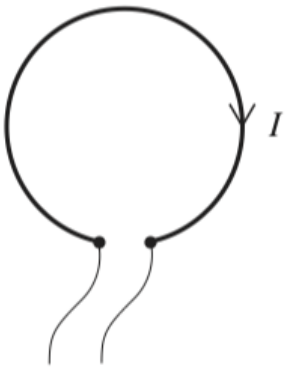
10 A flexible wire loop is lying on a frictionless table made from an insulating material. The wire can slide around horizontally on the table and change shape freely, but it cannot move vertically. The loop is connected to a power supply, a switch and two terminals fixed to the table as shown.



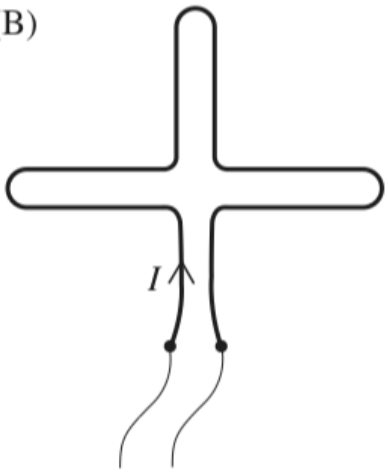
When the switch is closed, a current I flows around the loop.

Which of the following diagrams most closely represents the final shape of the loop after the switch is closed?

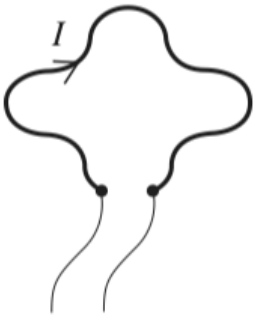
(A)



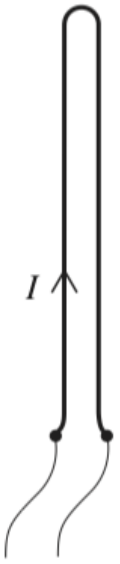
(B)



(C)



(D)



Question 20 (4 marks)

Two solenoids (coils) with hollow cores are suspended using string so that they are hanging in the positions shown below. The solenoids are free to move in a pendulum motion. **4**

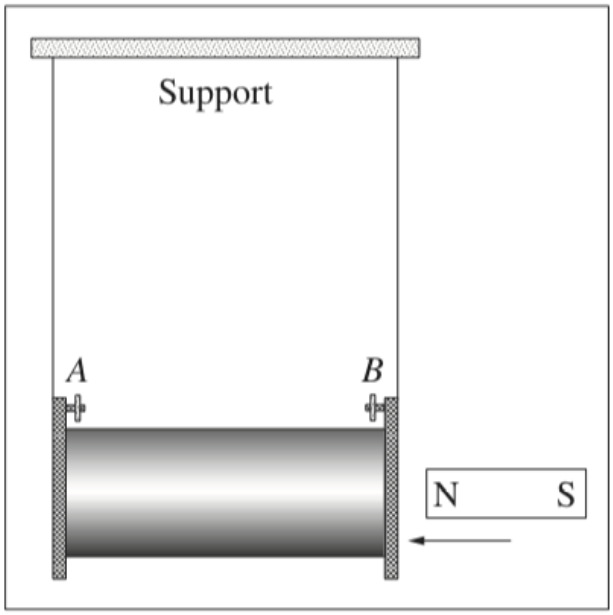


Figure 1 – First investigation

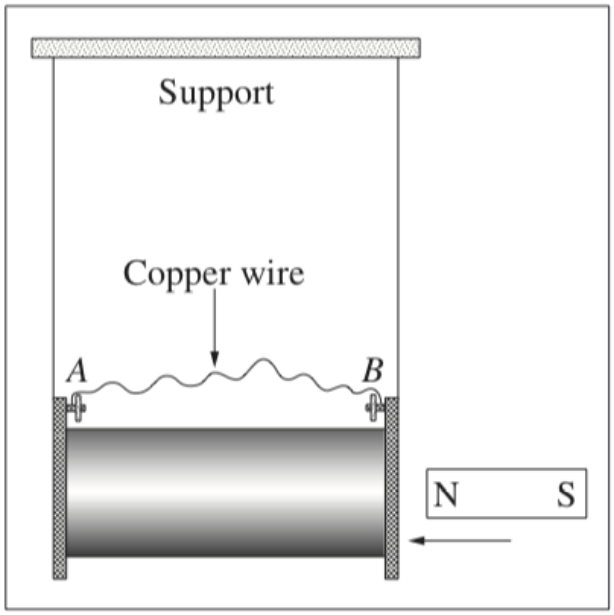


Figure 2 – Second investigation

In the first investigation shown in Figure 1, a strong bar magnet is moved towards the solenoid until the north end of the magnet enters the solenoid and then the motion of the magnet is stopped.

In the second investigation, shown in Figure 2, a thick copper wire is connected between the two terminals, *A* and *B*, at the ends of the solenoid. The motion of the magnet is repeated exactly in this second investigation.

Explain the effect of the motion of the magnet on the solenoid in the two investigations.

.....

.....

.....

.....

.....

.....

.....

.....

Question 21 (5 marks)

(a) Explain the relationship between the current in the primary coil and the current in the secondary coil of an ideal step-down transformer in relation to the conservation of energy. **3**

.....

.....

.....

.....

.....

.....

(b) Explain why a transformer will work in an AC circuit but not in a DC circuit. **2**

.....

.....

.....

.....

2002:

6 What is the role of a transformer at an electrical power station?

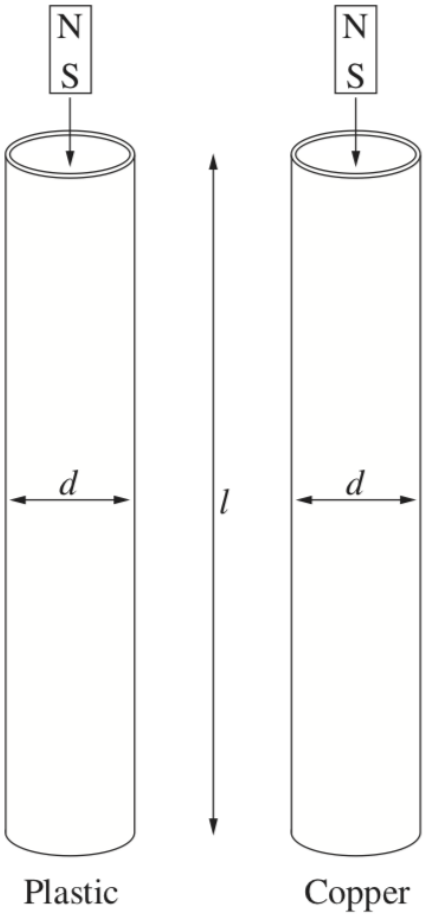
(A) To reduce heating in the transmission lines by stepping up the voltage

(B) To reduce heating in the transmission lines by stepping up the current

(C) To increase heating in the transmission lines by stepping up the voltage

(D) To increase heating in the transmission lines by stepping up the current

9 In a student experiment, a bar magnet is dropped through a long plastic tube of length l and diameter d. The time taken for it to hit the floor is recorded.



The experiment is repeated using a copper tube of the same length and diameter.

Which of the following statements is correct?

(A) The magnet will take the same time to hit the floor in both cases.

(B) The magnet will come to rest in the middle of the copper tube.

(C) The magnet will take longer to fall through the copper tube.

(D) The magnet will take longer to fall through the plastic tube.

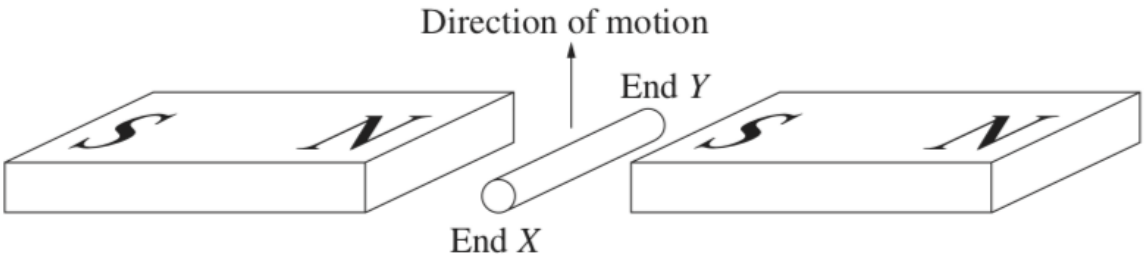
Question 23 (7 marks)

(a) State Lenz's law. **1**

.....

.....

(b) When the metal rod is moved upwards through the magnetic field as shown in the diagram, an emf is induced between the two ends.



(i) Which end of the rod is negative? **1**

.....

(ii) Explain how the emf is produced in the rod. **3**

.....

.....

.....

.....

.....

.....

(c) Explain how the principle of induction can be used to heat a conductor. **2**

.....

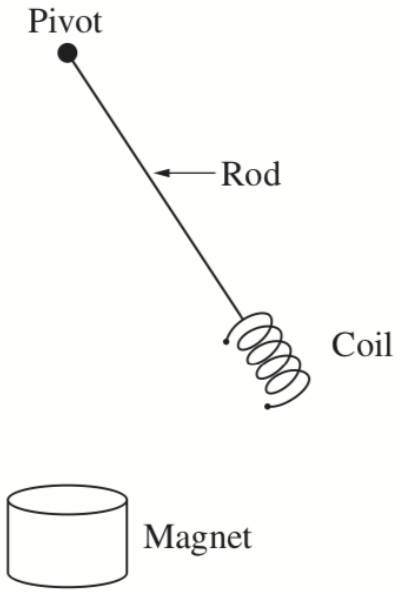
.....

.....

.....

2001:

8 A light rod has a coil of insulated copper wire fixed at one end and is pivoted at the other end. The result is a pendulum which is free to swing back and forth. A magnet is placed underneath this pendulum. The arrangement is shown in the diagram.



The pendulum is pulled back and then allowed to swing. Which of the following would cause the pendulum to come to rest most quickly?

(A) Replacing the magnet with a stronger one

(B) Shortening the pendulum

(C) Replacing the rod with a heavier one

(D) Connecting the ends of the coil by a piece of copper wire

---

11 A transformer has a primary coil with 60 turns and a secondary coil with 2300 turns.

If the primary voltage to the transformer is 110 V, what is the secondary voltage?

(A) 2.4×10^{-4} V

(B) 2.4×10^{2} V

(C) 1.3×10^{3} V

(D) 4.2×10^{3} V
