



**Anglican High School
Secondary Four
Preliminary Examination
2025**

S4

CANDIDATE
NAME

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CLASS

4	
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INDEX NUMBER

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PHYSICS

Paper 1 Multiple Choice

6091/01

29 August 2025

1 hour

Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, highlighters, glue or correction tape.

Write your name, index number and class on the Answer Sheet in the spaces provided unless this has been done for you.

There are **forty** questions on this paper. Answer **all** questions. For each question, there are four possible answers **A, B, C** and **D**.

Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done on this question paper.

The use of an approved scientific calculator is expected, where appropriate.

This document consists of **18** printed pages.

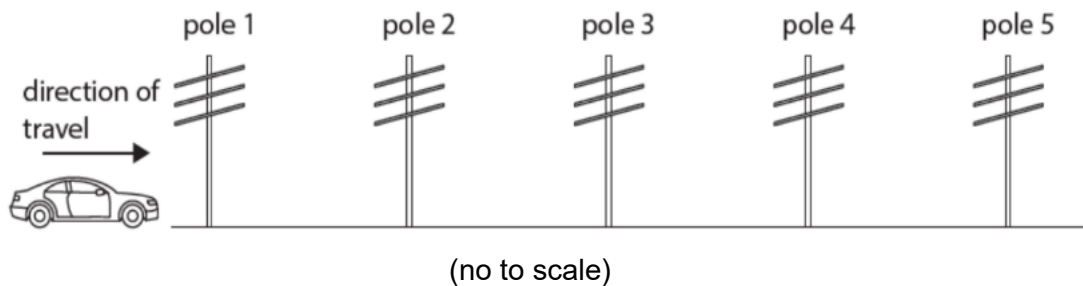
1 Which pair of units measure the same quantity?

- A A and C / s
- B W and J s
- C N and kg m / s
- D N m² and Pa

2 Which instrument can be directly used to measure the circumference of a cup?

- A digital calipers
- B measuring tape
- C digital micrometer screw gauge
- D metre rule

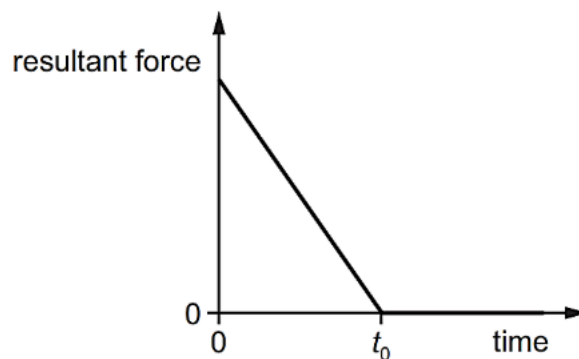
3 Five poles are positioned equally apart along a straight road. A car starts from rest and accelerates at an increasing rate from pole 1 to pole 2 till it reaches maximum acceleration. It then continues with this maximum acceleration from pole 2 to pole 3. The car then travels along the road with zero acceleration until it reaches pole 4. Between pole 4 and 5, it starts to decelerate at a decreasing rate.



The time intervals for the car to travel between the poles are measured.
Which time interval is the shortest?

- A pole 1 to pole 2
- B pole 2 to pole 3
- C pole 3 to pole 4
- D pole 4 to pole 5

- 4 A small jet plane is at rest on a runway, ready for take-off. The average acceleration during take-off is 2.2 m/s^2 and the minimum speed required for take-off is 66 m/s . What is the minimum length of runway required for the jet plane to take off?
- A 150 m
B 990 m
C 1500 m
D 1900 m
- 5 A man of mass 50 kg stands on an electronic balance in a lift. The balance reads 600 N. The gravitational field strength, g is 10 N/kg . Which of the following describes the motion of the lift?
- A accelerating upwards
B accelerating downwards
C moving upwards with constant speed
D moving downwards with constant speed
- 6 A resultant force acts on an object and causes it to move in a straight line. The graph shows how the resultant force on the object varies with time.



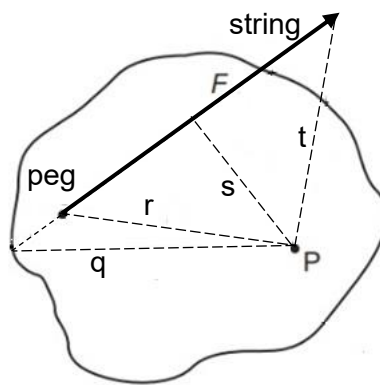
Which of the following is true about the motion of the object?

- A The object accelerates at a constant rate until it reaches a constant velocity.
B The object accelerates at a decreasing rate until it reaches a constant velocity.
C The object decelerates at a constant rate and finally come to rest.
D The object decelerates at a decreasing rate and finally come to rest.

- 7 35 g of liquid Z is poured into a measuring cylinder containing 56 g of paraffin oil. Liquid Z is insoluble in the oil and the total volume of the substances in the cylinder is 90 cm^3 . Given that the density of paraffin oil is 0.80 g / cm^3 , what is the density of liquid Z?

- A 0.50 g / cm^3
 B 0.78 g / cm^3
 C 1.0 g / cm^3
 D 1.8 g / cm^3

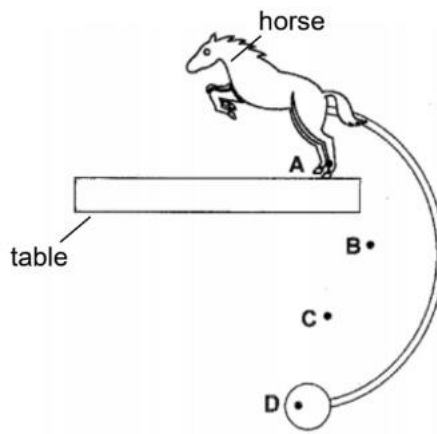
- 8 An object is pivoted at point P. A student ties a length of string to a peg on the object. He pulls the string with a force F in the direction shown.



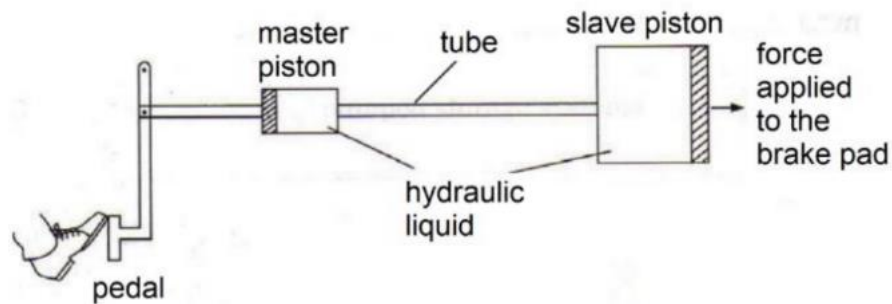
What is the moment of the force F about the point P?

- A $F \times q$
 B $F \times r$
 C $F \times s$
 D $F \times t$

- 9 The diagram shows the rest position of a balancing toy near the edge of a table. Which position is most likely to be the centre of gravity of the toy?



- 10 The diagram shows a hydraulic brake system used in vehicles.

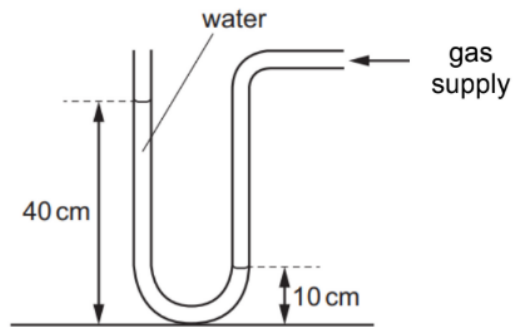


A tube links the master piston to the slave piston. Both pistons are cylindrical and the area of the slave piston is four times that of the master piston. The driver presses down on the pedal and a force of 450 N is applied on the master piston.

What is the force applied by the slave piston to the brake pad?

- A 113 N
- B 225 N
- C 900 N
- D 1 800 N

- 11** A manometer containing water is used to measure the pressure of a gas supply, as shown. The gravitational field strength, g is 10 N / kg .

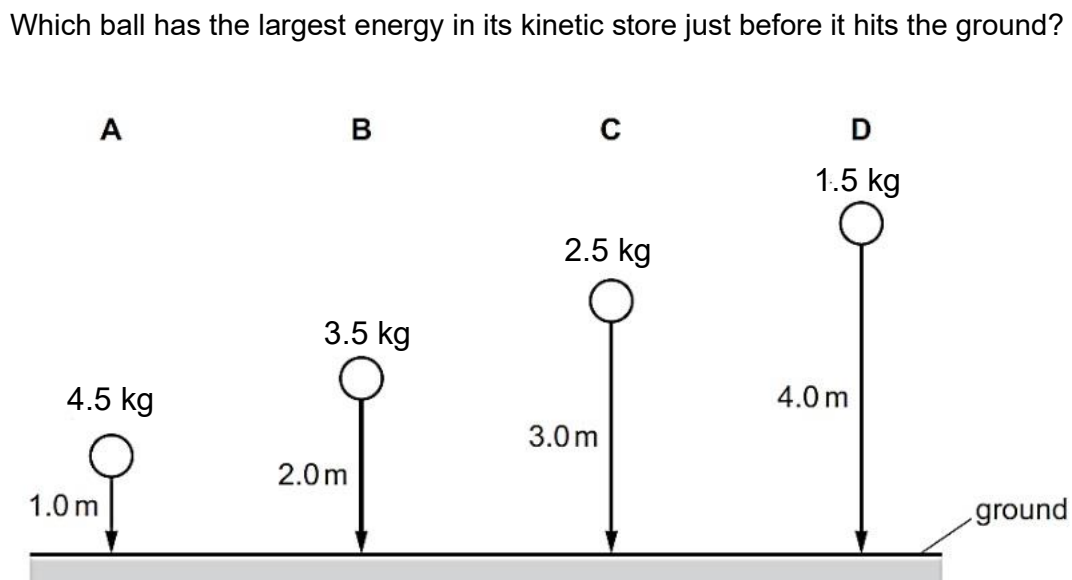


The atmospheric pressure is 76 cm Hg .

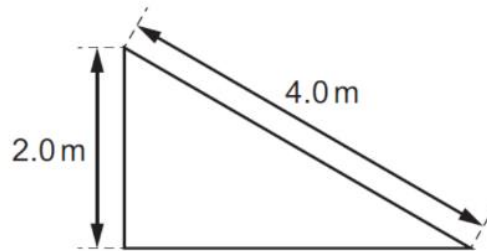
The density of mercury is $13\,600 \text{ kg / m}^3$ and density of water is 1000 kg / m^3 .

What is the pressure of the gas supply?

- A** $100\,000 \text{ Pa}$
B $104\,000 \text{ Pa}$
C $106\,000 \text{ Pa}$
D $144\,000 \text{ Pa}$
- 12** Four balls with different masses are dropped from the heights shown. Air resistance may be ignored. The acceleration due to gravity g , is 10 m / s^2 .



- 13** A box is initially at rest at the top of a rough slope. The box slides down the slope. The mass of the box is 2.0 kg and gravitational field strength, g is 10 N / kg . The slope is 4.0 m long and 2.0 m high.



The frictional force acting on the box is 2.6 N .

What is the speed of the box as it reaches the bottom of the slope?

- A** 5.4 m / s
 - B** 6.3 m / s
 - C** 7.1 m / s
 - D** 9.5 m / s
- 14** Electromagnetic waves from the Sun are absorbed by solar panels with a total area of 12 m^2 . Every 1.0 m^2 of the solar panels absorbs 0.85 kJ of energy from the Sun each second.

If the efficiency of the panels is 16% , what is the power output of the panels?

- A** 1.6 kW
- B** 2.2 kW
- C** 64 kW
- D** 160 kW

- 15** Brownian motion can be observed in small magnetic particles suspended in a fluid.

What causes the motion of the small magnetic particles?

- A** The collisions of the small magnetic particles with each other.
- B** The gravitational forces acting on the small magnetic particles in the fluid.
- C** The presence of magnetic fields within the fluid.
- D** The fluid particles bombarding the small magnetic particles.

- 16** A bicycle tyre contains air. When the bicycle is in motion, the air in the tyre becomes warmer and the air pressure inside the tyre increases. The volume of the tyre remains unchanged.

Which description about the air particles in the tyre when the bicycle is in motion is correct?

	force exerted on the inner walls of tyre by air particles	frequency of collisions between air particles and inner walls of tyre
A	increase	increase
B	increase	unchanged
C	unchanged	increase
D	unchanged	unchanged

- 17** Energy in the internal store of the following objects is dissipated to the surroundings.

Which object transferred its energy by radiation only?

- A** a concrete block with white surfaces at 100 °C in air
- B** a metal block with black surfaces at 40 °C in air
- C** a shiny metal satellite at 30 °C in outer space
- D** the heating element of a kettle at 150 °C in water

- 18** Two objects, A and B, are placed in physical contact with one another. They have the same temperature. Assume there is no energy transfer to the surrounding media.

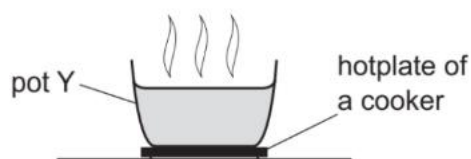
Which statement is correct?

- A** There is energy transfer from all molecules in A to all molecules in B.
- B** There is energy transfer from some molecules in A to some molecules in B, as well as from some molecules in B to some molecules in A.
- C** There is energy transfer from some molecules in A to some molecules in B, but no energy transfer from some molecules in B to some molecules in A.
- D** There is no energy transfer between any molecule in A to any molecule in B.

- 19** Pot X and pot Y are both in a cool room.

Pot X contains hot water below its boiling point.

Pot Y is identical to pot X but contains water that is kept boiling by a hotplate underneath it.

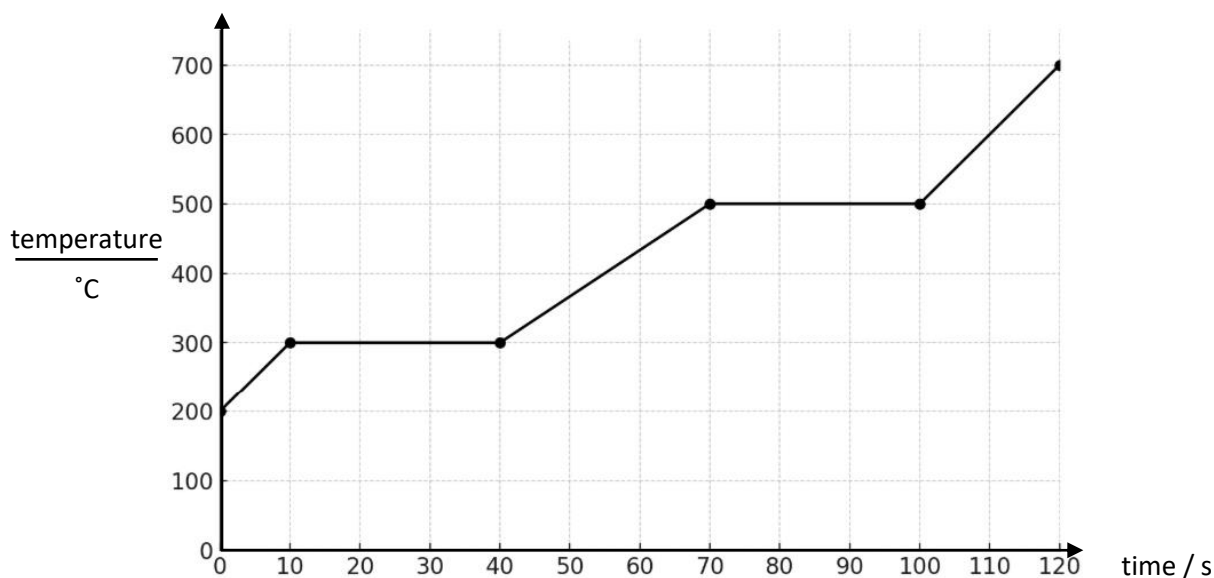


What happens to the average kinetic energy of the water particles in pot X and pot Y?

	kinetic energy of liquid particles in pot X	kinetic energy of liquid particles in pot Y
A	decreases	increases
B	decreases	stays the same
C	stays the same	increases
D	stays the same	stays the same

- 20** A solid substance is heated at a constant rate by an electric heater.

The graph shows how the temperature of the substance changes as it is heated by a 1000 W heater.



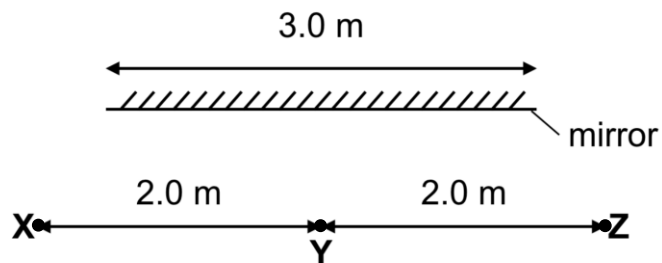
Which statement about the substance is correct?

- A** The melting point of the substance is 500 °C.
 - B** The specific latent heat of fusion is greater than the specific latent heat of vaporisation.
 - C** The specific heat capacity of the substance in liquid state is larger than the specific heat capacity of the substance in solid state.
 - D** The specific heat capacity of the substance in gaseous state is larger than the specific heat capacity of the substance in solid state.
- 21** What is meant by the term *wavefront*?
- A** the distance between successive crests of a wave
 - B** the distance between the trough and the crest of a wave
 - C** a line joining points along the crest of a wave
 - D** a line joining the trough and a the crest of a wave

- 22** Which of the following correctly shows examples of a transverse and longitudinal waves?

	longitudinal	transverse
A	Sound	gamma-rays
B	water waves	infrared
C	Light	radio
D	X-rays	sound

- 23** Three student stand 2.0 m apart in front of a plane mirror that is 3.0 m long. Student Y is standing opposite the mid-point of the mirror.



How many students can see the images of the other 2?

- A** 0
- B** 1
- C** 2
- D** 3
- 24** Radio waves, visible light, and X-rays are part of the electromagnetic spectrum. Which of the following show them in ascending order of wavelength?
- A** radio waves, visible light, X-rays
- B** radio waves, X-rays, visible light
- C** X-rays, radio waves, visible light
- D** X-rays, visible light, radio waves

25 Below are four statements about the uses of electromagnetic radiation.

- i. Gamma rays are used in medical treatment.
- ii. Ultraviolet waves are used in sunbeds.
- iii. Microwaves are used in mobile phones.
- iv. X-rays are used in intruder alarms.

How many of the statements are correct?

- A** 0
- B** 1
- C** 2
- D** 3

26 Which of the following will **not** attract small pieces of aluminum when placed near it?

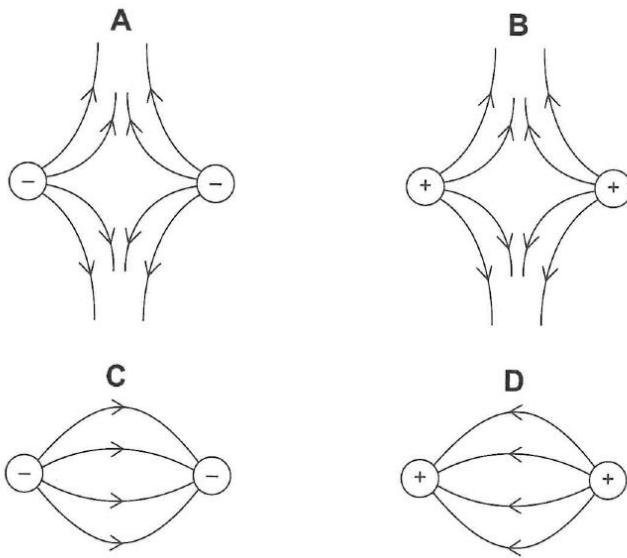
- A** an earthed metal rod rubbed with a feather duster
- B** a plastic comb pulled through dry hair
- C** a plastic rod rubbed with a piece of cloth
- D** a rubber balloon rubbed against a shirt

27 A neutral conductor is brought into contact with a positively charged conductor.

What happens to the neutral conductor?

- A** It remains neutral as no electrons are transferred.
- B** It becomes negatively charged due to the transfer of electrons.
- C** It becomes positively charged due to the transfer of protons.
- D** It becomes positively charged due to the transfer of electrons.

- 28** Which diagram correctly shows the electric field pattern in between two isolated point charges?



- 29** The potential difference across a conductor is 12 V.
How much energy is transferred when 100 C of charge flows through it?

- A** 0.12 J
- B** 8.3 J
- C** 88 J
- D** 1200 J

- 30** Why can birds stand on an overhead transmission line without getting an electric shock?

- A** Their bodies have very high resistance.
- B** Their feet are very good electrical insulators.
- C** There is no potential difference between their feet.
- D** The air trapped in their feathers is an insulator.

- 31 Which of the following changes causes a wire to double its resistance?

	diameter	length
A	halve	double
B	halve	halve
C	double	double
D	double	halve

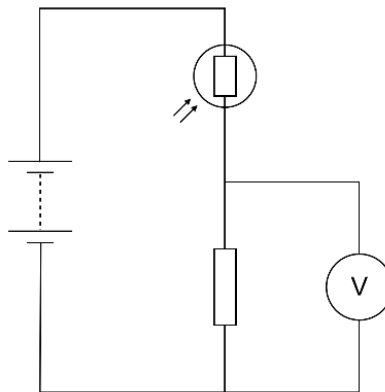
- 32 A circuit with a light dependent resistor (LDR) is used to detect changes in light levels.

In sunlight, the LDR has a resistance of $200\text{ k}\Omega$.

In moonlight, the LDR has a resistance of $2.0\text{ M}\Omega$.

The fixed resistor has a resistance of $1.0\text{ M}\Omega$

What are the voltmeter readings in sunlight and in moonlight?



	in sunlight / V	in moonlight / V
A	2.0	8.0
B	8.0	4.0
C	4.0	10
D	10	4.0

33 For all devices, the switch is always connected to the live wire.

Which of the following best explains why?

- A** No current flows in the neutral wire of the device.
- B** The device can be made to be at zero potential.
- C** The device can never be switched off if the switch is connected to the neutral wire.
- D** The earth wire is not always necessary.

34 A house owner replaces a blown fuse for the lights in the house. When the lights are switched on, the second fuse also blows. The owner then decides to use a third fuse with a higher rating than the previous two.

Why is this **not** the correct thing to do?

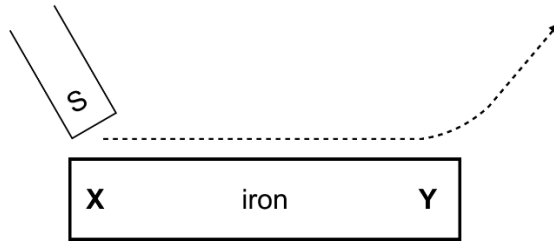
- A** The fuse rating must be exactly equal to the operating current.
- B** The third fuse will melt because its rating is too high.
- C** If the fuse rating is too high, it can cause electric shocks.
- D** The lights may work but the fault is not corrected.

35 Which of the following will prove that a metal bar is a permanent magnet?

- A** it attracts another magnet
- B** it repels another magnet
- C** it can be given an electric charge
- D** it attracts both ends of a compass needle

- 36** A piece of iron can be magnetised by stroking it with a magnet.

When the magnet is moved in the direction shown, which poles are produced at X and Y?

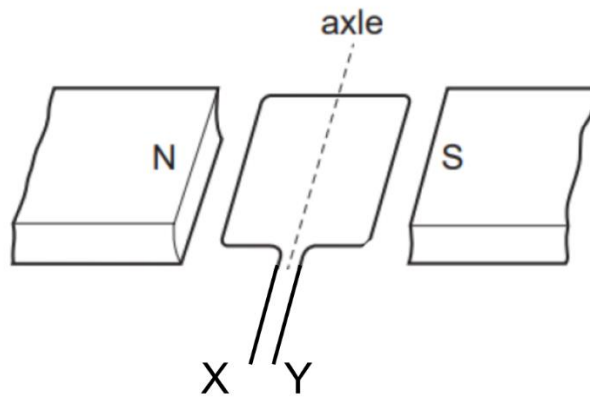


	X	Y
A	north	north
B	north	south
C	south	north
D	south	south

- 37** Which of the following has **no** effect on the size of the turning effect acting on the coil of an electric motor?
- A** the size of the current in the coil
 - B** the direction of the current in the coil
 - C** the number of turns in the coil
 - D** the strength of the magnetic field

- 38 The diagram shows a coil in a magnetic field. The coil is to be used in a d.c. motor.

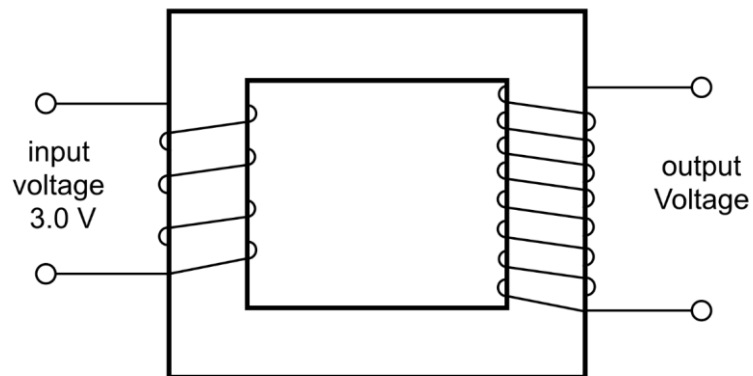
What must be connected directly to X and Y?



What must be directly connected to X and Y?

- A split rings
 - B slip rings
 - C direct current supply
 - D carbon brushes
- 39 Why is the core of most transformers made of iron?
- A iron is a good electrical conductor
 - B iron is cheaper than copper
 - C iron is easily magnetised and demagnetised
 - D iron can be made into a permanent magnet

- 40** An ideal step-up transformer has an input voltage of 3.0 V and an input current of 2.0 A



Under these conditions, what output voltage and output current can be obtained?

	output voltage / V	output current / A
A	1.0	6.0
B	2.0	3.0
C	4.0	1.0
D	6.0	1.0