

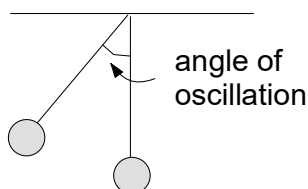
2

- 1** A pipe has an approximate length of 80 cm with an approximate external and internal diameter of 5 cm and 3 cm respectively.

Which instruments are the most suitable for measuring accurately the length, external and internal diameters?

	length	external diameter	internal diameter
A	metre rule	vernier calipers	micrometer
B	tape	metre rule	digital calipers
C	metre rule	vernier calipers	digital calipers
D	tape	micrometer	digital calipers

- 2** A pendulum is set into motion. As it swings, the angle of oscillation gradually decreases to zero.



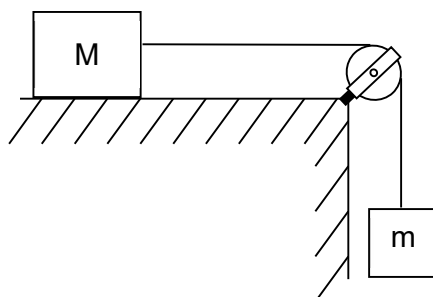
Which of the following statements about energy at any point of the pendulum's motion is correct?

- A** The kinetic energy of the pendulum is constant.
 - B** The potential energy of the pendulum is constant.
 - C** The total energy of the pendulum and air is constant.
 - D** The sum of kinetic energy and potential energy of the pendulum is constant.
- 3** A ball bearing is released in a liquid. It sinks vertically downward until it reaches terminal velocity.

Which describes the resultant force acting on the ball bearing during terminal velocity?

- A** constant **B** decreasing **C** increasing **D** zero

- 4 Two blocks M and m are connected by a light spring passing over a smooth pulley as shown.



When block m is released, the blocks move with constant speed. After a while, the string is cut in between.

Which of the following correctly describes the motion of the blocks immediately after the string is cut?

	M	m
A	stops moving	moves with constant speed
B	moves with constant speed	accelerates
C	decelerates	moves with constant speed
D	decelerates	accelerates

- 5 A block is resting on a table. Two forces act on the block: its weight and the normal contact force.

Which force will make an action-reaction pair with the weight of the block?

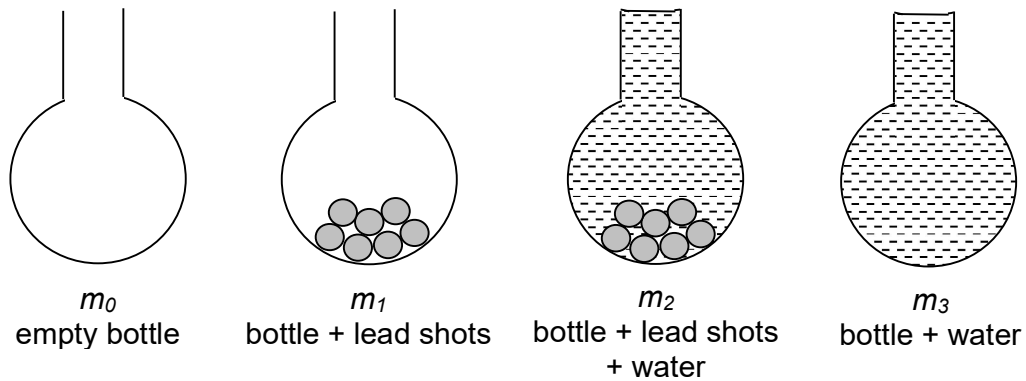
- A** the force acting on the Earth by the block
- B** the force acting on the table by the block
- C** the force acting on the block by the table
- D** the force acting on the block by the Earth

- 6 When a horizontal force of 4.0 N is applied to a wooden block of mass 2.0 kg on a horizontal surface, the block moves with a constant velocity.

What is the acceleration of the block if the horizontal force is increased to 12.0 N?

- A** 2.0 m/s² **B** 4.0 m/s² **C** 6.0 m/s² **D** 8.0 m/s²

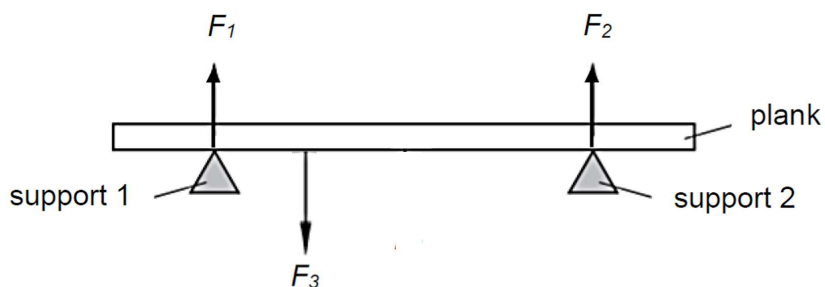
- 7 In an experiment to determine the density of lead shots, the following masses, in grams, are obtained.



If the density of water is 1 g/cm³, what is the volume of the lead shots in cm³?

- A** $m_3 - m_2$
B $m_3 - m_2 - m_1$
C $m_3 - m_2 + m_1 - m_0$
D $m_3 + m_2 - m_1 - m_0$

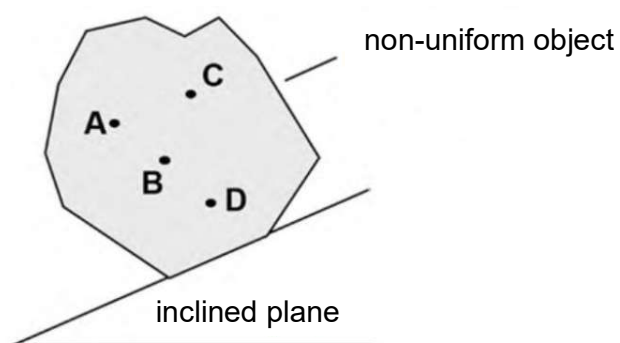
- 8 The diagram shows a heavy non-uniform wooden plank resting on two supports which act as pivots (not to scale). Three forces F_1 , F_2 and F_3 are acting on the plank. The plank is in equilibrium.



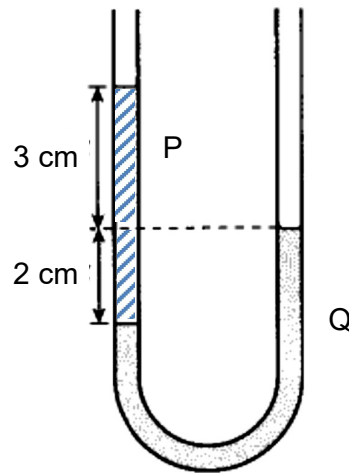
Which statement is correct?

- A F_1 is larger than F_2 .
 - B F_2 is larger than F_1 .
 - C The sum of F_1 and F_2 is twice of F_3 .
 - D F_3 is larger than the sum of F_1 and F_2 .
- 9 A non-uniform object is placed on an inclined plane. The object is just about to topple.

Which position is the centre of gravity?

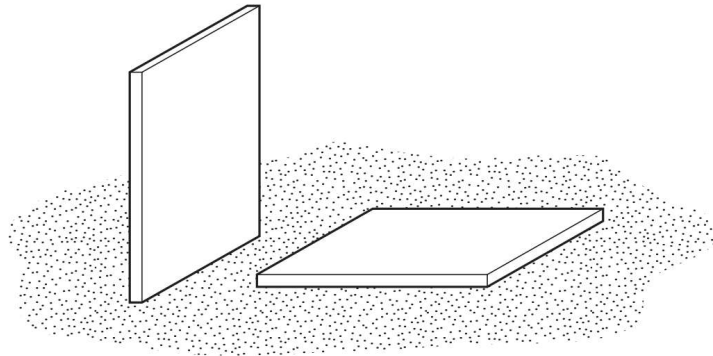


- 10 The diagram shows two liquids, P and Q, which do not mix. The liquids are in equilibrium in an open U-tube.



What is the ratio of $\frac{\text{density of P}}{\text{density of Q}}$?

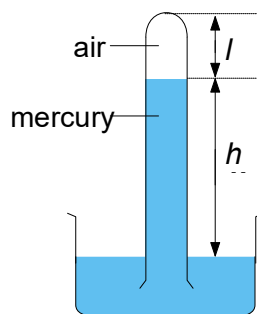
- A** 2 / 5 **B** 3 / 5 **C** 2 / 3 **D** 3 / 2
- 11 A builder leaves two identical, heavy, stone tiles resting on soft earth. One is vertical and the other is horizontal.



Which row correctly compares the forces and the pressures that the tiles exert on the earth?

	forces	pressures
A	different	different
B	different	same
C	same	different
D	same	same

- 12 Some air is trapped in the space above the mercury in a barometer.



The glass tube is pressed down into the mercury bath.

Which of the following best describes the change of l , the height of air column, and h , the height of mercury column?

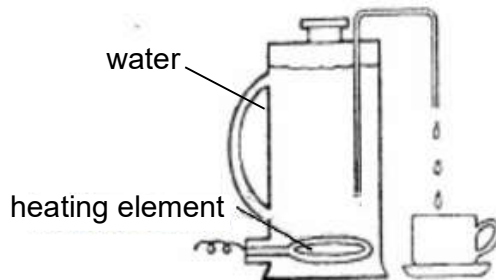
	l	h
A	decrease	remain unchanged
B	remain unchanged	decrease
C	decrease	decrease
D	increase	decrease

- 13 A gas in a sealed cylinder with fixed volume is heated.

Which of the following does **not** increase as the gas is heated?

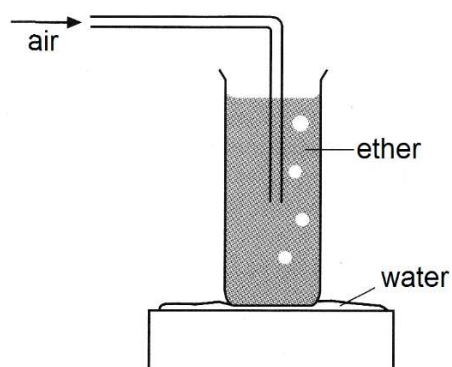
- A** the average distance between the gas molecules
- B** the average kinetic energy of the gas molecules
- C** the average number of collisions between gas molecules
- D** the frequency of gas molecules hitting the cylinder walls

- 14 The diagram shows an automatic dispenser of hot water which is used in a tea maker. When the water boils, it rushes out through the pipe into the cup.



The main cause of this is due to

- A the expansion of water in the tea maker.
 - B the expansion of the air above the water.
 - C the steam pressure building up inside when the water boils.
 - D the formation of convection currents in the water when it boils.
- 15 Air is blown through a tube containing some ether. Underneath the beaker is a small pool of water as shown in the diagram below.



Which of the following best describes what happens?

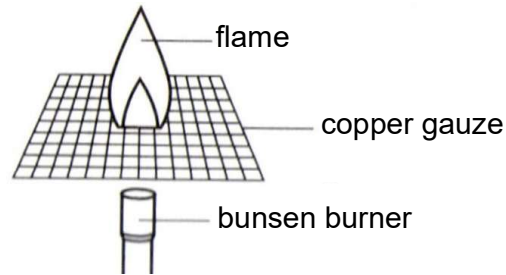
	ether	water
A	boils	evaporates
B	evaporates	freezes
C	condenses	evaporates
D	freezes	boils

- 16** On a warm afternoon, Amy submerges her hands in water. Heat is transferred from her skin to the water.

Which of the following is the main heat transfer process?

- A** conduction **B** convection **C** evaporation **D** radiation

- 17** A bunsen burner is lit above a copper gauze as shown below.

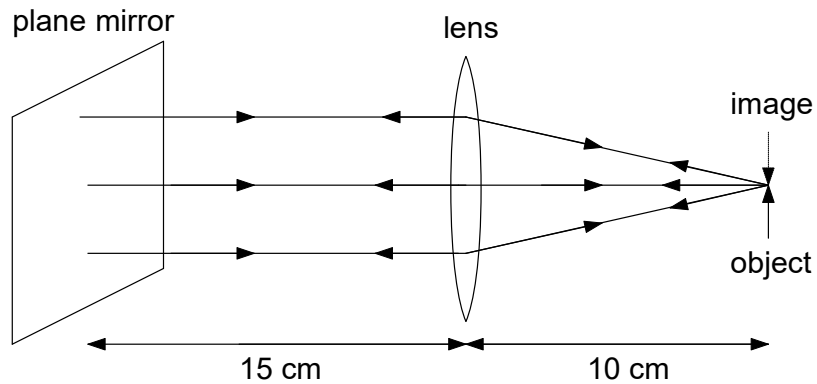


There is no flame below the gauze because

- A** there is no gas below the gauze.
B heat is conducted away by the gauze.
C heat is radiated from the copper gauze.
D convection current is created below the gauze.
- 18** Water in a kettle boils and turns into steam.
- What is happening to the water molecules?
- A** They are losing energy.
B They are moving faster.
C They are moving further apart.
D They are expanding and getting lighter.

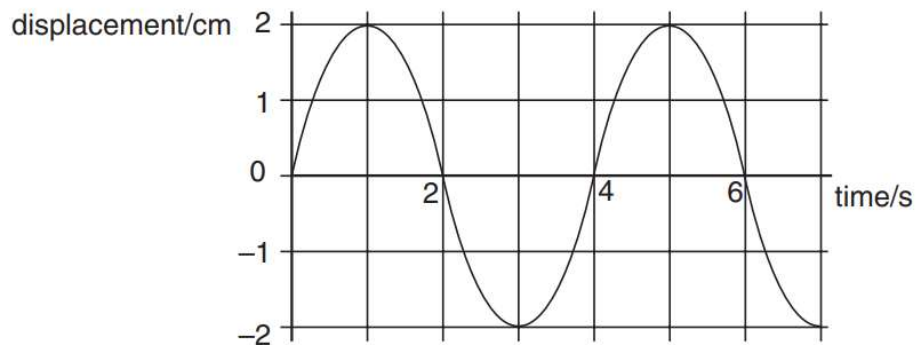
- 19** Which of the following explains why the specific latent heat of vaporisation of a substance is usually much higher than its specific heat capacity?
- A** The substance loses its mass when it undergoes state change.
 - B** More energy is lost to the surroundings during the process of vaporisation.
 - C** Latent heat of vaporisation includes the energy required to raise the temperature of the molecules to boiling point and to break the bond between the molecules.
 - D** More energy is required to separate the molecules further apart when the substance changes from liquid to gas as compared to heating a liquid without a change of state.
- 20** A man stands 4 m in front of a plane mirror. If the mirror is moved 2 m away from the man, what is the distance between the man and his image?
- A** 6 m **B** 10 m **C** 12 m **D** 20 m
- 21** A lens is used to form a sharp image of a bright object on a screen. The top half of the lens is now covered with an opaque material.
- How will the image seen be affected?
- A** The top half of the image will disappear.
 - B** The bottom half of the image will disappear.
 - C** The brightness of the image will be reduced.
 - D** The size of the image will be reduced to half its original size.

- 22** The diagram shows a set-up for finding the focal length of a convex lens using a plane mirror. The lens position is adjusted until the image is formed beside the illuminated object.



What is the focal length of the lens?

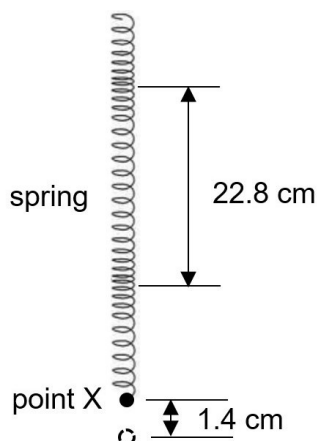
- A** 5.0 cm **B** 7.5 cm **C** 10.0 cm **D** 15.0 cm
- 23** The graph shows how the displacement of a particle in a wave varies with time.



Which characteristics of the wave can be deduced from the graph?

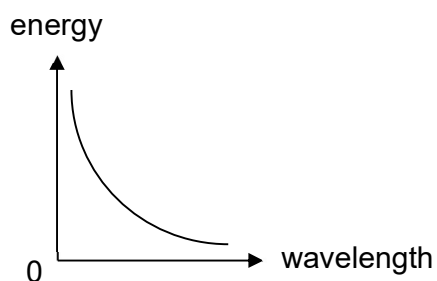
- A** Its period is 2.0 s and its speed is 0.5 cm/s.
B Its period is 4.0 s and its frequency is 0.25 Hz.
C Its period is 4.0 s and its frequency is 1.75 Hz.
D Its period is 6.0 s and its frequency is 0.17 Hz

- 24** The diagram shows a spring oscillating vertically. Point X at the end of the spring is oscillating between two vertical points 1.4 cm apart.



	amplitude / cm	wavelength / cm
A	0.7	11.4
B	0.7	22.8
C	1.4	11.4
D	1.4	22.8

- 25** The diagram shows the relationship between the energy of electromagnetic radiation and the wavelength of the waves.



Which of the following has the highest energy?

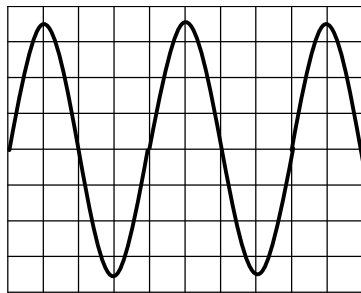
- A** visible light **B** radio waves **C** microwaves **D** infra-red rays

26 Which of the following about ultra-violet rays is **incorrect**?

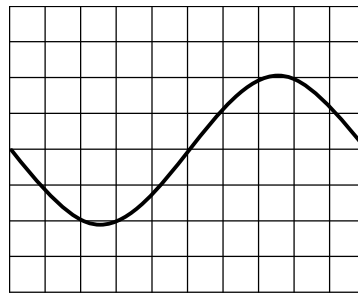
- A They can be used for sterilization.
- B They are widely used in burglar alarms.
- C They can be used in sunbeds for artificial tanning.
- D They produce fluorescence in fluorescent materials.

27 Which of the sound waves below is high-pitched but soft?

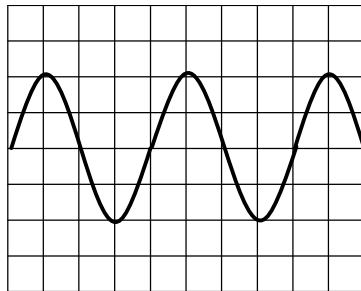
A



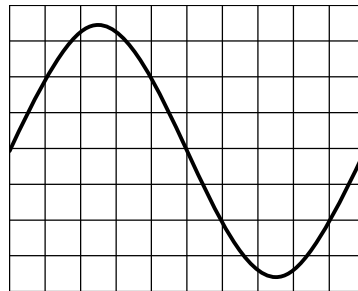
B



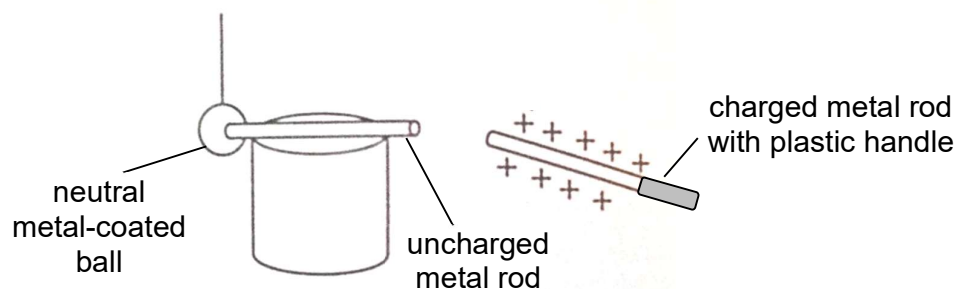
C



D



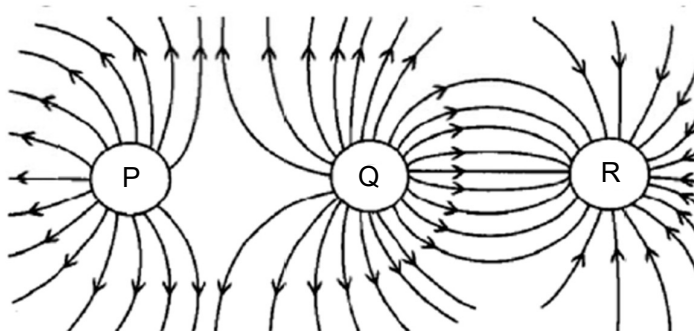
- 28 An uncharged metal rod is placed on top of a glass beaker. A neutral metal-coated ball hanging from a thread just touches one end of the metal rod.



Another charged metal rod is brought into contact with the other end of the first metal rod and then removed.

Which of the following will take place?

- A The ball remains stationary throughout.
 - B The ball moves away only when the two rods are in contact.
 - C The ball swings back and forth while the rods are in contact.
 - D The ball moves and stays away even after the charged rod has been removed.
- 29 The electric field pattern between three spheres P, Q and R is shown.

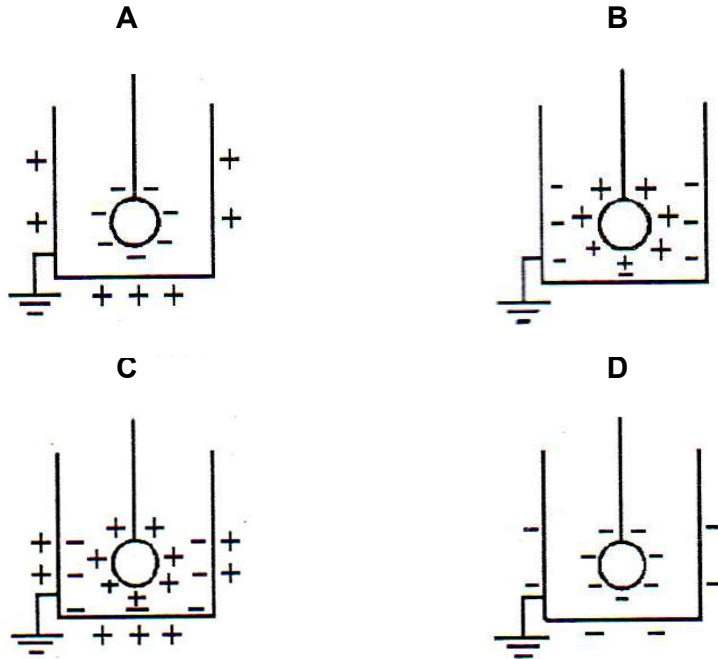


Which is the correct charge on each sphere?

	P	Q	R
A	+	+	+
B	+	+	-
C	-	-	+
D	-	-	-

- 30 A charged sphere is suspended by an insulating thread inside a metal can. The outside of the can is earthed.

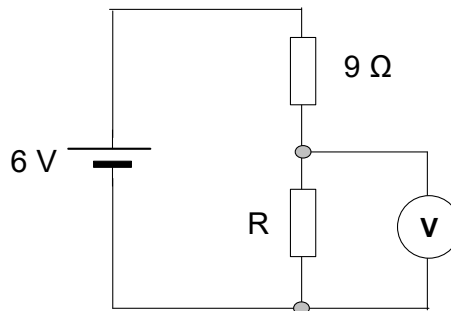
Which diagram shows the correct resulting charges on the sphere and on the can?



- 31 A charged cloud carrying a charge of 150 C passes all its charge to the earth through lightning. The lightning lasts for 0.5 ms.

What is the current of the lightning?

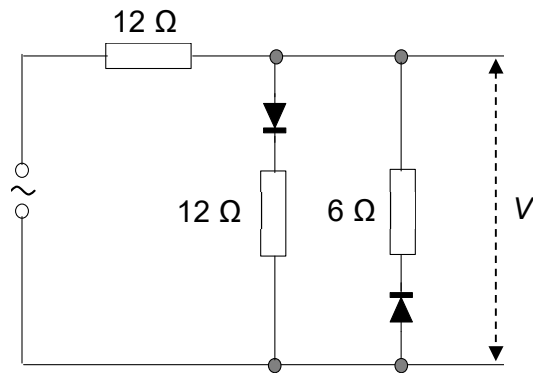
- A 75 A B 300 A C 75 000 A D 300 000 A
- 32 In the potential divider circuit shown below, the voltmeter reads 1.5 V.



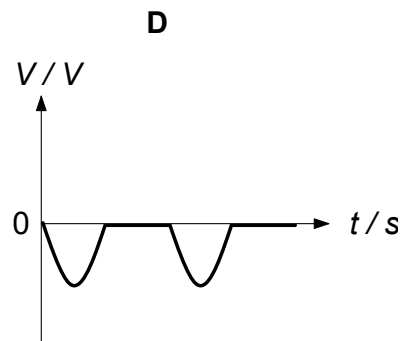
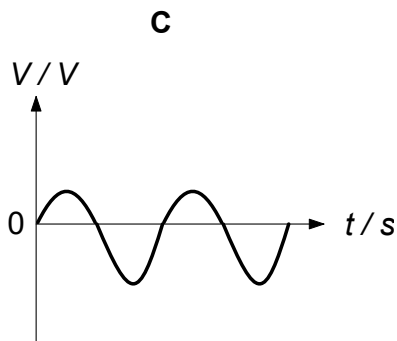
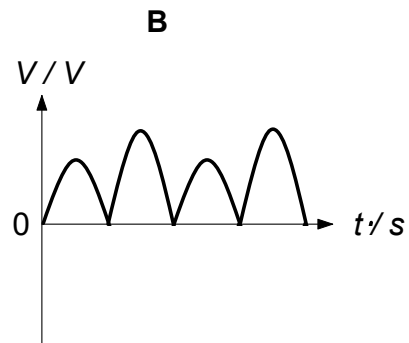
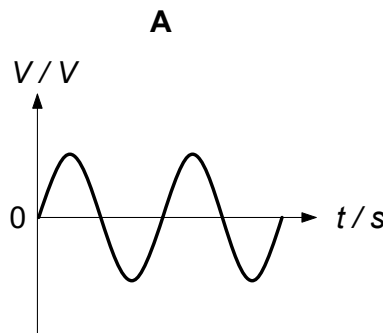
What is the value of resistance R?

- A 1.5 Ω B 3.0 Ω C 12.0 Ω D 27.0 Ω

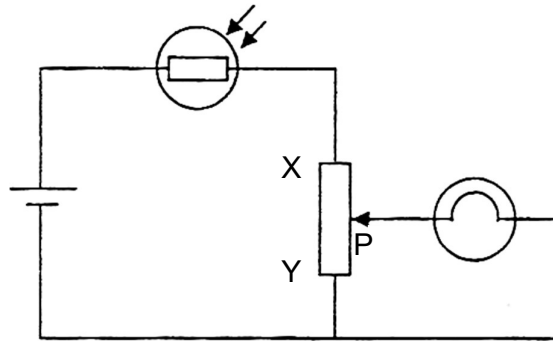
- 33 An a.c. supply is connected to the circuit as shown below.



Which of the following diagrams shows how the voltage V varies with time t ?

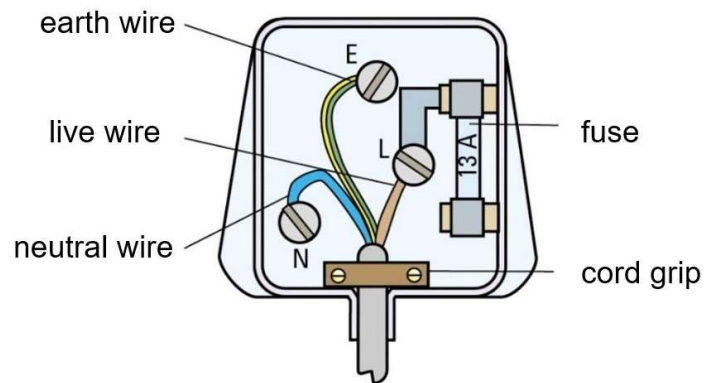


- 34 A lamp is connected to a circuit as shown in the diagram.



What happens to the brightness of the lamp when the environment becomes darker and contact P is shifted towards Y?

- A The lamp stays about the same brightness as the two changes cancel out.
 - B The lamp becomes brighter as the voltage across it increases.
 - C The lamp becomes dimmer as the voltage across it drops.
 - D The lamp becomes dimmer as the resistance of the lamp increases.
- 35 The diagram shows an electrical plug of a 1500 W electric kettle connected to a 240 V supply.



What is the current in the three wires when the kettle is working normally?

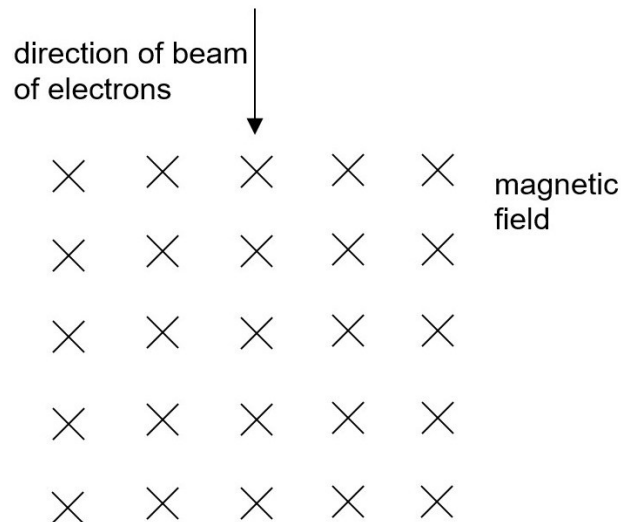
	live wire / A	neutral wire / A	earth wire / A
A	0	0	6.25
B	6.25	0	0
C	6.25	6.25	0
D	6.25	6.25	6.25

- 36** A 2500 W air-conditioner is switched on for 6 h daily. It cost \$0.32 for 1 kW h of electrical energy.

What is the cost to use the air-conditioner for 1 month (30 days)?

- A** \$4.00 **B** \$4.80 **C** \$144 **D** \$144 000

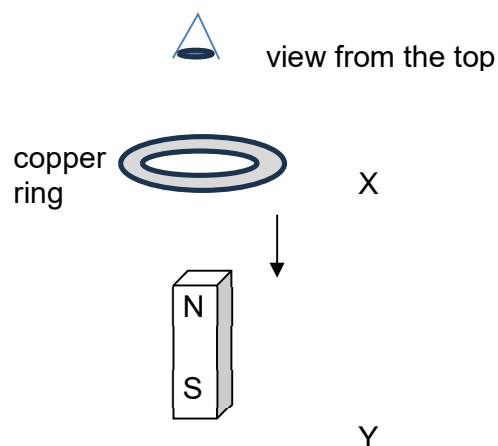
- 37** The diagram shows a beam of electrons entering a magnetic field.



Which of the following describes the movement of the electrons as it enters the magnetic field?

- A** The electrons are deflected into the paper.
B The electrons are deflected out of the paper.
C The electrons are deflected to the left.
D The electrons are deflected to the right.

- 38 A copper ring is dropped over a bar magnet from point X to point Y as shown in the diagram.

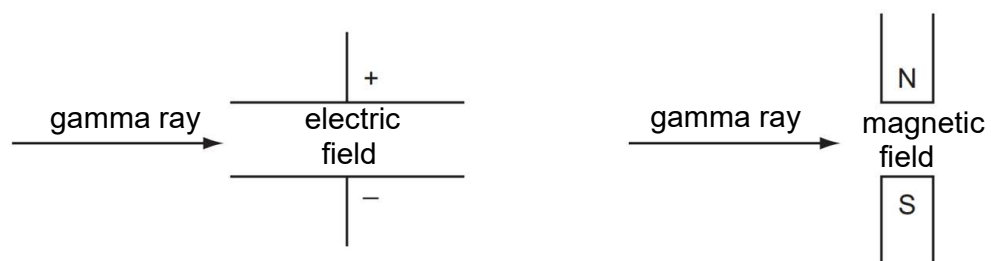


Which of the following statements about the induced current in the ring, when viewed from the top, is **correct**?

- A It always flows in the clockwise direction.
 - B It always flows in the anti-clockwise direction.
 - C It flows in the clockwise direction at point X and the anti-clockwise direction at point Y.
 - D It flows in the anti-clockwise direction at point X and the clockwise direction at point Y.
- 39 What are the characteristics of an alpha particle?

	charge	ionising effect
A	negative	strong
B	negative	weak
C	positive	strong
D	positive	weak

- 40 A gamma ray passes through an electric field and a magnetic field.



How is the path of the gamma ray affected by these fields?

	electric field	magnetic field
A	deflected	deflected
B	deflected	undeflected
C	undeflected	deflected
D	undeflected	undeflected

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