



PHYSICS

5058/01

Paper 1 Multiple Choice

Set 1

1 hour

Additional Materials: Multiple Choice Answer Sheet
Soft Clean Eraser
Soft Pencil (type B or HB is recommended)

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

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

Write your name, Centre number and candidate number 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**.

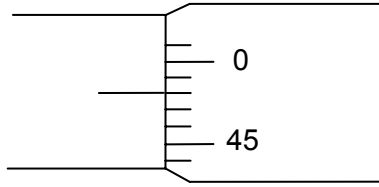
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

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 in this booklet.

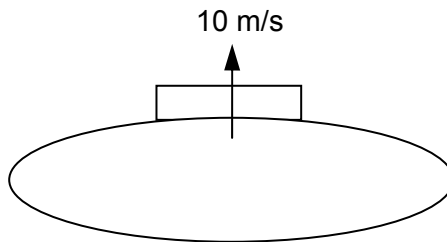
1 – 2

- 1 The diagram below shows the zero error of a micrometer screwgauge.



The zero error is

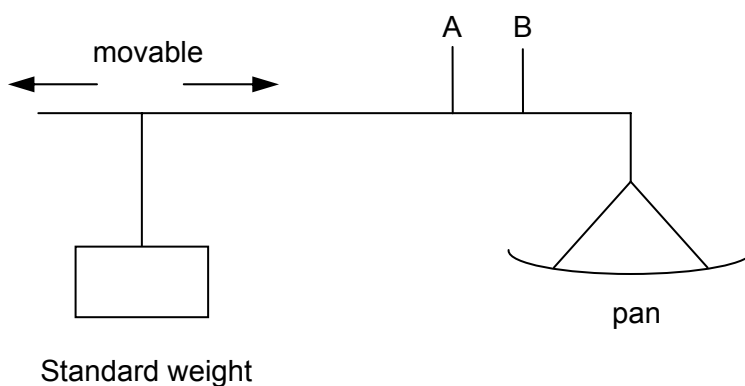
- A 0.02 mm and it has to be subtracted from the final reading.
 - B - 0.02 mm and it has to be subtracted from the final reading.
 - C 0.48 mm and it has to be subtracted from the final reading.
 - D - 0.48 mm and it has to be subtracted from the final reading.
- 2 The diagram below shows a submarine of mass 20 000 kg which is rising from the sea bed at a constant velocity of 10m/s.



What is the resultant force acting on the submarine?

- A 200 000 N
- B 20 000 N
- C 10 N
- D 0 N

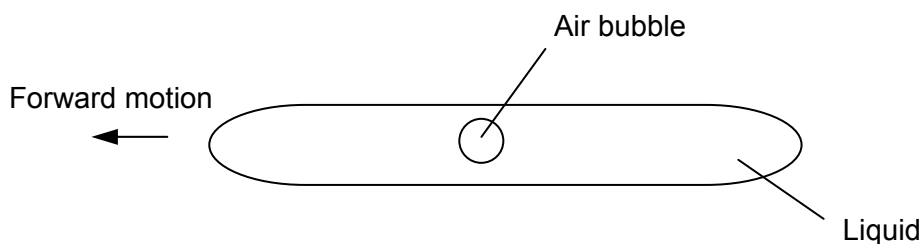
- 3 Which of the following situations describes an object with constant velocity?
- A A pendulum bob swinging in a flat plane.
- B A satellite staying above the same position on earth.
- C A trolley being pulled up a straight ramp at a constant 5 km/h.
- D A rocking chair rocking back and forth.
- 4 A Chinese steelyard for weighing consists of a light rod, a moveable standard weight, two strings A and B for suspension and a pan on which objects of unknown weight are placed.



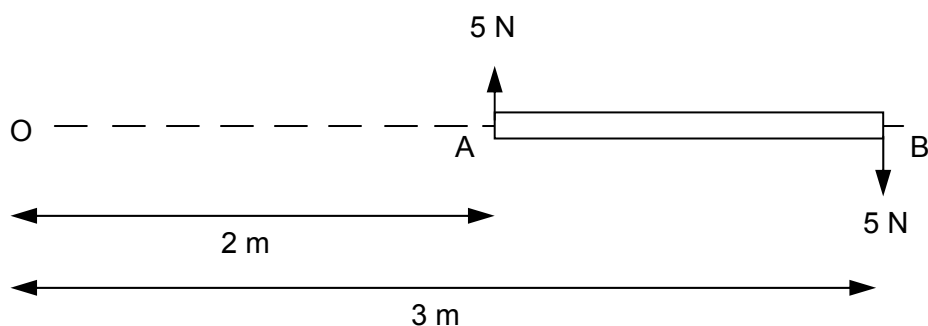
When weighing, either A or B is held. Which of the following concerning the above lever is/are **correct**?

- (1) When weighing a heavy object, string A is held preferably for balance.
- (2) When weighing a heavy object, the standard weight is moved towards the far end from the suspension for balance.
- (3) For a fixed mass of object, holding at B requires a larger force than holding at A if the Chinese steelyard remains in balance.
- A (1) only
- B (2) only
- C (1) and (2) only
- D None of the above

- 5 A spirit level is made of a sealed glass bulb with a small air bubble floating on the liquid inside. It is moved forward with a constant velocity as shown in the figure. What would be the motion of the air bubble if the spirit level is stopped suddenly?

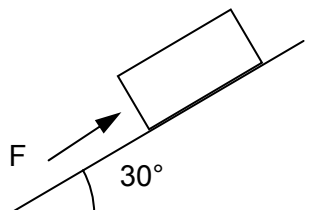


- A Moving forward.
 B Remains at original position.
 C Moving backwards.
 D Not determined because the total mass of the checker is unknown.
- 6 In the system shown, the magnitude of moment about O is



- A 0 Nm B 5 Nm C 10 Nm D 15 Nm
- 7 A rubber ball of mass 4 kg is released from rest from a height of 1.25 m to the ground. It rebounds to the same initial height. If the time of duration of the impact between the ground and the ball is 0.1s, what is the total reaction of the ground on the ball?
- A 40 N B 80 N C 400 N D 440 N

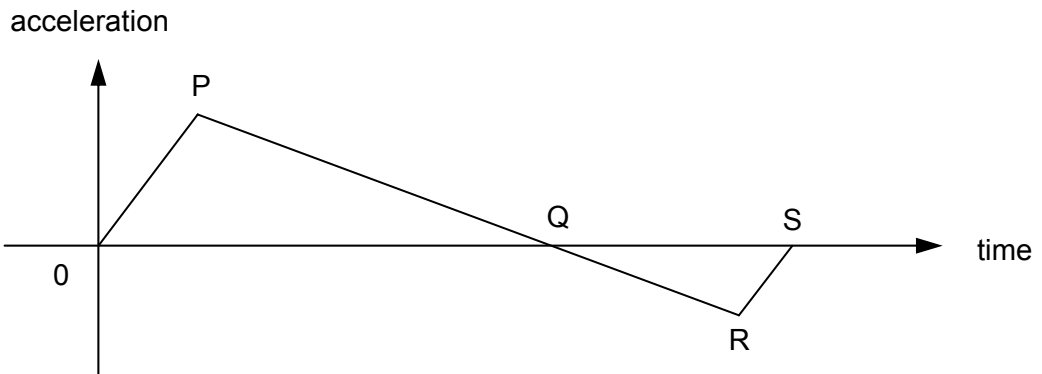
- 8 A force F is applied to a block of mass 2 kg as shown below. The minimum value of F in order to prevent the block from sliding down is 5 N.



If F is increased to 20 N, what is the motion of the block?

- A Remaining at rest
- B Moving with an acceleration of 2.5 m s^{-1}
- C Moving with an acceleration of 5 m s^{-1}
- D Moving with an acceleration of 10 m s^{-1} .
- 9 When a cube of solid wood of mass m was pushed along a surface with a constant force F , it experienced a frictional force f . Which of the following is true when a hollow cube of mass m , made of the same wood, is pushed along the same surface with a force F ?
- A The cube experiences less friction.
- B The cube experiences greater friction.
- C The cube experiences the same friction f .
- D The change in the friction experienced cannot be predicted.
- 10 Which of the following statements is true?
- A Inertia is a force which keeps stationary objects at rest and moving objects in motion at constant velocity.
- B As object moving at a higher speed has more inertia than another object of the same mass moving at a lower speed.
- C In a gravity-free environment, two moving bodies, one with a bigger mass and another one with a smaller mass will have the same ability to stop.
- D The inertia of an object still exists in outer space.

- 11 The acceleration-time graph of an object moving in a straight line is as shown.



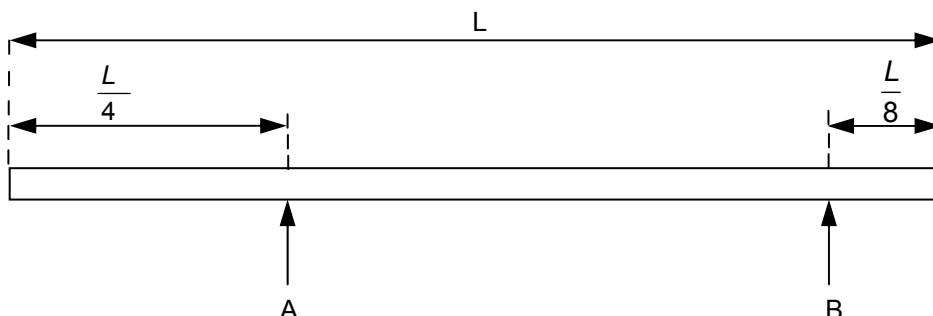
If the object starts its motion from rest, at which point is the object moving with the largest speed?

- A** P **B** Q **C** R **D** S
- 12 An object of mass m is hanging by a string from the ceiling of a lift. The lift is accelerating upwards.

The tension in the string is

- A** zero.
B less than mg .
C exactly mg .
D greater than mg .

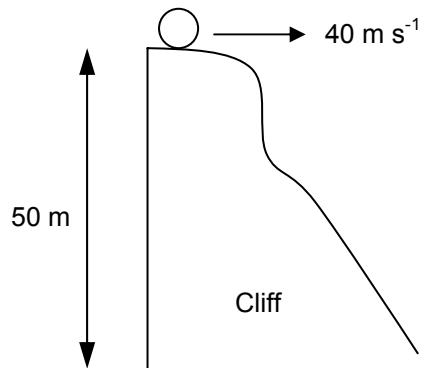
- 13 A heavy uniform plank of length L is supported by two forces, forces A and B, at points of distances $\frac{L}{4}$ and $\frac{L}{8}$, from its end as shown in the diagram below.



What is the ratio of B: A?

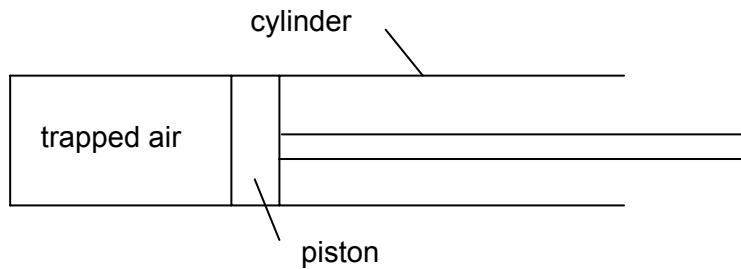
- A** 1 : 3 **B** 2 : 3 **C** 3 : 2 **D** 3 : 8
- 14 Which of the following involves an energy transfer of 200 J?
- (1) A mass of 20 kg is raised vertically by 10 m.
 (2) A mass of 2 kg gains a speed of 10ms^{-1} from rest.
 (3) A 5 W heater is switched on for $\frac{2}{3}$ minutes.
- A** (1) only
B (3) only
C (1) and (2) only.
D (2) and (3) only.
- 15 A car of mass 1500 kg is accelerated from rest to a speed of 100 km h^{-1} on level ground. Given that the time taken is 12.1 s, calculate the maximum power delivered by the engine.
- A** 1.75 kW **B** 47.8 kW **C** 95.7 kW **D** 620 kW

- 16 A ball is projected horizontally from the top of a cliff as shown.



Its speed after falling 45 m is

- A** 30 m s^{-1} **B** 40 m s^{-1} **C** 50 m s^{-1} **D** 60 m s^{-1}
- 17 A smooth piston and cylinder combination is placed horizontally as shown. What will decrease when the piston is pulled to the right?



- (1) temperature of trapped air
 (2) pressure of trapped air
 (3) volume of trapped air

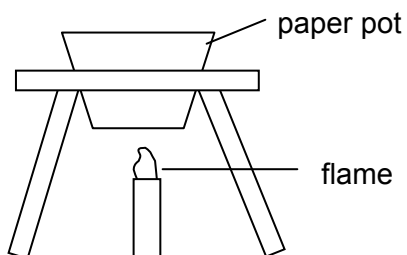
- A** (1) only
B (1) and (2) only
C (1) and (3) only
D All of the above

18 When an object is being heated, which of the following statements is/are correct?

- (1) Its temperature always increases.
- (2) Its internal energy always increases.
- (3) Its kinetic energy and potential energy cannot rise at the same time.

- A (2) only
- B (1) and (2) only
- C (2) and (3) only
- D All of the above

19 Some steamboat restaurants use paper pots for their customers to boil the food themselves. What is the reason for the paper not to catch fire when in contact with the flame?



- (1) Water has a boiling point lower than the burning temperature of the paper.
- (2) The paper is thin and therefore heat is conducted quickly to the water in the paper pot.
- (3) The paper is thick enough to withstand the high temperature of the flame.

- A (1) and (2) only
- B (1) and (3) only
- C (2) and (3) only
- D All of the above

20 Which of the following statement is false?

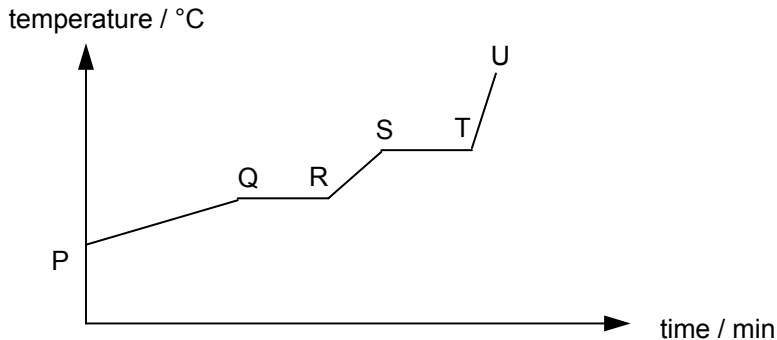
- A Dog drools (salivates) to allow heat loss by evaporation.
- B Elephant sprays water over its body to allow heat loss by evaporation.
- C Camel has big humps to store water so that it can dissipate thermal energy by convection.
- D Jack rabbit has enormous ears with many blood vessels to dissipate thermal energy faster.

21 Rachel tried to use a thermistor as a thermometer. She found out that when the temperature was 200°C , the resistance of the thermometer was $250\ \Omega$ and when the temperature was -50°C , the resistance of the thermometer increased to $500\ \Omega$.

What would be the temperature when the resistance of the thermistor is $300\ \Omega$?

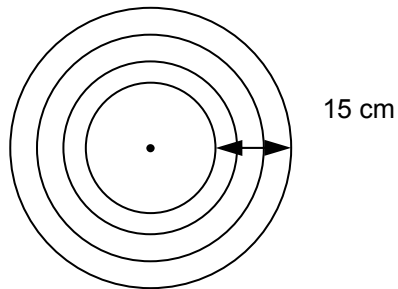
- A 110°C B 130°C C 150°C D 170°C

- 22 A heater supplies constant power to heat a substance from solid state. Which of the following statement is true about the substance?



- (1) The specific heat capacity of the solid substance is higher than the specific heat capacity of the liquid substance.
- (2) The heat capacity of the liquid substance is higher than the heat capacity of the gaseous substance.
- (3) Portion QR is in liquid state.
- A** (1) only
- B** (2) only
- C** (1) and (2) only
- D** All of the above
- 23 Ocean waves usually have wavelengths of hundreds of metres. However sea waves approaching the beaches usually have wave lengths of tens of metres though they originated from ocean waves. It is because, when approaching the land,
- A** the waves travel faster.
- B** the waves travel slower.
- C** the frequency of the waves increases.
- D** the frequency of the waves decreases.

- 24 In a ripple tank experiment, the original pattern of circular water waves is frozen by a stroboscope as shown.

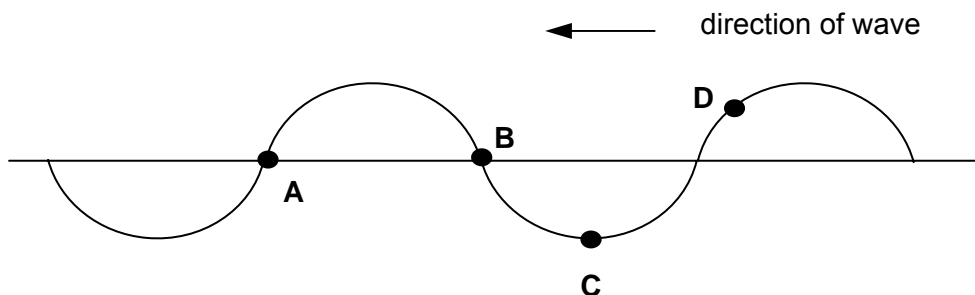


If the dipper is vibrating at 10 Hz, find the wavelength and speed of the waves.

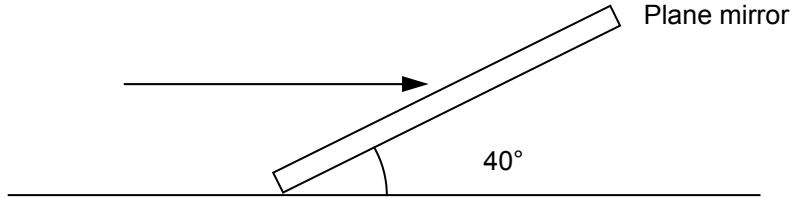
	Wavelength	Speed
A	5 cm	0.5 m s^{-1}
B	15 cm	0.5 m s^{-1}
C	5 cm	1.5 m s^{-1}
D	15 cm	1.5 m s^{-1}

- 25 The diagram shows a cross-section of a water wave moving from right to left.

Which point on the wave is moving upwards with maximum velocity?

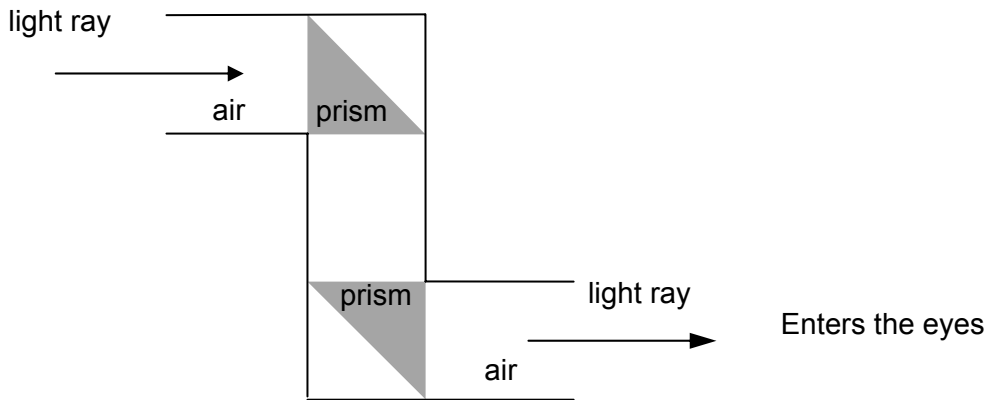


- 26 A plane mirror is inclined at 40° to the table. An incident ray parallel to the floor strikes the mirror and a reflected ray is formed. What is the angle of reflection?



- A 20° B 40° C 50° D 80°

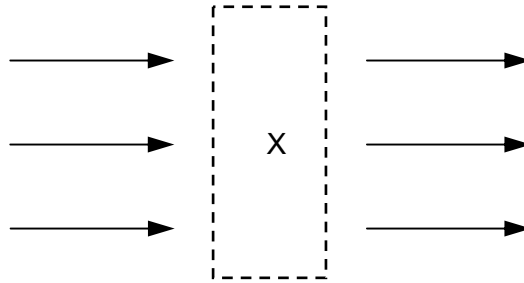
- 27 A periscope uses two 45° prisms to reflect the light ray into the observer's eye. What is/are the possible refractive index of the prism's material?



- (1) 1.2 (2) 1.5 (3) 2.2

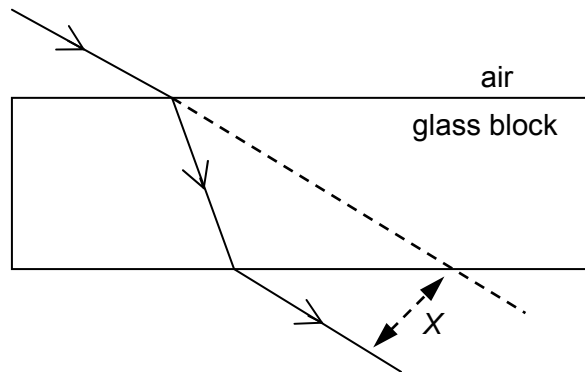
- A (1) only
 B (2) only
 C (2) and (3) only
 D All of the above

28 The diagram below shows rays of light passing through an object X. What could X be?



- A a diverging lens
- B a converging lens
- C a glass block
- D a plane mirror

29 Which of the following minimizes the gap x ?

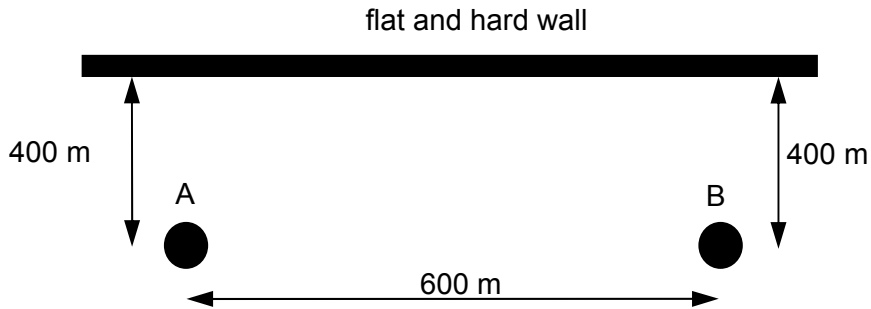


- (1) Use a thinner glass block
- (2) Use a glass of smaller refractive index
- (3) Use a stronger light ray

- A (1) and (2) only
- B (1) and (3) only
- C (2) and (3) only
- D All of the above

- 30 Two men, A and B, are facing a flat and hard wall as shown. When man A makes a clap, man B hears two claps.

If the speed of sound is 320 m s^{-1} , what is the time interval between the two claps heard by man B?



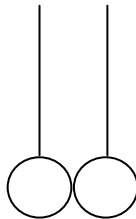
- A 0.32s B 0.67s C 1.25s D 2.50s
- 31 Which of the following uses X-rays?
- (1) detecting flaws in metals
 - (2) detecting restricted objects in the luggage
 - (3) detecting bone fracture in human body
- A (1) and (2) only
 B (1) and (3) only
 C (2) and (3) only
 D All of the above

32 Which of the following comes after green in the ascending order of wavelength?

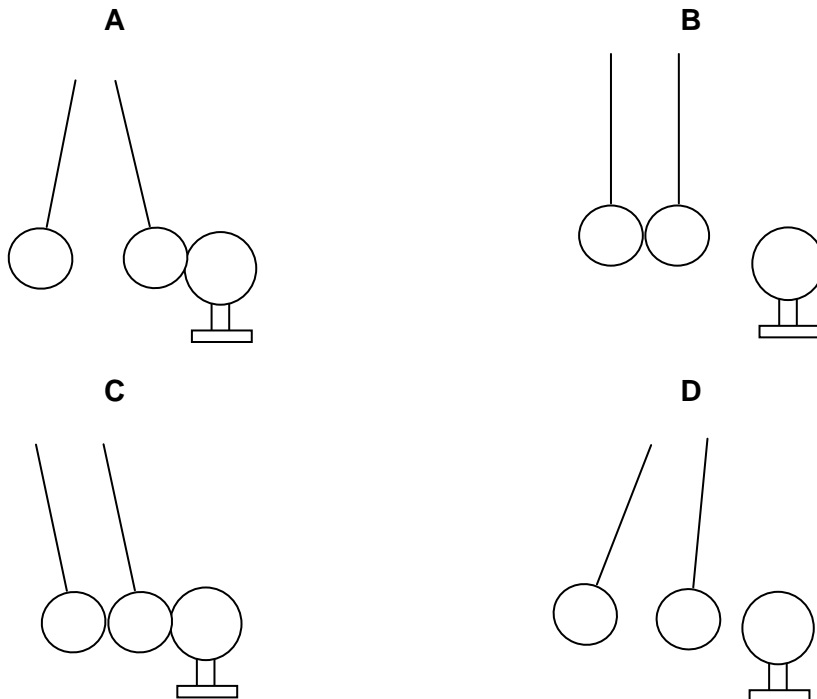
- (1) yellow (2) blue (3) red

- A (1) and (2) only
 B (2) and (3) only
 C (1) and (3) only
 D All of the above

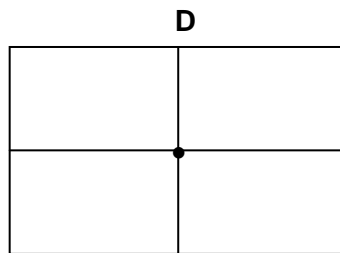
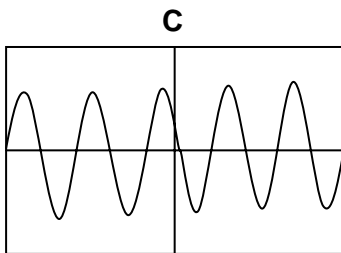
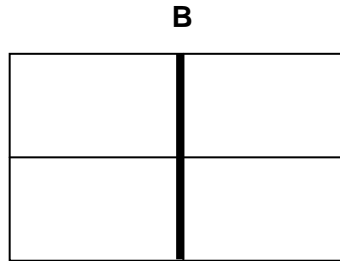
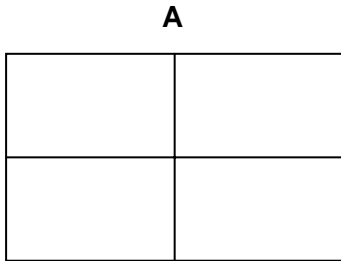
33 Two identical neutral light conducting balls, suspended by insulating thread, touch each other as shown.



Which of the following shows the position of the balls when a heavy positively-charged conducting sphere touches one of them?

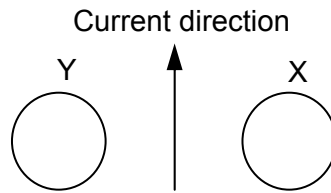


- 34 An alternating voltage is applied to the Y-plates of a CRO while the X-plates are turned off. What will be observed on the screen?

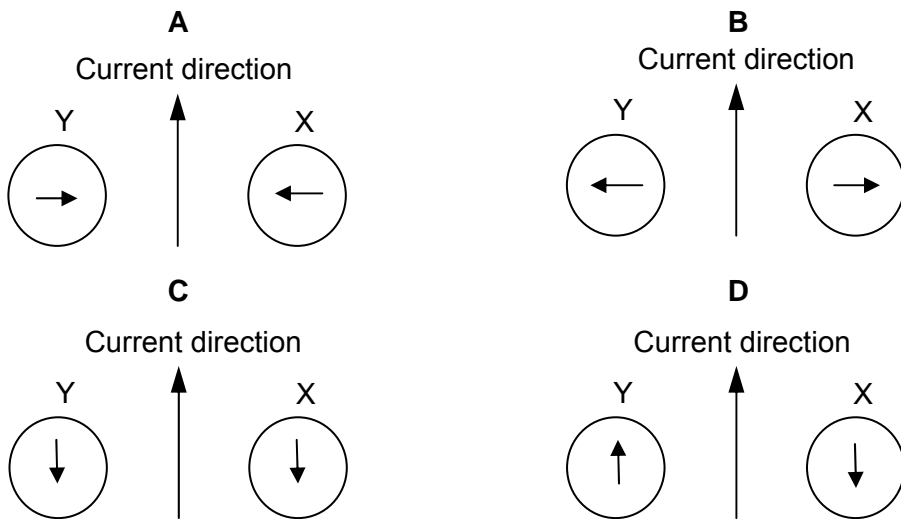


- 35 What is the problem when a multi-plugs adaptor is used to connect many appliances to the same socket?
- A** The current drawn from the mains gets higher and overheating may occur.
 - B** The voltage across the live and neutral wires increases and overheating may occur.
 - C** The flow of the current will be slowed down and the power to each appliance will be reduced.
 - D** The appliances will be damaged due to the higher current that flows through each appliance.
- 36 Many domestic hair-dryers have no earth wire. Why is this so?
- A** The fan prevents the heating coil from becoming too hot.
 - B** The current is small.
 - C** The casing of the hair-dryer is made of plastic material.
 - D** The plug is installed with a fuse.

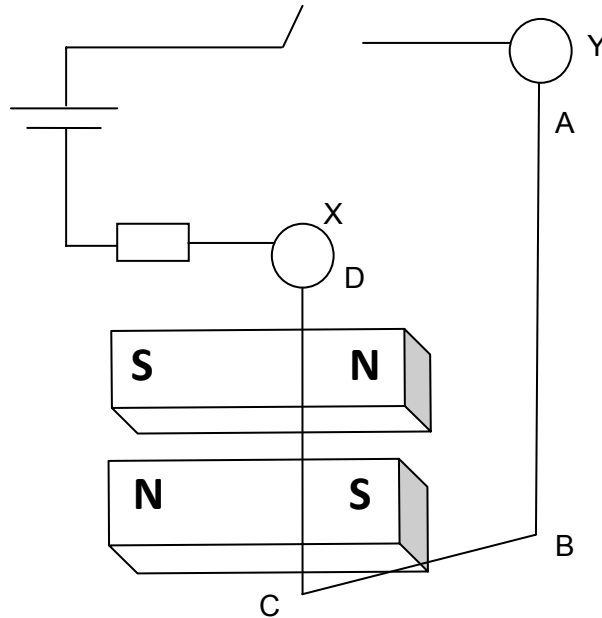
- 37 Plotting compasses X and Y are placed on the right and left of a current carrying wire respectively as shown in the diagram.



In which direction will the compass needles point?



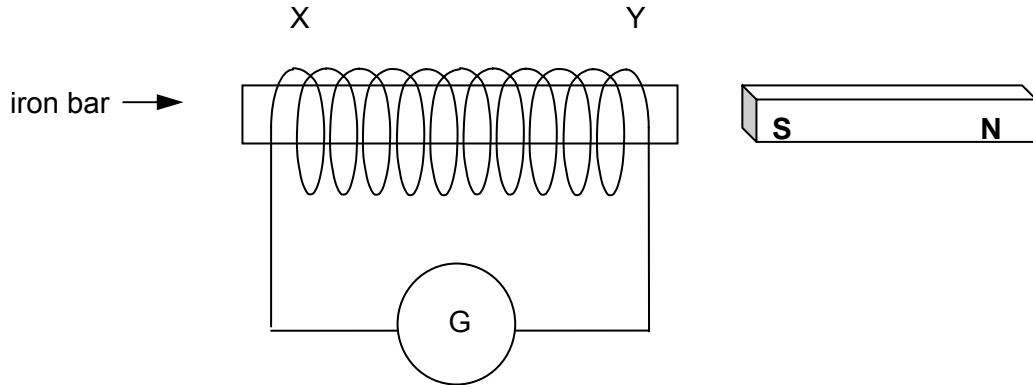
- 38 The diagram below shows a U-shape wire hanging freely on rods X and Y. Rods X and Y are connected to a d.c. supply.



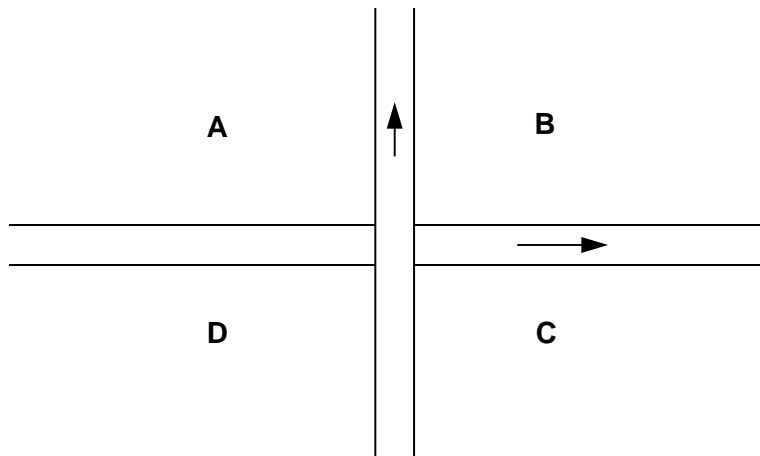
Which of the following is true when the switch is closed?

- A U-shape wire starts to oscillate to and fro, moving in between the two bar magnets and away from the magnets.
- B U-shape wire swings away from the magnets and stays at a position away from the magnets.
- C U-shape wire swings inwards, towards the magnets and stays at a position in between the magnets.
- D Nothing happens to the U-shape wire.

- 39 A permanent magnet is placed near a solenoid as shown in the diagram below. Which of the following is/are true?



- I A S-pole is induced at Y when the magnet moves away from the solenoid.
 - II A N-pole is induced at Y when the magnet moves towards the solenoid.
 - III Nothing happens when the magnet does not move.
- A II only
 - B III only
 - C I and II only
 - D All of the above
- 40 Equal amount of current is flowing in two insulated wires perpendicular to each other as shown below.



Which segment, A, B, C or D has the strongest magnetic field flowing out of the paper?

1 – 21

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1 – 22

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1 – 23

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