Class	Register Number	Name

南洋女子中学校

NANYANG GIRLS' HIGH SCHOOL

End-of-Year Examination 2014
Secondary Three

PHYSICS **45 minutes**

Paper 1 Multiple Choice **08:00 – 08:45**

Friday **03 Oct 2014**

Additional materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Do not open this booklet until you are told to do so.

Write in soft pencil.
Do not use staples, paper clips, highlighters, glue or correction fluid.
Write your name, class and register number on the Multiple Choice Answer Sheet provided.

There are **thirty** questions in 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 answer sheet.

INFORMATION FOR CANDIDATES

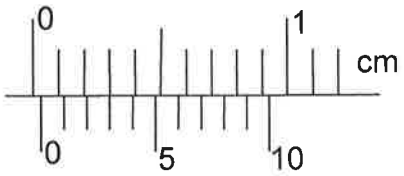
Each correct answer will score one mark. A mark will not be deducted for a wrong answer. Any rough working should be done in this booklet.

The gravitational field strength near Earth's surface, g = 10 N/kg

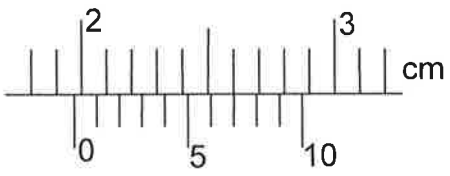
1 Which of the following does **NOT** show a physical quantity and its correct unit in terms of SI base units?

A	pressure	m^{-1} kg s^{-2}
B	force	m kg s^{-2}
C	work done	m^2 kg s^{-2}
D	power	m kg s^{-3}

2 The diagram on the left below shows the vernier calipers reading when the jaws of a pair of vernier calipers are closed. The diagram on the right below shows the vernier calipers reading when the jaws are clamped across the diameter of a rod. What is the true value of the diameter of the rod?



jaws closed



jaws clamped across diameter of rod

A 1.94 cm
B 1.97 cm
C 2.00 cm
D 2.67 cm

3 Which of the following consists of only vector quantities?

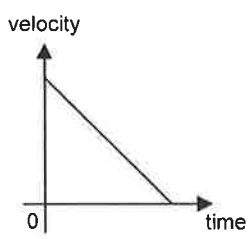
A acceleration, force, energy
B density, moments, work done
C displacement, velocity, force
D weight, velocity, power

4 Which of the following statements describes a situation where only random error occurs?

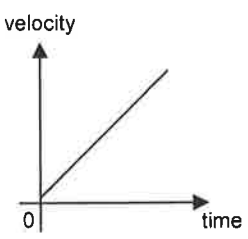
A measuring the length of a 50 cm elastic cord with a metre rule
B measuring the period of a pendulum with a stopwatch that is running slow
C measuring the diameter of a wire with a micrometer screwgauge that has zero error
D measuring the volume of water with a measuring cylinder that has a piece of plasticine stuck to its bottom

5 Ignoring air resistance, which of the following graphs correctly shows the motion of an object thrown upwards through a vertical height of 5 m?

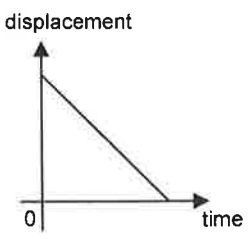
A



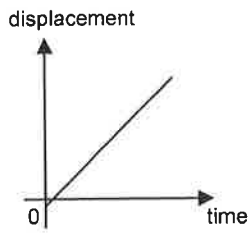
B



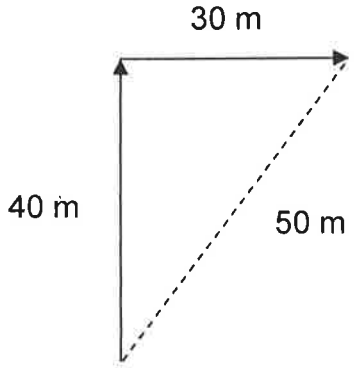
C



D



6 A woman runs 40 m to the north in 6.0 s, and then 30 m to the east in 4.0 s. What is the magnitude of her average velocity?



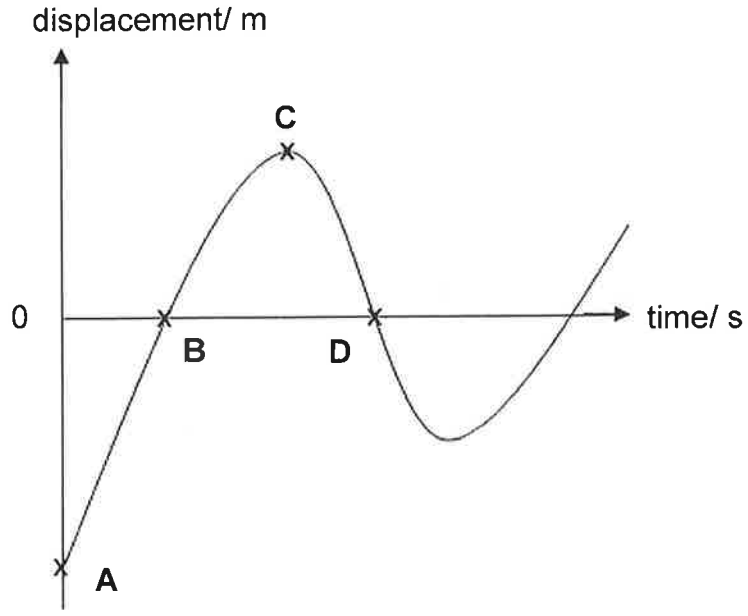
A 1.0 m s^{-1}

B 5.0 m s^{-1}

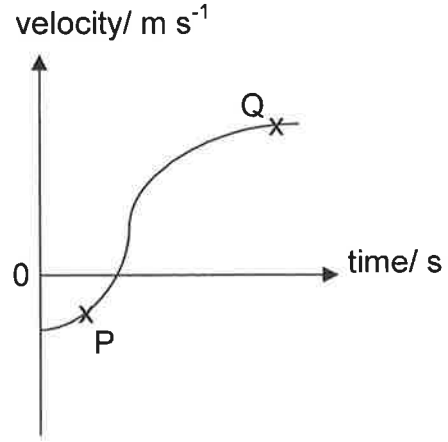
C 6.0 m s^{-1}

D 7.0 m s^{-1}

7 An object's position during a given time interval is shown by the graph below. At which point is the object at rest?



8 The following graph shows a velocity-time graph of a moving object.



How do the acceleration and displacement of the particle at point Q compare to the acceleration and displacement of the particle at point P, starting from time = 0 s?

A Acceleration is smaller and displacement is smaller at Q

B Acceleration is smaller and displacement is greater at Q

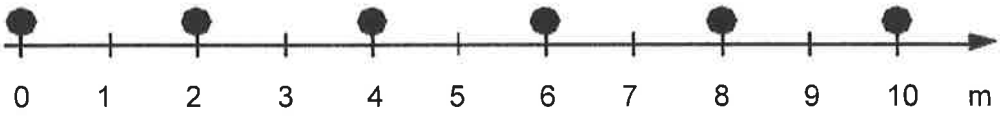
C Acceleration is greater and displacement is smaller at Q

D Acceleration is greater and displacement is greater at Q

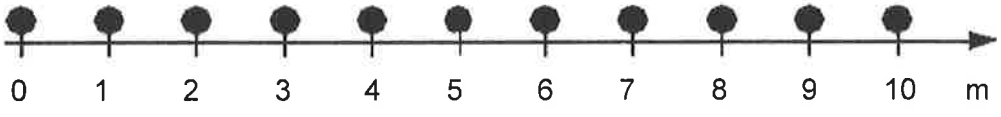
9 The diagrams below show the position of a ball at every second as it moves from the left to the right.

Which of the following diagrams shows the ball moving with the highest average speed in the first 3 s?

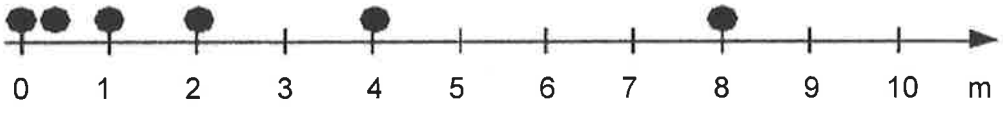
A



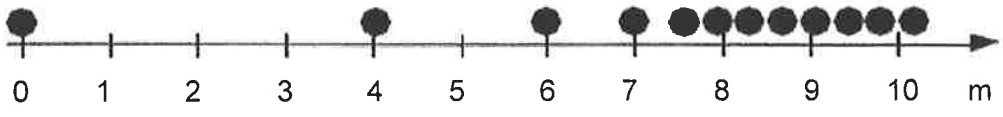
B



C

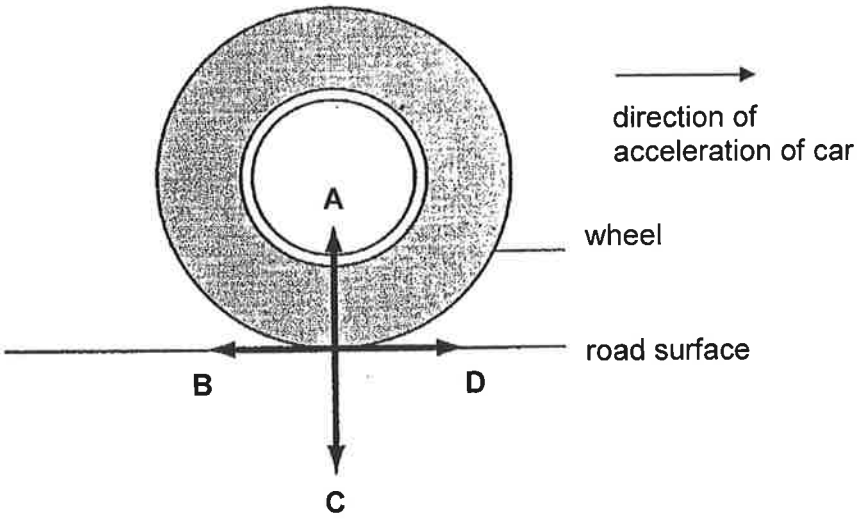


D

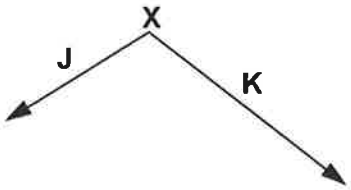


10 The diagram below shows the wheel of a moving car that is driven by the engine. The car is accelerating in the direction shown.

In which direction does the frictional force act on the wheel?

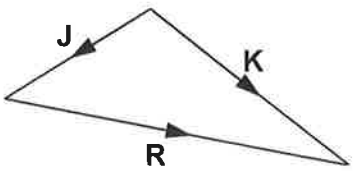


11 The diagram below shows two forces **J** and **K** acting on a point **X**.

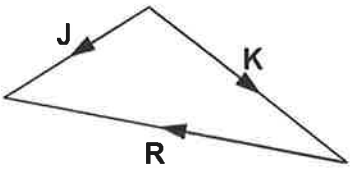


In which of the following vector diagrams does the vector **R** represent the resultant force of **J** and **K**?

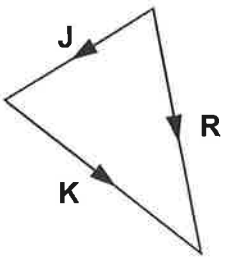
A



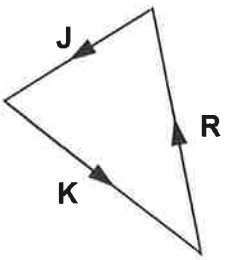
B



C

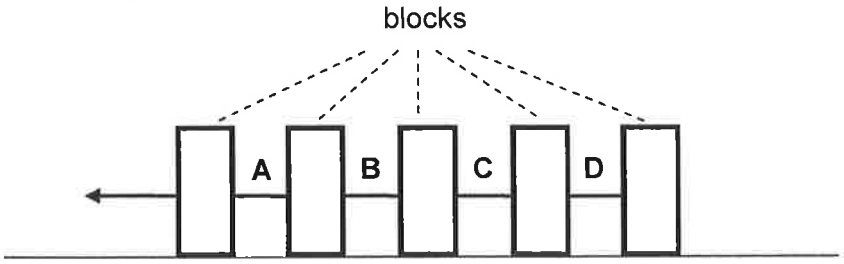


D



12 The diagram below shows five blocks of equal masses connected by four identical strings. They are pulled by a steadily increasing force **F** to the left on a smooth surface.

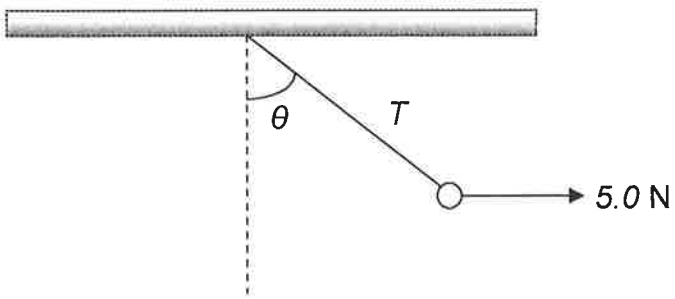
Which string (A, B, C or D) is least likely to break first?



13 A tension of 6000 N is experienced by the elevator cable of an empty elevator moving upwards with an acceleration of 2.0 m s^{-2}. What is the mass of the elevator?

A 500 kg
B 750 kg
C 3000 kg
D 12000 kg

14 A pendulum of mass 1.0 kg is hung by a light string. A horizontal constant force of 5.0 N is applied to the particle. What is the tension T in the string and the angle θ which the string makes with the vertical?

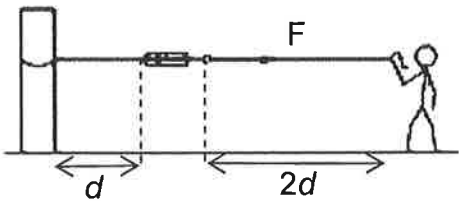


	T / N	θ / °
A	5.1	11.3
B	11.2	26.6
C	11.2	63.4
D	5.1	78.7

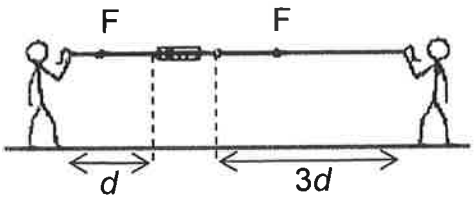
15 In scenario 1, a person pulls with a force F on a string of length $2d$ that is connected to a spring balance. The other end of the spring scale is connected to a post by a string of length d.

In scenario 2, the person pulls on a string of length $3d$ with a force of F, and a second person stands where the post was in scenario 1, and also pulls with a force of F.

Scenario 1



Scenario 2



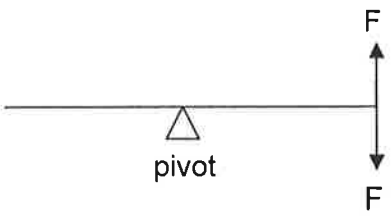
If the spring balance reads 50 N in scenario 1, what does the spring balance read in scenario 2?

A 50 N **B** 67 N

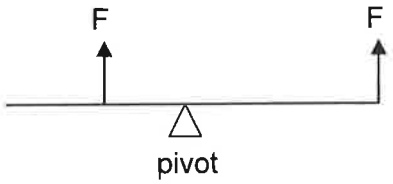
C 100 N **D** 133 N

16 Two equal forces, F, act on each of four uniform planks. The pivot is placed at the middle of each plank. Which plank is in equilibrium?

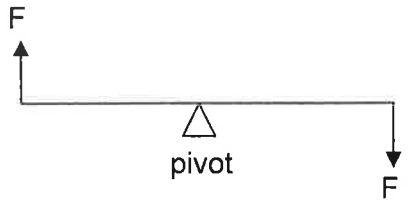
A



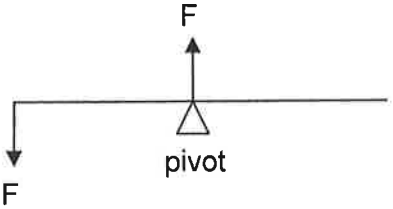
B



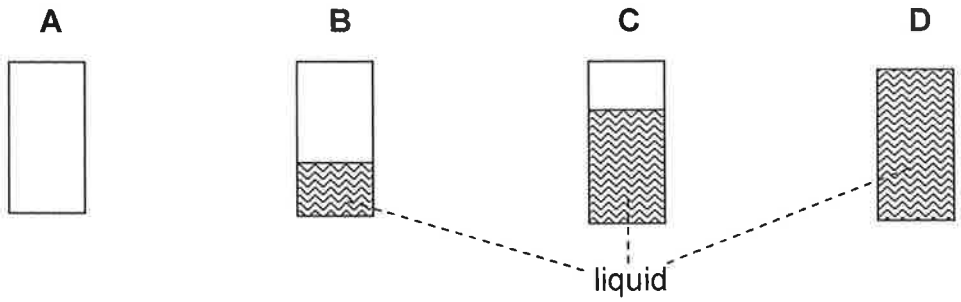
C



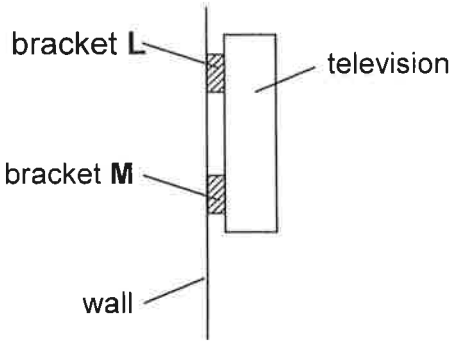
D



17 A, B, C and D are four identical containers. B, C and D are filled with the same liquid to different levels as shown below. Given that the density of the liquid is much higher than the density of the container, which of the following containers has the largest angle of tilt before toppling?

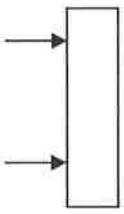


18 The diagram below shows a LED television hung on the wall using bracket **L** and bracket **M**.

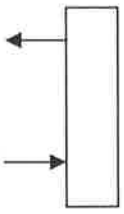


Which of the following diagrams shows the correct direction of the horizontal forces acting on the television by the two brackets?

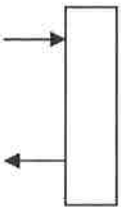
A



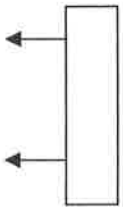
B



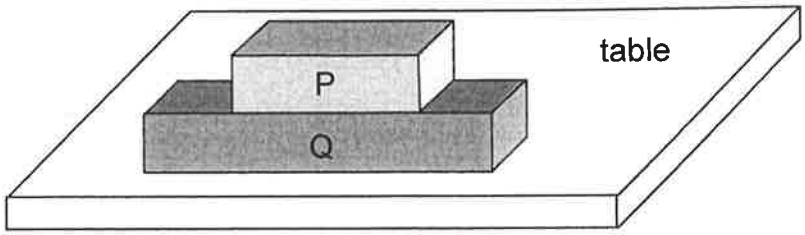
C



D



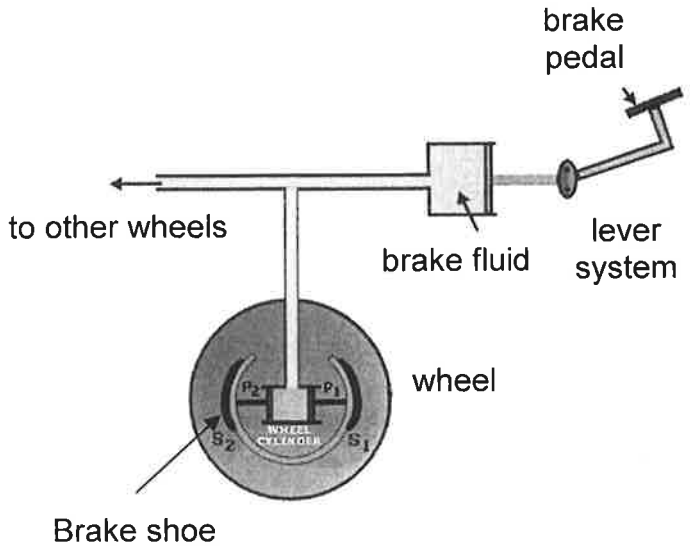
19 The diagram shows a block P on top of another block Q, resting on a table.



Which of the following statements is **true** about the pressure exerted by the blocks **on the table**?

A The pressure is dependent on how P is placed on top of Q.
B The pressure decreases as the area of the table increases.
C The pressure on the table is highest on the area directly under P.
D The pressure increases when the position of P and Q are interchanged.

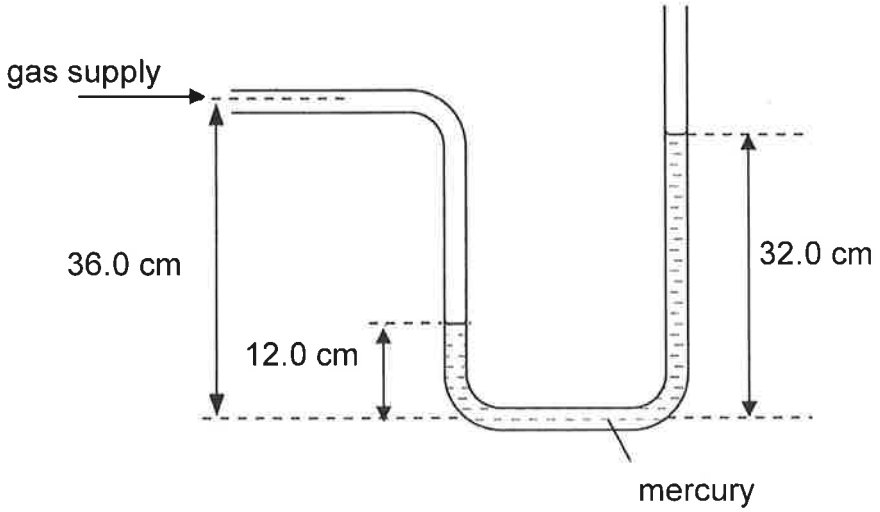
20 The hydraulic brake is an example of the application of fluid pressure. The diagram below shows part of a hydraulic brake system of a car.



Which of the following statements is **NOT** true about the brake system?

A The brake fluid transmits pressure equally in all directions.
B The system works because liquids are almost incompressible.
C The system multiplies the effort applied on the brake pedal to increase the force acting on the brake shoe.
D The presence of air bubbles in the brake fluid increases the effectiveness of the hydraulic system.

21 A manometer is used to measure the pressure of a gas supply as shown in the diagram below. The gas pressure is then changed and the mercury level on the right arm of the manometer drops by 3.0 cm.

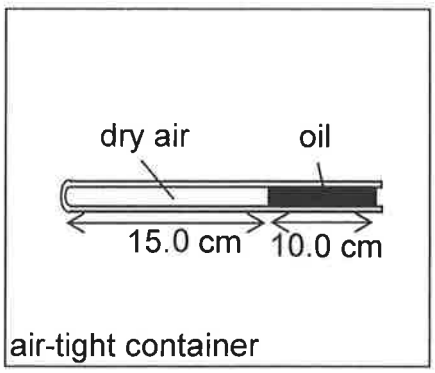


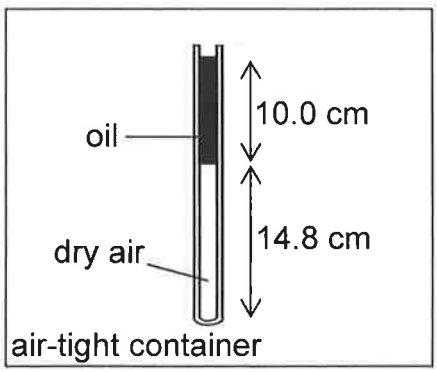
What is the new excess pressure of the gas supply?

A 14.0 cm of mercury
B 17.0 cm of mercury
C 20.0 cm of mercury
D 29.0 cm of mercury

22 A narrow uniform tube, closed at one end, contains some dry air which is sealed by a thread of oil 10.0 cm long. The tube is enclosed in an air-tight container.

When the tube is held vertically, with the closed end at the bottom, the air column is 14.8 cm long, but when it is held horizontally, the air column is 15.0 cm long.
What is the air pressure in the air-tight container?



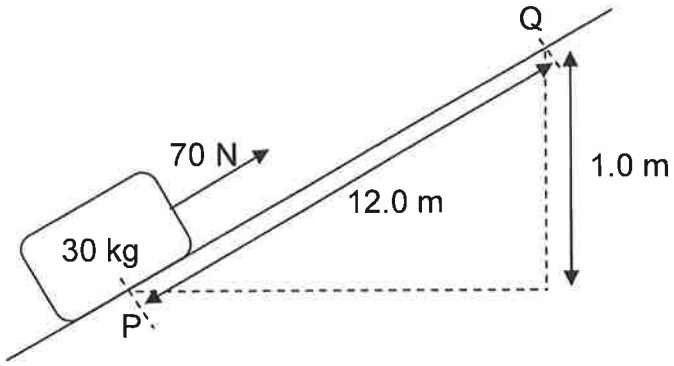


A 20 cm oil
B 298 cm oil
C 150 cm oil
D 740 cm oil

23 A bullet of mass 40.0 g travels horizontally. It hits a wooden block at 330 m s^{-1} and comes out of the block at 208 m s^{-1}. What is the energy loss of the bullet?

A 865 J
B 1310 J
C 2180 J
D 13100 J

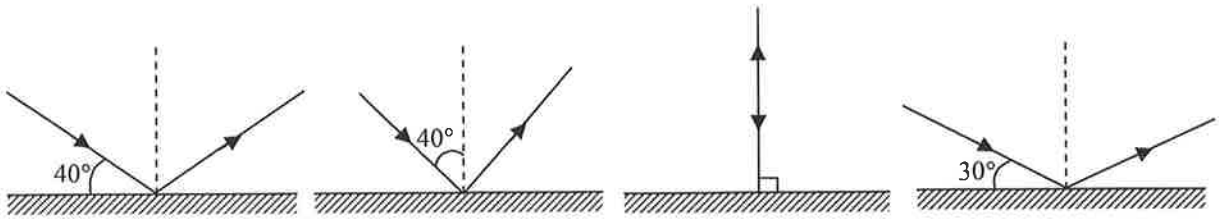
24 A mass of 30 kg is pulled up a rough inclined plane at a constant speed by a force of 70 N. It is moved 12.0 m along the plane from P to Q, and the increase in height is 1.0 m.



What is the work done against friction?

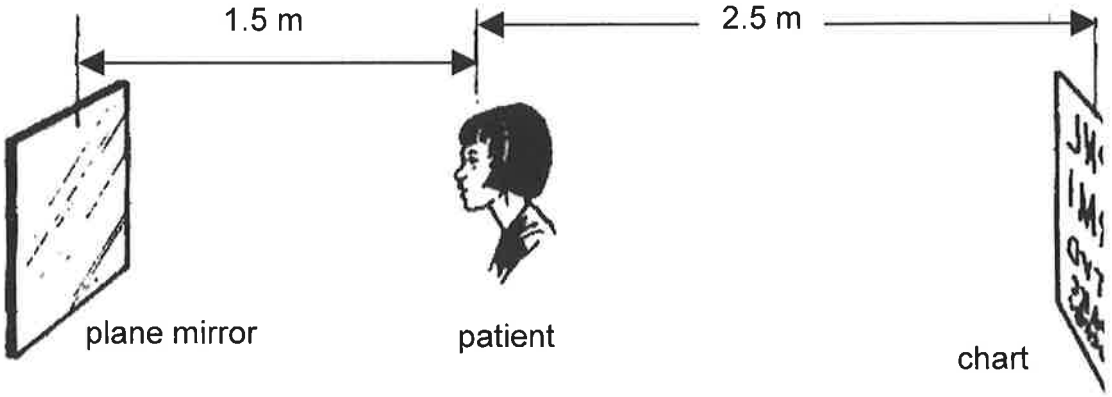
A 300 J
B 360 J
C 540 J
D 840 J

25 In the following figures, a light ray is incident on a plane mirror and then reflected away from it.
Which of the diagrams shows the smallest angle of reflection?



A **B** **C** **D**

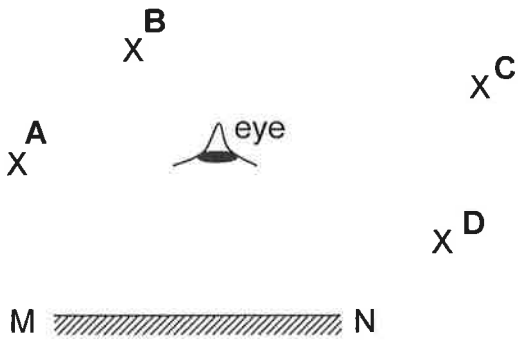
26 The diagram shows a patient having her eyes tested. A chart with letters on it is placed behind her and she sees it reflected in a plane mirror.



How far away from the patient will the image of the chart appear to her?

A 3.0 m **B** 5.0 m **C** 5.5 m **D** 8.0 m

27 Four objects A, B, C and D are placed in front of a plane mirror MN. A viewer looks into the mirror as shown in the diagram below.
Which of the objects' images cannot be seen by the viewer?

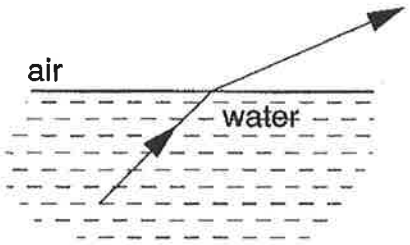


28 Which of the following statements is **true** about reflection?

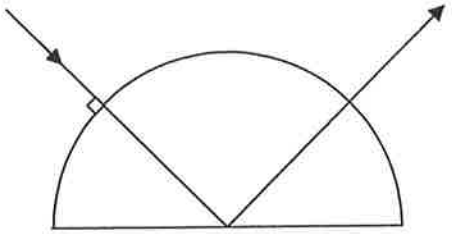
A The incident ray is equal to the reflected ray.
B The speed of light becomes slower after reflection.
C The incident ray, reflected ray and normal always lie on the same plane.
D The intensity of the light remains the same before and after reflection from a mirror.

29 In which of the diagrams is the path of the light ray **NOT** correct?

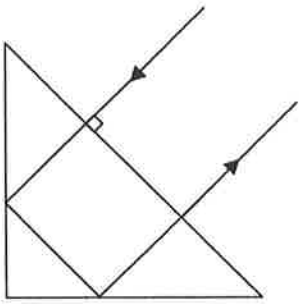
A



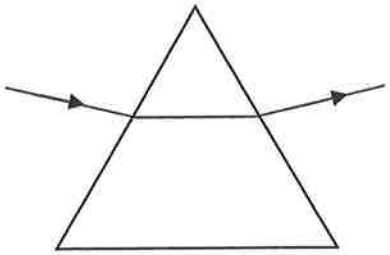
B



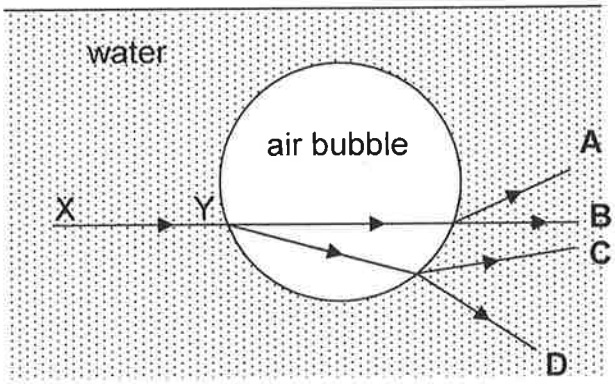
C



D



30 A light ray, XY, passes through a spherical air bubble in water.
Which direction, A, B, C or D correctly indicates the subsequent path of the ray emerging from the bubble?



End of paper

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