SINGAPORE SPORTS SCHOOL
PRELIMINARY EXAMINATION 2022
SECONDARY 4
NORMAL (ACADEMIC)

CANDIDATE NAME			
CLASS	**4D / 4A2**	INDEX NUMBER	

SCIENCE (PHYSICS) **5105/01**

Paper 1 Multiple Choice **18 August 2022**

Papers 1 and 2: 1 hour 15 minutes

Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

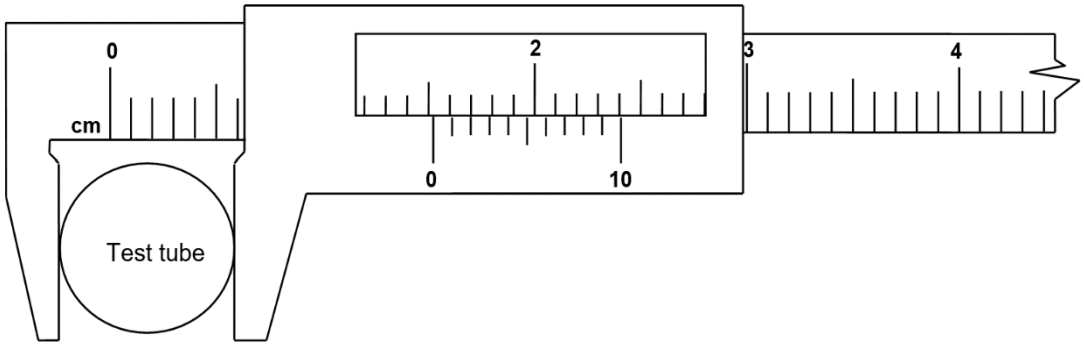
Write in soft pencil.
Do not use correction fluid.
Write your name on the Answer Sheet in the spaces provided.

There are twenty questions on this paper. Answer **all** questions. Four 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.

Answers to Paper 1 and Paper 2 must be handed in separately.
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
You are advised to spend no more than **30 minutes** on **Paper 1**.
You may proceed to answer Paper 2 as soon as you have completed Paper 1.
The use of an approved scientific calculator is expected, where appropriate.

1 The diagram shows a vernier caliper that is used to measure the diameter of a test tube.



What is the diameter of the test tube?

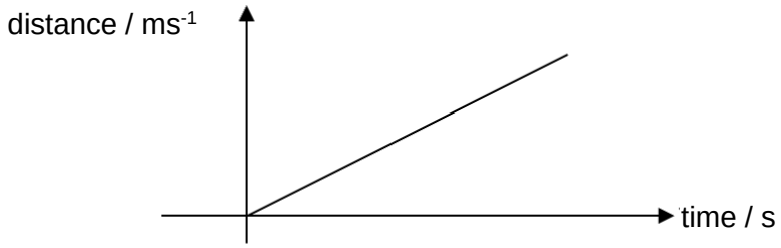
A 1.02 cm

B 1.52 cm

C 1.57 cm

D 1.70 cm

2 The diagram shows the distance-time graph of an object.



Which of the following statements describe the motion of the object?

A The object is moving with constant speed.

B The object is moving with constant acceleration.

C The object is moving with increasing acceleration.

D The object is at rest.

3 A driver travelled from town A to town B, which is 100 km apart. He took 45 minutes to travel the first 40 km, rested for 15 minutes before completing 60 km in 1 hour.

What is his average speed for the journey?

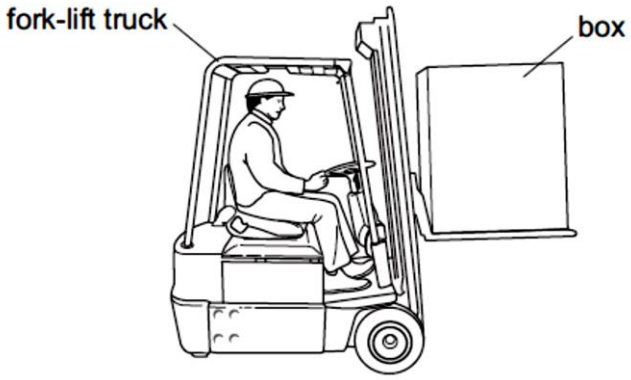
A 10 km/h

B 40 km/h

C 45 km/h

D 50 km/h

4 A box is being moved by a fork-lift truck. The total weight of the box is 3000 N.



The force exerted by the fork-lift truck on the box is 3500 N upwards. What is the resultant force on the box?

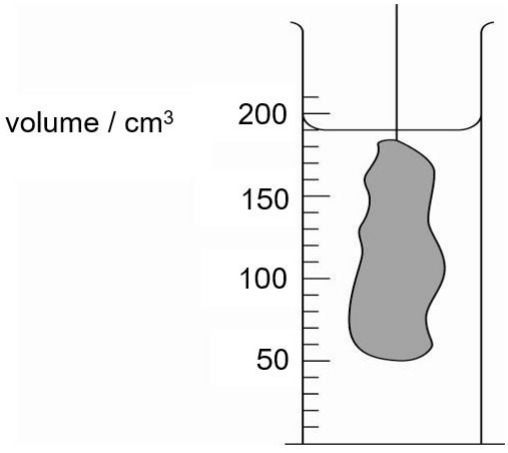
A 500 N downwards

B 500 N upwards

C 6500 N downwards

D 6500 N upwards

5 The diagram shows an object suspended in 100 cm^3 of water by a piece of thread.



What is the density of the object if its mass is 250 g?

A 1.25 g/cm^3

B 1.32 g/cm^3

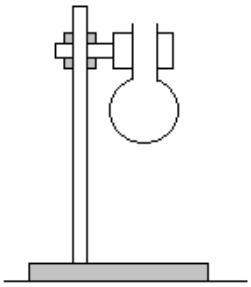
C 2.50 g/cm^3

D 2.78 g/cm^3

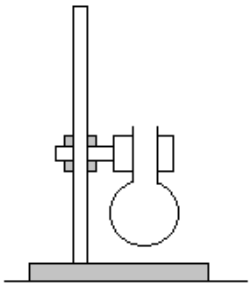
6 A student uses a retort stand and clamp to hold a flask of liquid.

Which diagram shows the least stable arrangement?

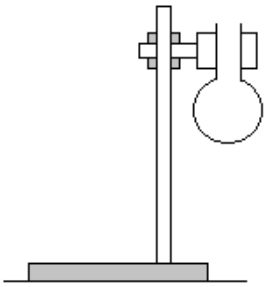
A



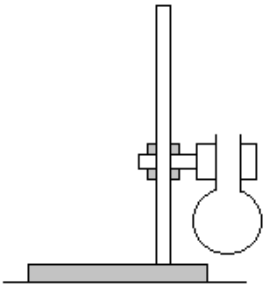
B



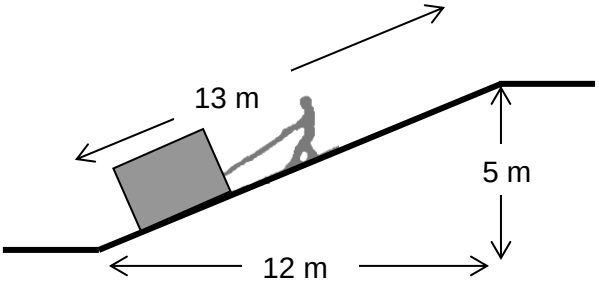
C



D



7 The diagram shows a man pulling a box of mass 30 kg up a slope.



What is the gravitational potential energy the box gains when it reaches the top?

A 150 J

B 390 J

C 1500 J

D 3900 J

8 A rectangular block of dimension 1.2 m x 0.5 m x 0.8 m can exert a maximum pressure of up to 300 Pa on a flat surface.

What is weight of this rectangular block?

A 120 N

B 144 N

C 180 N

D 288 N

9 When a car is driven for some time, the temperature of the tyres increases.

What has happened to the air molecules in the tyres?

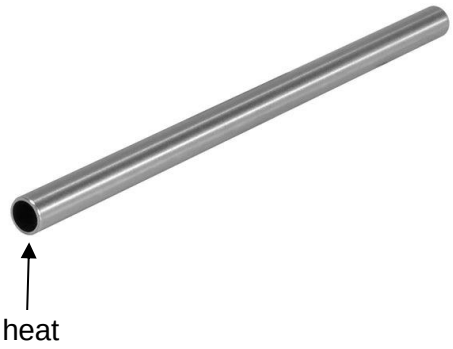
A Air molecules expand.

B The speed of the air molecules increases.

C The force between the air molecules increases.

D There are more air molecules.

10 A metal pipe is heated from one end. The other end gets hot after a while.



Which statement best explains this?

A Heat is transferred by molecular vibration.

B Heat is radiated from the source to the other end.

C The heated molecules moved from one end to the other end.

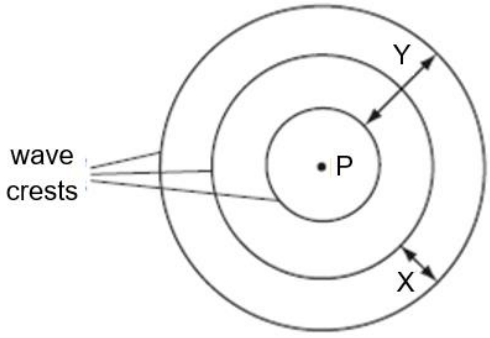
D Heat is transferred by molecular vibration and free electron diffusion.

11 A boy spilled his drink on the table, and noticed that after a while, the liquid puddle of liquid decreased in volume. He reasoned that some of the liquid molecules have escaped from the liquid.

From where do the molecules escape, and what is the effect on the temperature of the liquid?

	molecules escape from	temperature of the liquid
A	all parts of the liquid	decreases
B	all parts of the liquid	increases
C	only the surface of the liquid	decreases
D	only the surface of the liquid	increases

12 A vertical stick is dipped up and down in water at P. In 2.0 s, three wave crests are produced on the surface of the water.



Which statement is correct?

A The period of the waves is 1.5 s.

B The frequency of the wave is 1.5 Hz.

C Distance X is the amplitude of the waves.

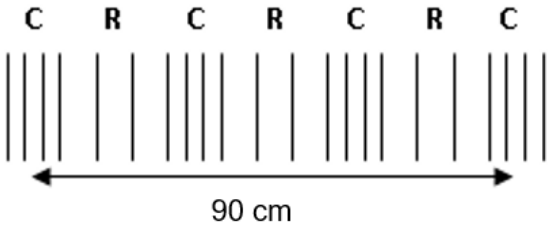
D Distance Y is the wavelength of the waves.

13 Radio waves, visible light and X-rays are parts of the electromagnetic spectrum.

What is the correct order of increasing wavelength?

	shortest wavelength ⟶		longest wavelength
A	visible light	radio waves	X-rays
B	visible light	X-rays	radio waves
C	X-rays	visible light	radio waves
D	X-rays	radio waves	visible light

14 The figure shows the compression (C) and rarefaction (R) of air molecules as sound waves travels through it.



What is the wavelength of the sound waves?

A 30 cm

B 45 cm

C 60 cm

D 90 cm

15 Ships use sound waves to find the vertical distance to the seabed. A pulse of sound waves is sent out and the echoes are detected. The time taken for the pulse to be transmitted to the bottom of the sea and being detected by the receiver is 3.0 s. The speed of sound in water is 1500 m/s.

Calculate the distance between the ship and the bottom of the sea.

A 500 m

B 1000 m

C 2250 m

D 4500 m

16 A lamp was lit by a current of 2 A for 2 minutes.

How much charge passed through the lamp?

A 1.0 C

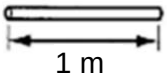
B 4.0 C

C 60 C

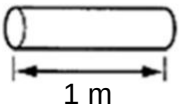
D 240 C

17 The diagrams show four wires made from the same material.

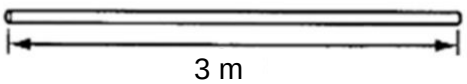
Which wire has the greatest resistance?

A 

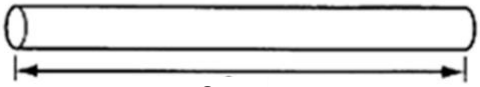
1 mm^2 cross-sectional area

B 

8 mm^2 cross-sectional area

C 

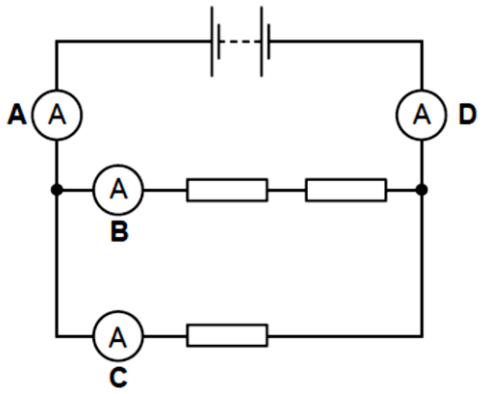
1 mm^2 cross-sectional area

D 

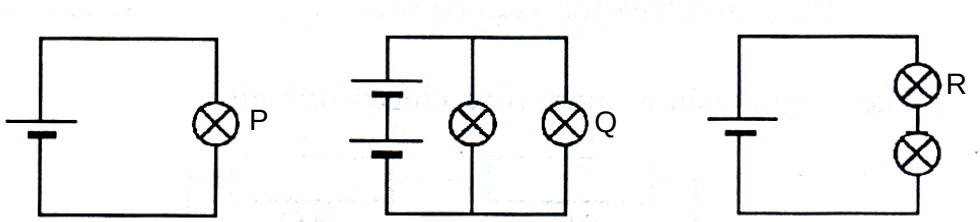
8 mm^2 cross-sectional area

18 The diagram shows a battery connected to three identical resistors. Four ammeters **A**, **B**, **C** and **D** are connected in the circuit.

Which ammeter shows the smallest reading?



19 Similar cells are used to light up similar lamps in the circuits.



Which statement is correct?

A P is the brightest.

B Q is the brightest.

C R is the brightest.

D All three lamps will light up with the same brightness.

20 A 2000 W air-conditioning system is used for 4 hours every day.

What is the cost of using the air-conditioner for 30 days if 1 unit of energy costs 15 cents?

A $1.20

B $3.60

C $36

D $120