YUHUA SECONDARY SCHOOL
PRELIMINARY EXAMINATION 2022
SECONDARY FOUR NORMAL (ACADEMIC)

4NA	CANDIDATE NAME			
	CLASS		INDEX NUMBER	

SCIENCE (PHYSICS) 5105 / 01

Paper 1 Multiple Choice

17 August 2022
Papers 1 and 2: 1 hour 15 minutes

Additional Materials : Multiple Choice Answer Sheet

Setter: Mr Kenny Low

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 *Class Index Number* on the Answer Sheet in the spaces provided unless this has been done for you

Read the instructions on the Answer Sheet very carefully

There are **twenty** 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.

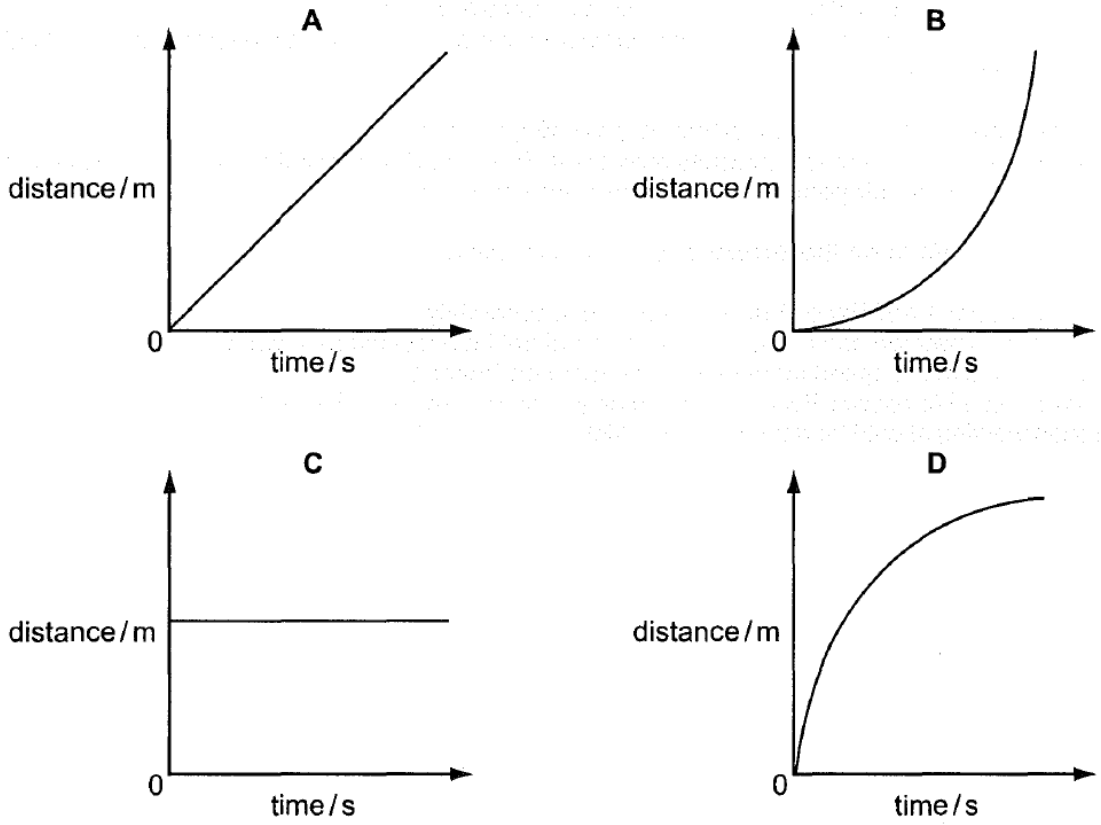
Answers to Paper 1 and Paper 2 must be handed in separately.
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
You are advised to spend no longer than **30 minutes** on **Paper 1**.
You may proceed to answer Paper 2 as soon as you have completed Paper 1.
Any rough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

1 What do all physical quantities consist of?

	numerical magnitude	direction
A	✓	✓
B	✓	×
C	×	✓
D	×	×

2 The following are distance-time graphs.

Which graph shows an object that is stationary?



3 Which of the following defines acceleration?

A $\frac{change\ in\ distance}{time\ taken}$

B $\frac{change\ in\ distance\ in\ a\ fixed\ direction}{time\ taken}$

C $\frac{change\ in\ speed}{time\ taken}$

D $\frac{change\ in\ velocity}{time\ taken}$

4 A balloon is filled with air and is then heated.

What happens to the volume and the density of the air in the balloon as it is heated?

	volume of air	density of air
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

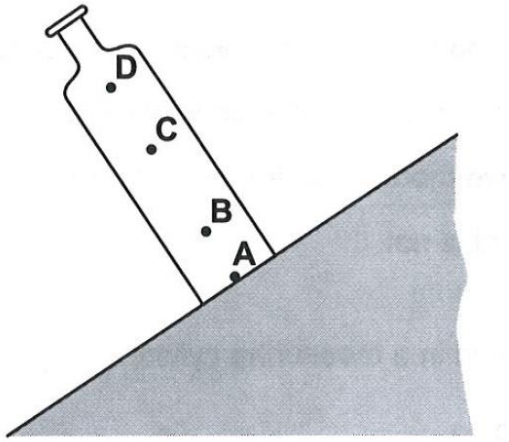
5 The inertia of a body is its resistance to changes in motion.

Which property is a measure of the body's inertia?

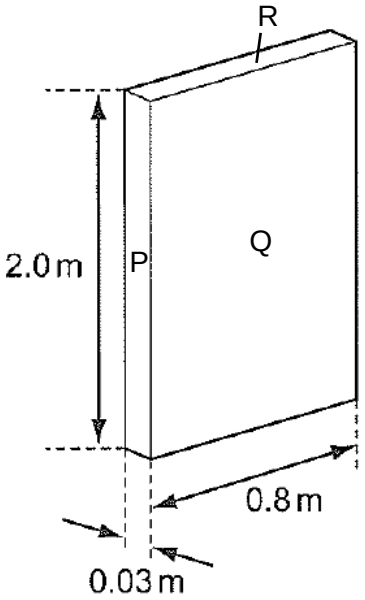
A its density
B its mass
C its volume
D its weight

6 A bottle is **just** able to rest on the sloping surface without falling over.

Where is its centre of gravity?



7 A construction worker is preparing a concrete slab to be laid as part of a pavement. The concrete slab has dimensions of 2.0 m x 0.8 m x 0.03 m.



On which labelled surface should the worker lay it on the ground so that it exerts the **least** pressure?

A P

B Q

C R

D the slab exerts the same pressure on all faces

8 Singapore began to import renewable hydropower from Laos on 23 Jun 2022.

What is the overall energy conversion from a hydropower station?

A	kinetic	→	electrical
B	kinetic	→	potential
C	potential	→	electrical
D	potential	→	kinetic

9 During the Tokyo 2020 Olympics, Lasha Talakhadze from Georgia broke the world record in the weightlifting event by lifting a weight of 4880 N.

Assuming that he lifts the weights through a distance of 2 m, what is the total work done by him?

A 244 J

B 976 J

C 4880 J

D 9760 J

10 A liquid is being heated but does not reach its boiling point yet.

Which statement about the molecules in the liquid is **not** correct?

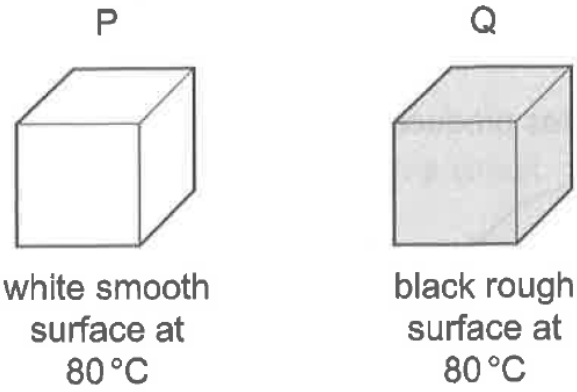
A The molecules expand.

B The molecules gain energy.

C The molecules move faster.

D The molecules move slightly further apart.

11 Two blocks, P and Q, are the same size and made from the same material. They are coated and are set up as shown in the diagram.



P and Q emit thermal energy.

Which row correctly describes the block that emits more thermal energy per second and the reason?

	block that emits more thermal energy per second	reason
A	P	white smooth surface is a better conductor of heat
B	P	white smooth surface is a better emitter of heat
C	Q	black rough surface is a better conductor of heat
D	Q	black rough surface is a better emitter of heat

12 A pot of water is put on the kitchen stove and is being heated.

Which of the statement describes what happens when the water is boiling?

A The heat from the flame stops going to the fire.

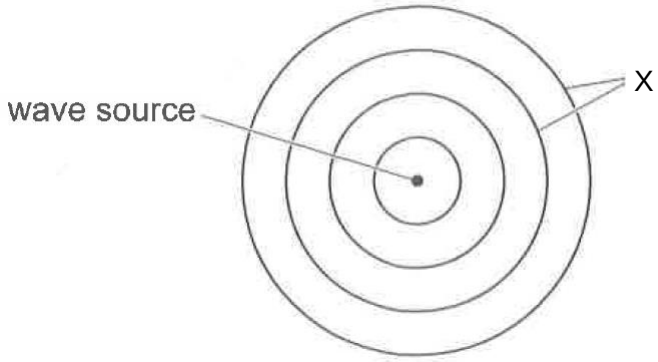
B The heat is being absorbed faster.

C The temperature of the water increases at a slower rate.

D The temperature of the water stops increasing.

13 Circular water waves are being produced in a ripple tank.

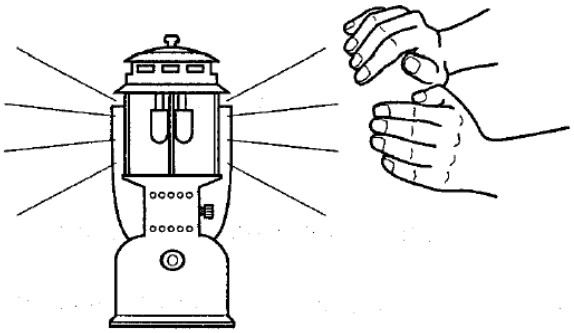
The diagram shows a snapshot of the waves produced.



What does X represent?

A frequency of the wave
B speed of the wave
C wavefronts
D wavelength

14 A student warms her hands near a gas lamp.



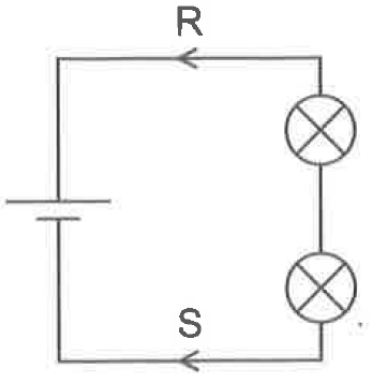
Which waves carry most heat to her hands?

A infrared
B microwaves
C ultraviolet
D visible light

15 Which of the following is a longitudinal wave?

A microwave
B radio wave
C ultrasound
D visible light

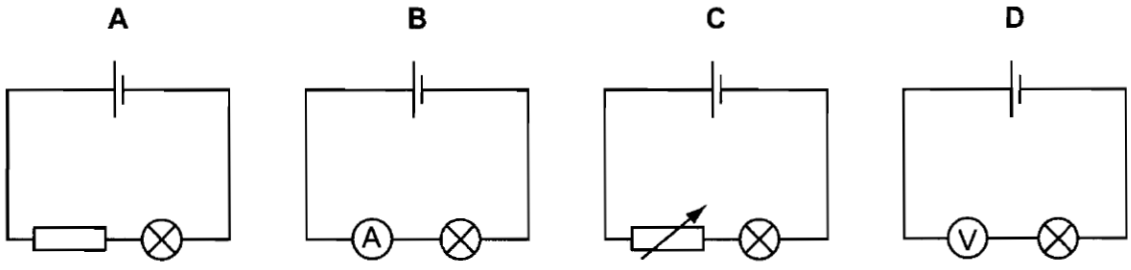
16 The arrows R and S show two directions in a circuit.



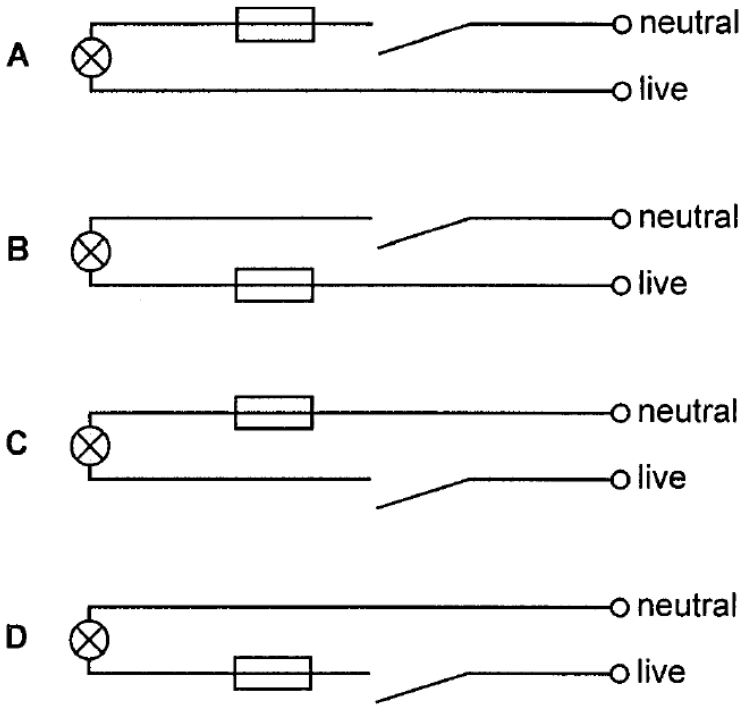
What are the directions of the conventional current and the electron flow in the circuit?

	conventional current	electron flow
A	R	R
B	R	S
C	S	R
D	S	S

17 Which circuit is used to vary the brightness of a lamp?



18 Which of the following circuits will be the safest to use?



19 A length of wire has a resistance of 8 Ω.

The length of the wire is 12 cm and it has a cross-sectional area of 2.0 mm^2.

Which wire, made of the same material, would have twice the resistance?

wire	length / cm	cross-sectional area / mm^2
A	6	1.0
B	6	2.0
C	24	1.0
D	24	2.0

20 There are 8 fans in a classroom. Each fan has a power rating of 40 W and is switched on for 8 hours on a school day.

Given that there are 20 school days in July, and the cost of electrical energy is $0.27 per kWh, how much does it cost to operate the fans in a classroom for July?

A $1.73

B $13.83

C $20.74

D $13824

END OF PAPER 1