ORCHID PARK SECONDARY SCHOOL
Preliminary Examination 2022

CANDIDATE NAME			
CLASS		INDEX NUMBER	

PHYSICS 5105/01

Paper 1 Multiple Choice **11 August 2022**

Secondary 4 Normal (Academic) **Paper 1 and 2: 1 h 15 min**

Setter: Ms Isa Tan

Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, glue or correction fluid.
Write your name and index number on the Optical Answer Sheet in the spaces provided.

There are **twenty** questions in this section. 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.
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.
Any rough working should be done in this paper.
The use of an approved scientific calculator is expected, where appropriate.

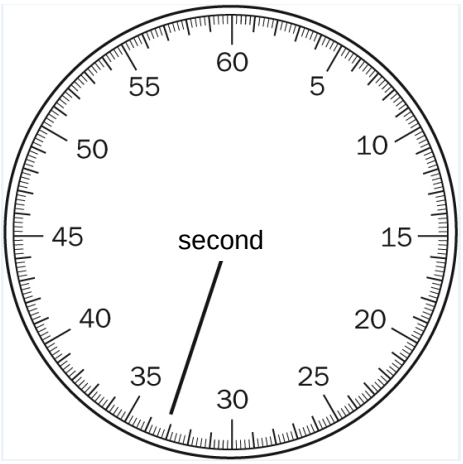
1 Which is not an SI unit?

A m **B** s

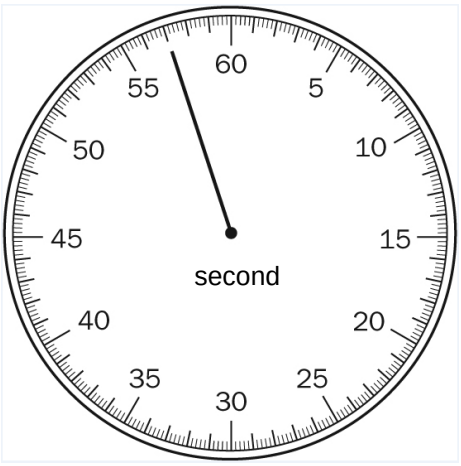
C C **D** °C

2 A stopwatch is used to time a race. The diagrams show the stopwatch at the start and at the end of the race.

start



end

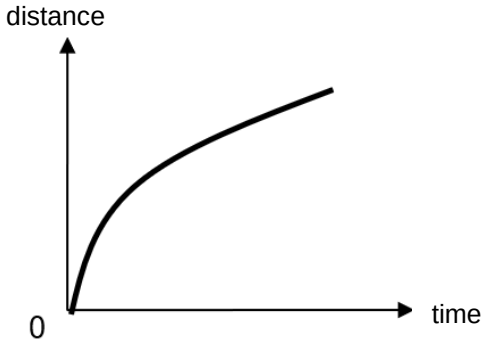


How long did the race take?

A 23.8 s **B** 24.9 s

C 33.0 s **D** 33.3 s

3 The graph shows how the distance of a car changes with time.



Which statement about the speed of the car is correct?

A The speed decreases then remains constant.

B The speed decreases throughout the journey.

C The speed increases then remains constant.

D The speed increases throughout the journey.

4 An object is falling freely in a vacuum near to the Earth's surface.

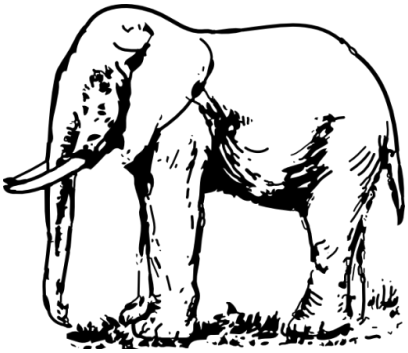
Which word describes the acceleration of the object?

A constant **B** increasing

C decreasing **D** zero

5 An elephant of weight 50 000 N stands on four legs.

Each leg has an area of contact of 0.25 m^2.



What is the pressure exerted by the elephant on the ground?

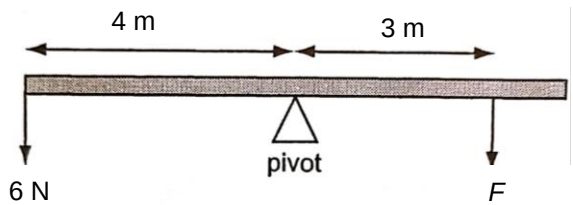
A 5 kPa **B** 20 kPa

C 50 kPa **D** 200 kPa

6 Which row in the table is correct?

	mass	weight
A	a force	a force
B	a force	not a force
C	not a force	a force
D	not a force	not a force

7 A uniform bar is pivoted at its centre as shown.



What force *F* is needed to balance the bar?

A 3 N **B** 4 N

C 6 N **D** 8 N

8 The diagram shows a man in a small boat.

Why does the boat become less stable when the man stands up?

A The centre of gravity of the man and boat is higher.

B The centre of gravity of the man and boat is lower.

C The total weight decreases.

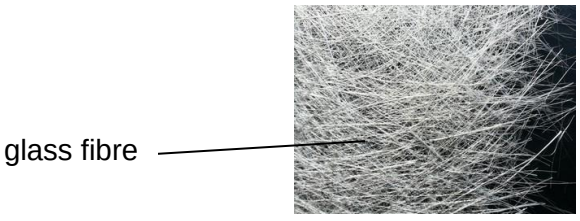
D The total weight increases.

9 Four students lift weight through the same distance. A teacher records the timings to do 10 lifts for each student. The table shows the results.

Which student produces the most power?

student	weight lifted / N	time taken / s
A	100	5
B	100	10
C	200	5
D	200	10

10 Fibre-glass coverings when laid on the walls and ceiling of a house can greatly reduce heat loss to the surroundings. Fibre-glass consists of a large amount of glass fibres.



Which statement best explains why heat loss is reduced by fibre-glass?

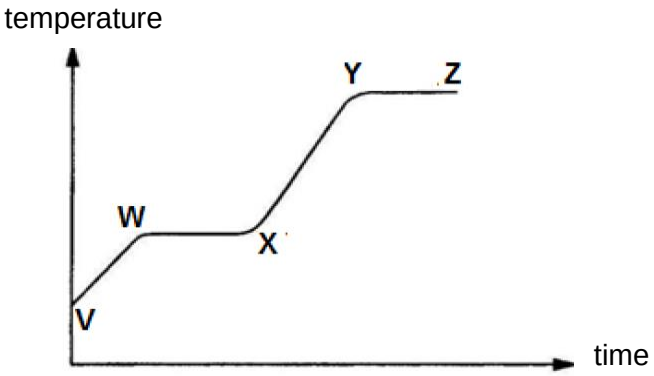
A Fibre-glass coverings are good absorbers of infra-red radiation.

B Fibre-glass has a lot of trapped air and air is a poor conductor of heat.

C Fibre-glass needs to absorb very little heat in order for its temperature to rise.

D Fibre-glass prevents heat losses due to convection currents.

Use the diagram to answer Questions 11 and 12.



Solid substance P is placed inside a flask and heated. The temperature-time graph shows the heating curve of substance P.

11 Which statement is true about substance P between X and Y?

A The molecules are bound by strong intermolecular forces of attraction.

B The molecules are bound by weak intermolecular forces of attraction.

C The molecules are expanding.

D The molecules vibrate about fixed positions.

12 Which describes the internal energy of substance P between W and X?

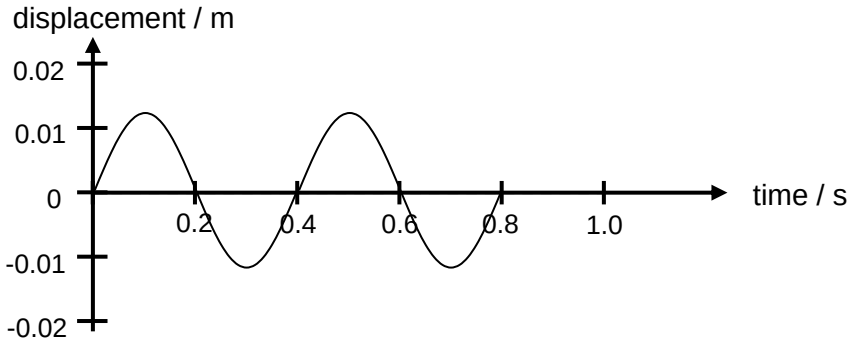
	kinetic energy	potential energy
A	increase	increase
B	increase	remain the same
C	remain the same	increase
D	remain the same	remain the same

13 Electromagnetic waves are used to scan passengers' luggage before they board an airplane. Electromagnetic waves are also used in a television remote controller.

Which type of electromagnetic wave is used for each of these purposes?

	scanning luggage	television remote controller
A	radio waves	infra-red waves
B	radio waves	ultraviolet waves
C	X-rays	infra-red waves
D	X-rays	ultraviolet waves

14 The diagram shows how displacement varies with time as a wave passes a fixed point.



What is the frequency of the wave?

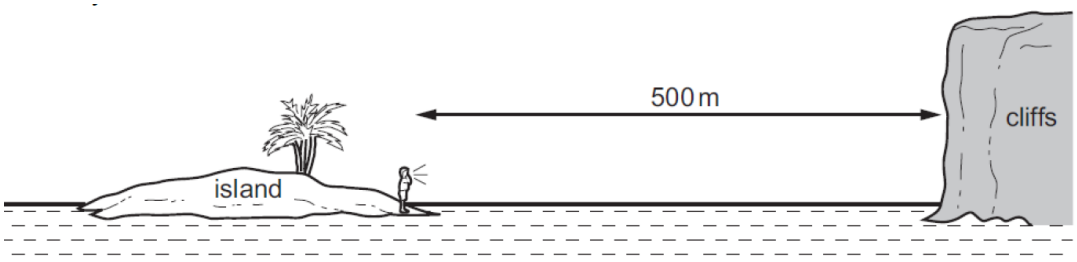
A 0.4 Hz **B** 1.25 Hz

C 2.5 Hz **D** 5.0 Hz

15 A boy on an island is 500 m from some cliffs.

He shouts and he hears an echo from the cliffs.

Sound travels at 340 m/s through the air.



What is the time interval between the time when the boy shouts and the time when he hears the echo?

A $\frac{500}{340}$ s **B** $\frac{2 \times 500}{340}$ s

C $\frac{340}{500}$ s **D** $\frac{2 \times 340}{500}$ s

16 An electric lamp uses energy at the rate of 48 W with a 12 V supply.

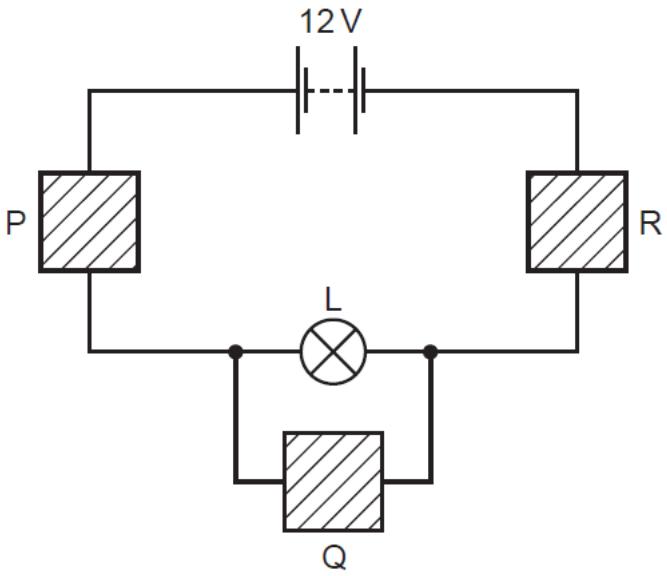
How much charge passes through the lamp in 2.0 seconds?

A 0.25 C **B** 0.50 C

C 2.0 C **D** 8.0 C

17 The diagram shows a circuit used to find the resistance of lamp L.

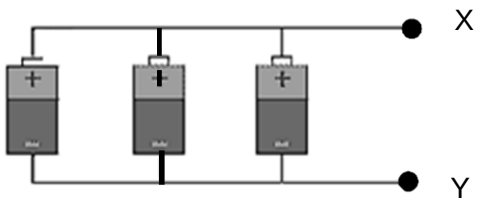
Blocks P, Q and R represent the different components used.



Which is the correct choice of components to use for P, Q and R?

	P	Q	R
A	ammeter	variable resistor	voltmeter
B	variable resistor	voltmeter	ammeter
C	voltmeter	ammeter	variable resistor
D	voltmeter	variable resistor	ammeter

18 Three dry cells, each of voltage 1.5 V, are connected in parallel.



If a voltmeter is connected between X and Y, what will its reading be?

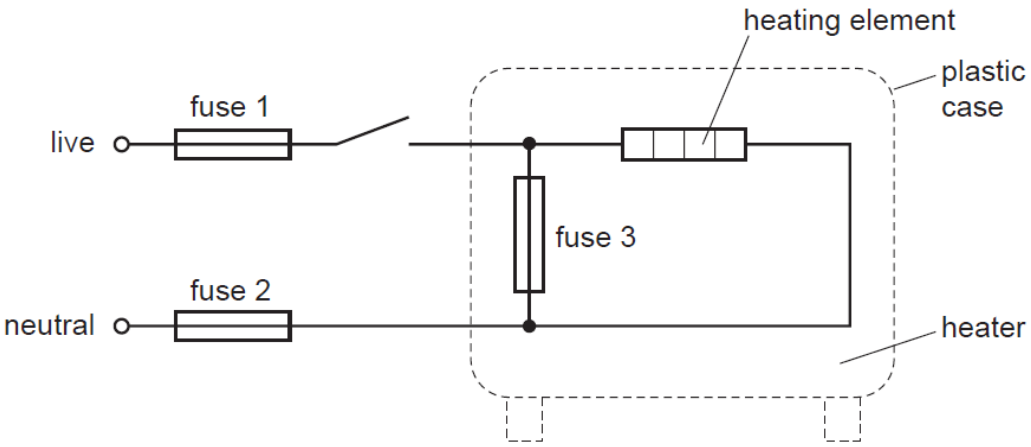
A 0 V

B 1.5 V

C 3.0 V

D 4.5 V

19 The diagram shows the connections to an electric heater. Three fuses have been added to the circuit.



Which of the fuses are correctly placed?

A fuse 1 only

B fuse 2 only

C fuse 1 and fuse 2 only

D fuse 1, fuse 2 and fuse 3

20 Four electrical appliances are left switched on over different time intervals.

In which appliance is the greatest amount of energy converted?

	appliance	time / h
A	100 W light bulb	12.0
B	1 kW fan	3.0
C	1.5 kW hotplate	1.5
D	3 kW water heater	0.5

END OF PAPER 1