



**BEATTY SECONDARY SCHOOL
PRELIMINARY EXAMINATION 2020**

SUBJECT : Science

LEVEL : Sec 4E/5N

PAPER : 5076 / 1

DURATION : 1 hour

SETTER : Mrs Seah-Pay Ling Ling

DATE : 1 Sept 2020

CLASS :	NAME :	REG NO :
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READ THESE INSTRUCTIONS FIRST:

Write in soft pencil.

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

Write your class, name and index number on the Answer sheet in the spaces provided.

There are **forty** 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 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.

A copy of the Periodic Table and Data page is provided on the last 2 pages.

This paper consists of **10** printed pages (including this cover page, periodic table and Data page)

[Turn over

- 1 Which row is not a correct unit for the corresponding physical quantity?

	physical quantity	unit
A	acceleration	N/kg
B	current	C/s
C	power	J/kg
D	pressure	Pa

- 2 Study the four equations shown below.

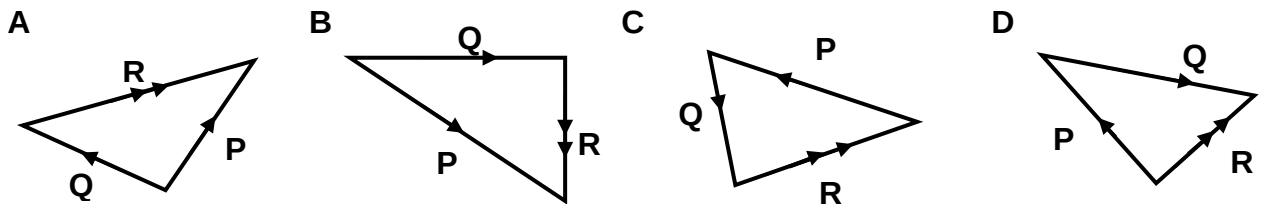
$$\text{force} = \text{mass} \times \text{acceleration} \qquad \text{power} = \frac{\text{work done}}{\text{time}}$$

$$\text{velocity} = \frac{\text{displacement}}{\text{time}} \qquad \text{density} = \frac{\text{mass}}{\text{volume}}$$

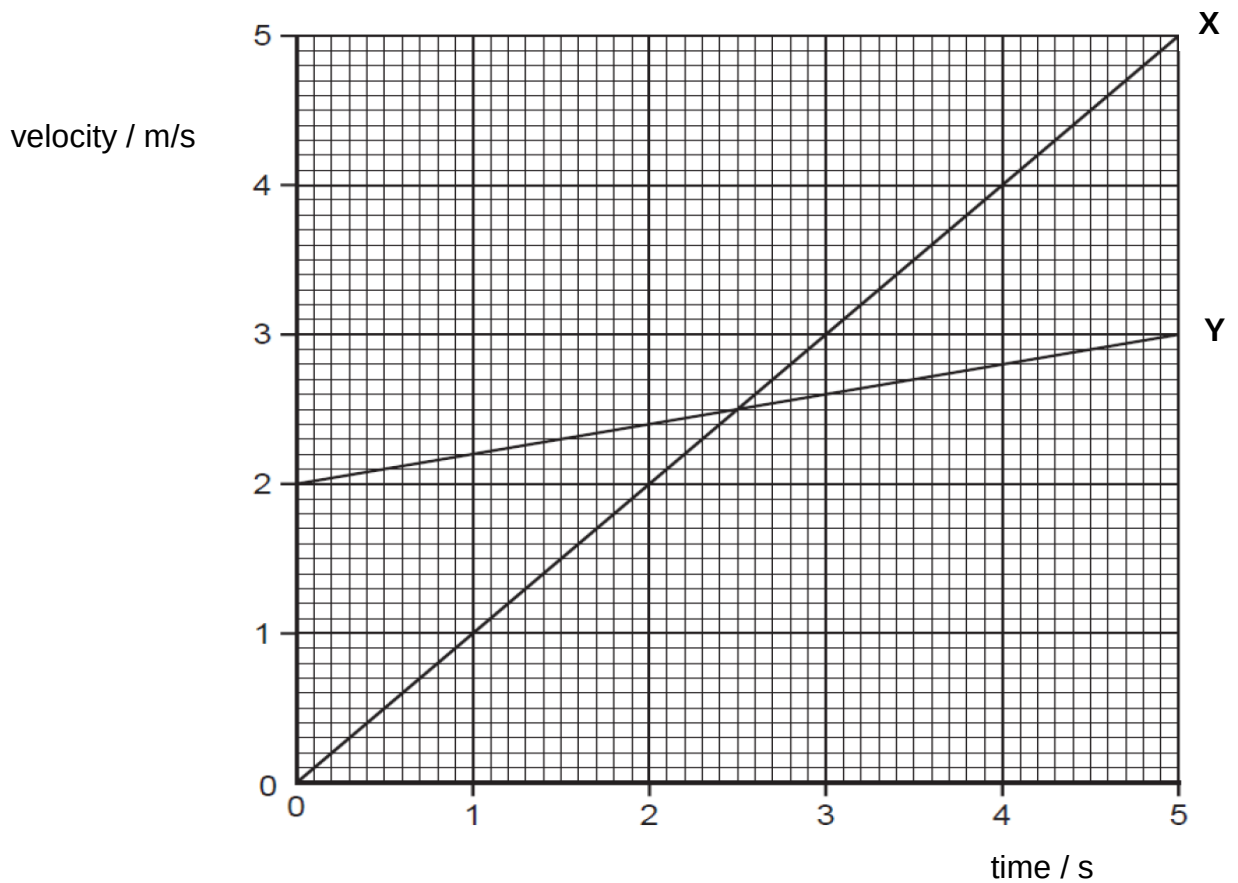
How many different scalar quantities can be found in these equations?

- A 5 B 6 C 7 D 8

- 3 Two forces **P** and **Q** act on a body. **R** is the resultant of these two forces. Which vector diagram could represent the relationship between the forces, **P**, **Q** and **R**?



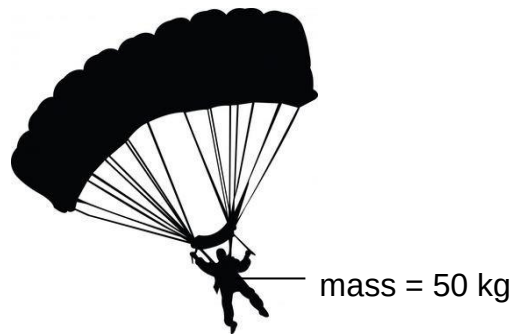
- 4 The velocity-time graphs for two vehicles **X** and **Y** are shown below. The acceleration and distance travelled by the two vehicles can be estimated from the graphs.



Which statement about the velocity-time graphs are correct?

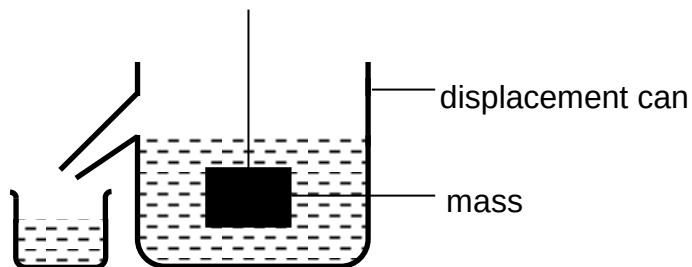
- A The acceleration of **X** and **Y** are the same at 2.5 s.
- B The distance travelled by **X** and **Y** in the 5 s period is the same.
- C The distance travelled by **X** is greater than that travelled by **Y** in the 5 s period.
- D The initial acceleration of **Y** is greater than that of **X**.

- 5** If a parachutist of mass 50 kg falls with constant velocity, what is the magnitude of air resistance acting on the parachutist?



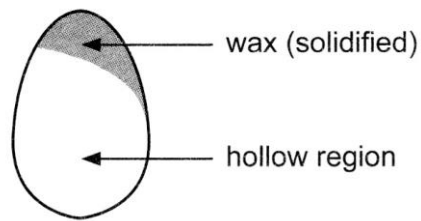
- A** 0 N **B** 5N **C** 50 N **D** 500 N

- 6** A block of mass 350 g is gently lowered into a displacement can that is filled with water. All the displaced water is collected in a beaker. If the density of the block is 6500 kg/m^3 and the density of water is 1000 kg/m^3 , what is the mass of the water collected in the beaker?

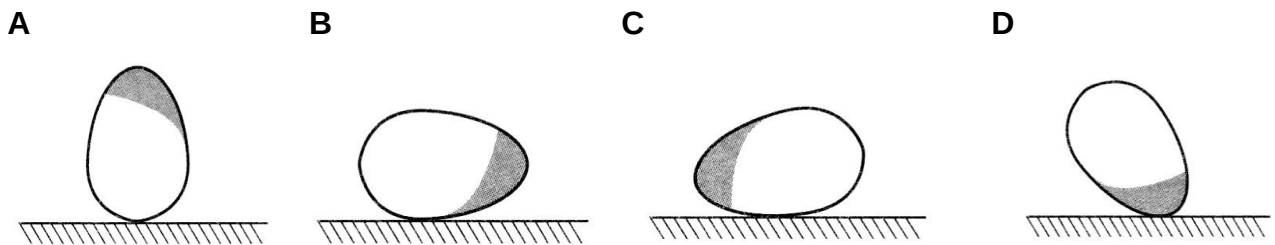


- A** 0.054 kg **B** 0.23 kg **C** 2.3 kg **D** 54 kg

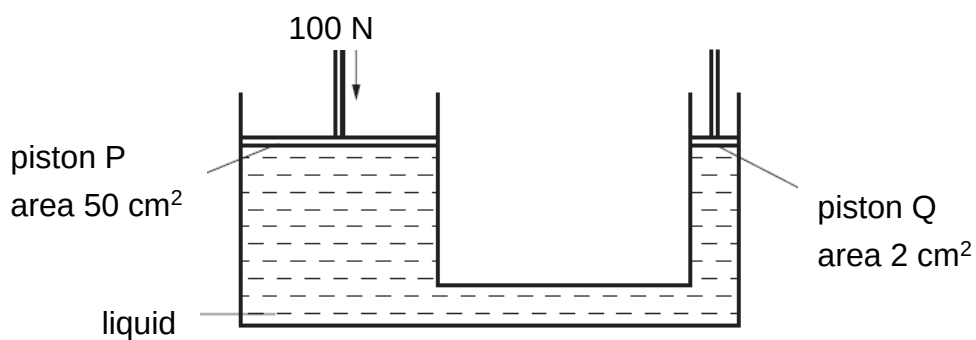
- 7 An empty egg shell has molten wax solidified inside it as shown in the figure below.



In which position is the egg shell most stable when placed on a flat, horizontal surface?



- 8** The hydraulic system shown below contains an incompressible liquid. A force of 100 N is exerted downward on the piston P.



What will be the upward force on piston Q?

- A** 1 N **B** 4 N **C** 100 N **D** 2500 N

- 9 A windmill is used to draw water from a well. The well is 5 m deep. The windmill draws 200 kg of water in a day.

What is the average power needed to draw the water from the well?

A $\frac{200 \times 10 \times 4}{5} \text{ W}$

B $\frac{200 \times 10}{5 \times 24 \times 60 \times 60} \text{ W}$

C $\frac{200 \times 10 \times 5}{24 \times 60 \times 60} \text{ W}$

D $\frac{200 \times 5}{24 \times 60 \times 10} \text{ W}$

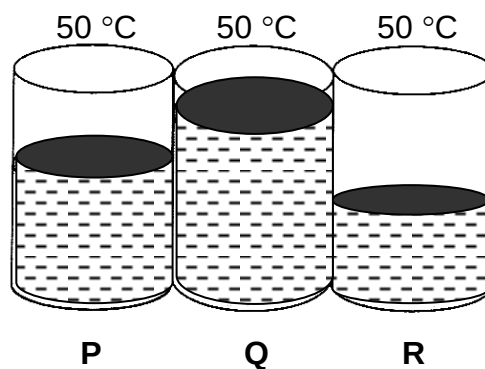
- 10 In a Brownian motion experiment involving smoke particles in air, heavy smoke particles settle quickly but very small smoke particles remain suspended for long periods of time.

Which statement explains why small smoke particles do **not** settle quickly?

- A Air pressure has a greater effect on smaller particles.
- B Random bombardments by air molecules keep the small smoke particles suspended.
- C The Earth's gravitational field does not act on small smoke particles.
- D The small smoke particles have the same density as air.

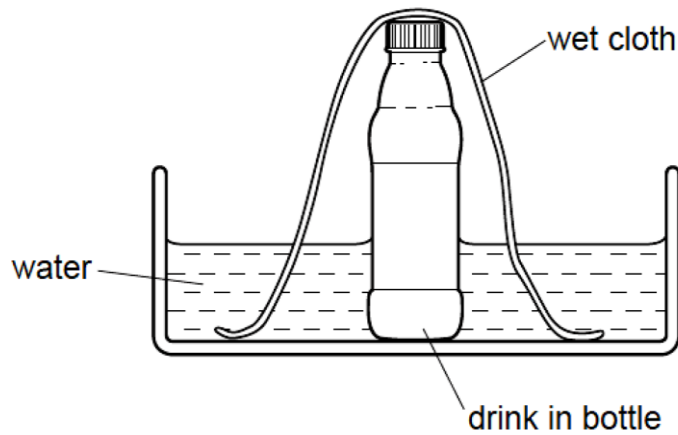
- 11 Three glasses of water of the same temperature are placed side by side touching each other as shown.

Given that glass **P** contains 0.3 kg of water, glass **Q** contains 0.5 kg of water and glass **R** contains 0.1 kg of water, which statement correctly states what happens?



- A Heat flows from glass **P** to glass **Q**.
- B Heat flows from glass **Q** to glass **P** and from glass **Q** to glass **R**.
- C Heat flows in all direction.
- D There is no net transfer of thermal energy.

- 12** On a hot day, the drink in a bottle can be kept cool by standing the bottle in a bowl of water and placing a wet cloth over it.

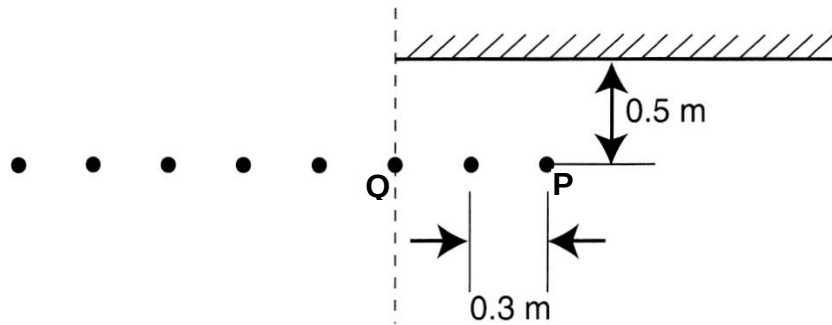


How is the drink in the bottle kept cool?

- A** Hot air cannot escape from the bottle.
 - B** The cloth conducts heat from the bottle into the water.
 - C** The drink cannot evaporate from the bottle.
 - D** Water evaporating from the cloth cools the drink.
- 13** Water waves were produced in a ripple tank using a vibrator. The time taken for the vibrator to make 4 oscillations in 5 s. Which set of values of speed and wavelength could the waves have?

	speed	wavelength
A	1.2 cm/s	1.0 cm
B	2.4 cm/s	3.0 cm
C	6.0 cm/s	1.5 cm
D	12.0 cm/s	4.0 cm

- 14** Eight students are standing in a straight line 0.5 m in front of a mirror, as shown in the diagram below. The students are spaced 0.3 m apart from each other, and the third student from the right, **Q**, is standing directly in front of the edge of the mirror. How many students, including himself, will the first student, **P**, be able to see in the mirror?



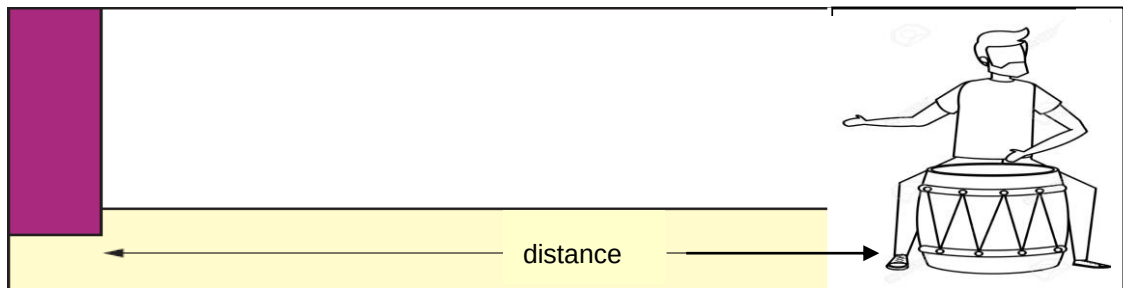
- A** 3 **B** 5 **C** 6 **D** 8
- 15** Below are four statements about the uses of electromagnetic radiation.

Gamma rays are used in medical treatment.
Infra-red waves are used in sunbeds.
Microwaves are used in satellite television.
X-rays are used in intruder alarms.

How many of these statements are correct?

- A** 1 **B** 2 **C** 3 **D** 4

- 16** The diagram shows a drummer in front of a wall. He taps his drum once, and as soon as he hears the echo, taps the drum again. He taps a total of 16 times. The time between the first and last tap is 25 s.

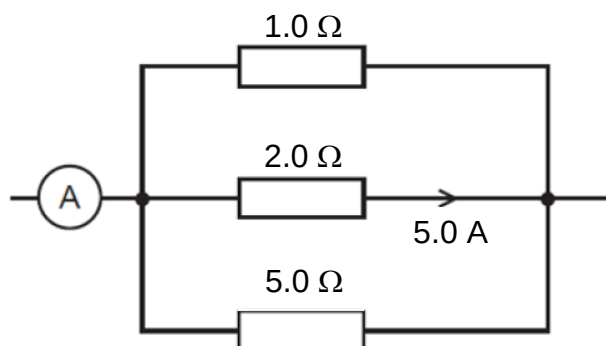


Given that the speed of sound in air is 330 m/s, what is the distance between the drummer and the wall?

- A** 99 m **B** 106 m **C** 198 m **D** 258 m
- 17** Which statement correctly describes an insulator that has been negatively charged?
- A** The insulator does not contain any protons at all.
B The insulator has an equal number of electrons and protons and does not contain any free electrons.
C The insulator has more electrons than protons and the electrons are free to move about.
D The insulator has more electrons than protons but both the electrons and the protons are not free to move about.
- 18** A 2 m long wire with a cross-sectional area of 1 mm^2 has a resistance of 8Ω .
What is the resistance of the same type of wire which is 4 m long and has a cross sectional area of 2 mm^2 ?

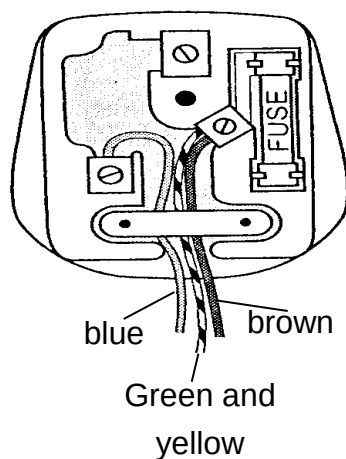
- A** 2Ω **B** 4Ω **C** 8Ω **D** 16Ω

- 19** The diagram shows part of a current-carrying circuit. The ammeter has negligible internal resistance.



What is the reading on the ammeter?

- A** $5.0\ \text{A}$ **B** $10.0\ \text{A}$ **C** $15.0\ \text{A}$ **D** $17.0\ \text{A}$
- 20** A plug is wrongly wired as shown. It is connected to an old vacuum cleaner, which has a metal case.



What would be the effect of using the plug wired in this way?

- A** The fuse in the plug would blow.
B The metal case would be live.
C The neutral wire would melt.
D The vacuum cleaner would catch fire.