



CONVENT OF THE HOLY INFANT JESUS SECONDARY
Preliminary Examination in preparation for
the General Certificate of Education Normal Academic Level 2024

SCIENCE (PHYSICS)

5105/01

Paper 1 Multiple Choice

2 August 2024

Paper 1 and 2: 1 hour 15 minutes

Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

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

Write your name, class and register number on the Answer Sheet in the spaces provided unless this has been done for you.

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.

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.

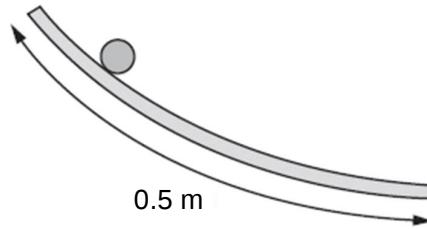
You are advised to spend no more than **30 minutes** on **Paper 1**.

You may proceed to answer Paper 2 as soon as you have completed Paper 1.

Any rough working should be done in this booklet.

The use of an approved scientific calculator is expected, where appropriate.

- 1 In an experiment, a ball is rolled down a curved track that is about half a metre long.

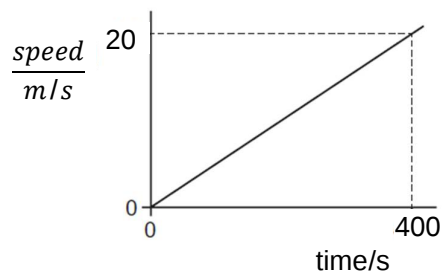


Which measuring device is used to measure the length accurately?

- A metre rule
 - B micrometer
 - C stop-watch
 - D measuring tape
- 2 Which equation contains two vector quantities?

- A $\text{acceleration} = \frac{\text{change in velocity}}{\text{time taken}}$
- B $\text{acceleration} = \frac{\text{distance travelled}}{\text{time taken}}$
- C $\text{density} = \frac{\text{mass}}{\text{volume}}$
- D $\text{volume} = \text{length} \times \text{width} \times \text{height}$

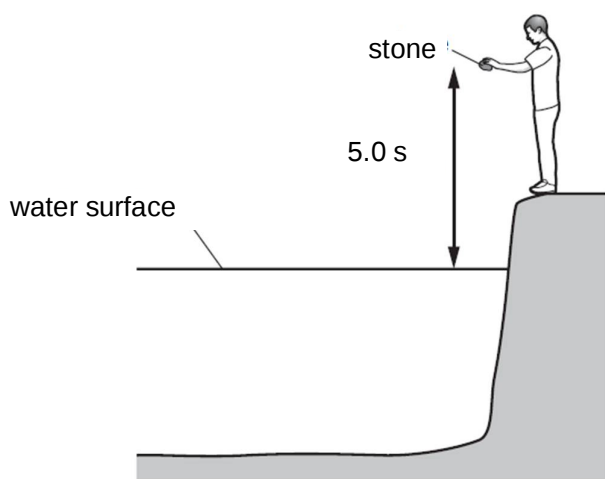
- 3 The graph represents the motion of a vehicle.



What is the distance travelled by the vehicle in 400 s?

- A 20 m
- B 400 m
- C 4000 m
- D 8000 m

- 4 A boy is standing by the side of a lake.



The boy drops a stone above the water surface, and it takes 5.0 s for the stone to reach the water surface as shown.

The acceleration due to gravity is 10 m/s^2 .

What is the speed of the stone when it hits the surface of the water. Assume air resistance acting on the stone is negligible.

- A 20 m/s
 - B 30 m/s
 - C 40 m/s
 - D 50 m/s
- 5 The gravitational field strength on Earth is 10 N/kg .
- The gravitational field strength on Mars is 3.7 N/kg .
- If the weight of an object on Mars is 30 N, find its weight on Earth.
- A 3.0 N
 - B 8.1 N
 - C 11 N
 - D 81 N

- 6** A woman has a weight of 600 N. She stands on a horizontal floor. The area of her feet in contact with the floor is 0.050 m^2 .

What is the pressure exerted by her on the floor?

- A** $1.2 \times 10^3 \text{ Pa}$
- B** $2.4 \times 10^3 \text{ Pa}$
- C** $1.2 \times 10^4 \text{ Pa}$
- D** $2.4 \times 10^4 \text{ Pa}$

- 7** A car of weight 11000 N moves with constant velocity along a horizontal road. A driving force of 5000 N acts on the car.

What is the force opposing the motion of the car?

- A** 5000 N
- B** 6000 N
- C** 11000 N
- D** 16000 N

- 8** A man with an open parachute falls to Earth at constant speed. The following forces act upon the man and his parachute:

P: upward force of the parachute on the man

Q: upward force of the man on the Earth

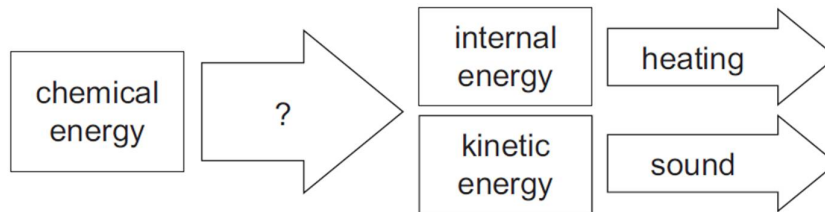
R: downward force of the Earth on the parachute

S: downward force of the man on the parachute

Which two forces are a Newton's third law force pair?

- A** P and Q
- B** P and R
- C** P and S
- D** Q and R

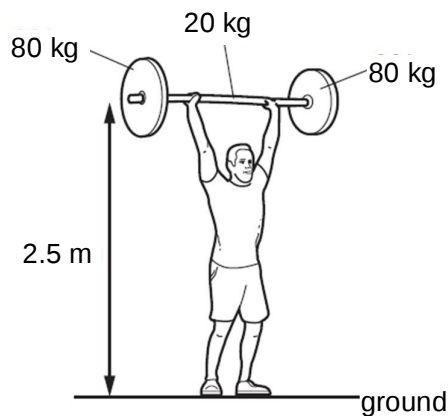
- 9 The diagram shows the energy stores for a mobile(cell) phone and how the energy is transferred between stores.



What describes how the chemical energy is transferred?

- A electrical work done
 - B mechanical work done
 - C electromagnetic waves
 - D sound waves
- 10 In a weightlifting contest, an athlete lifts a metal bar of mass 20 kg fitted with a mass of 80 kg on each end.

The lift from ground to a height of 2.5 m takes 0.50 s.



The acceleration of free fall g is 10 m/s^2 . What average power does the weightlifter exert in providing the gravitational potential energy during this lift?

- A 0.90 kW
- B 5.0 kW
- C 8.0 kW
- D 9.0 kW

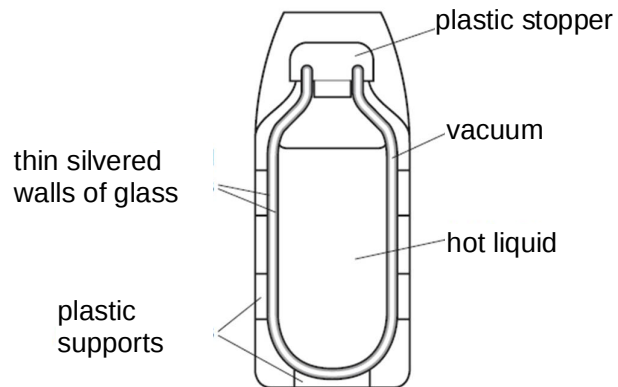
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- 11** The temperature of a body increases by 1°C .

Which other quantity also increases?

- A** chemical potential energy
- B** electrical energy
- C** kinetic energy of particles
- D** potential energy of particles

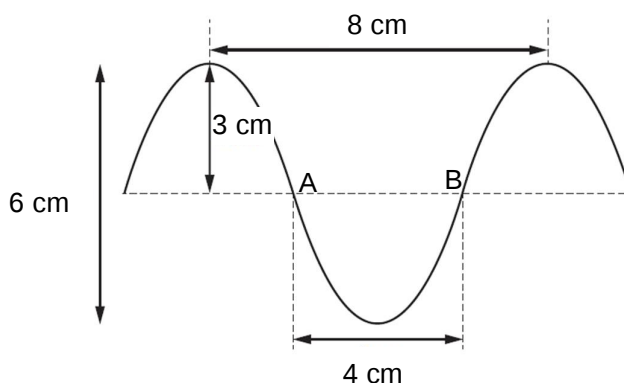
- 12** The diagram shows a flask designed to reduce the loss of energy from a hot liquid.



Which method(s) of thermal energy transfer is/are the silvered walls designed to reduce?

- A** conduction, convection and radiation
- B** conduction and convection only
- C** conduction only
- D** radiation only

- 13 The diagram shows a wave.



It takes 2 s for the wave to travel from A to B. Find its frequency.

- A 0.25 Hz
 B 0.50 Hz
 C 8.00 Hz
 D 16.00 Hz
- 14 Which row names a region of the electromagnetic spectrum with a wavelength longer than that of visible light, and a region with a frequency that is greater than that of visible light?

	wavelength longer than visible light	frequency greater than visible light
A	infrared	ultraviolet
B	microwave	Radio wave
C	Radio wave	microwave
D	ultraviolet	infrared

- 15 Three identical cells are connected in parallel to a resistor.

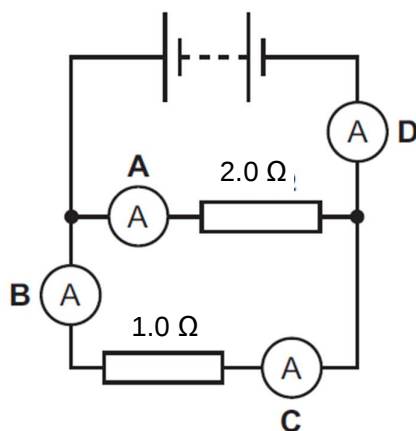
What is the advantage of using three cells in parallel rather than using a single cell?

- A Each cell produces more energy.
 B Less energy is required.
 C Each cell takes longer time to discharge.
 D The e.m.f. is greater than that of a single cell.

[Turn over

- 16** The circuit diagram shows a battery connected to two resistors. Four labelled ammeters are connected into the circuit.

Which ammeter shows the smallest reading?



- 17** The power consumption of a microwave oven is 1500 W.

The cost of 1.0 kWh of electrical energy is 24 cents.

What is the cost of using the microwave oven for 10 minutes?

- A** 6 cents
 - B** 36 cents
 - C** 60 cents
 - D** 360 cents
- 18** A kettle is connected to the 240 V mains supply using a plug containing a 13 A fuse. The kettle contains water. When it is switched on, the fuse blows. This happens again after a new fuse is fitted. Someone replaces the fuse with a nail, and the kettle works.
- What else might happen as a result of replacing the fuse with a nail?
- A** A very large current overloads the wiring, causing a fire.
 - B** The kettle boils the water less quickly.
 - C** The kettle uses more energy to boil the water.
 - D** The water boils at a higher temperature.

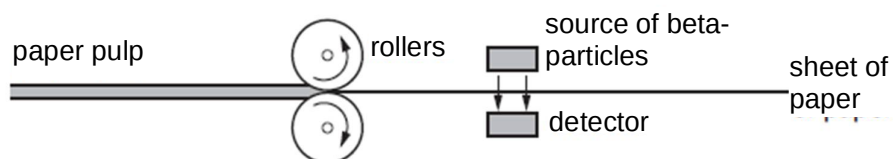
- 19** The only stable isotope of gold, Au, has 79 protons and 118 neutrons in a nucleus of an atom.

How many electrons are there in a neutral atom of this isotope?

- A** 39
- B** 79
- C** 118
- D** 197

- 20** The diagram shows how the thickness of paper is measured during manufacture.

If the sheet is too thick, fewer beta-particles can reach the detector.



Why are beta-particles used for this purpose?

- A** Alpha-particles are all stopped by the paper.
- B** Alpha-particles make the paper radioactive.
- C** Gamma radiation is all stopped by the paper.
- D** Gamma radiation is only produced by sources with a short half-life.

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