



General Certificate of Secondary Education
2023–2024

Centre Number

--	--	--	--	--

Candidate Number

--	--	--	--	--

Double Award Science: Physics

Unit P1

Higher Tier



[GDW32]

GDW32

FRIDAY 7 JUNE 2024, AFTERNOON

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Complete in black ink only. **Do not write with a gel pen.**

Answer **all nine** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 70.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Question 3.



- 1 The forces acting on a car travelling in a straight line are shown below.



- (a) (i) The mass of the car is 1100 kg.

By first finding the resultant force, calculate the acceleration of the car.

You are advised to show your working out.

Acceleration of car = _____ m/s² [4]

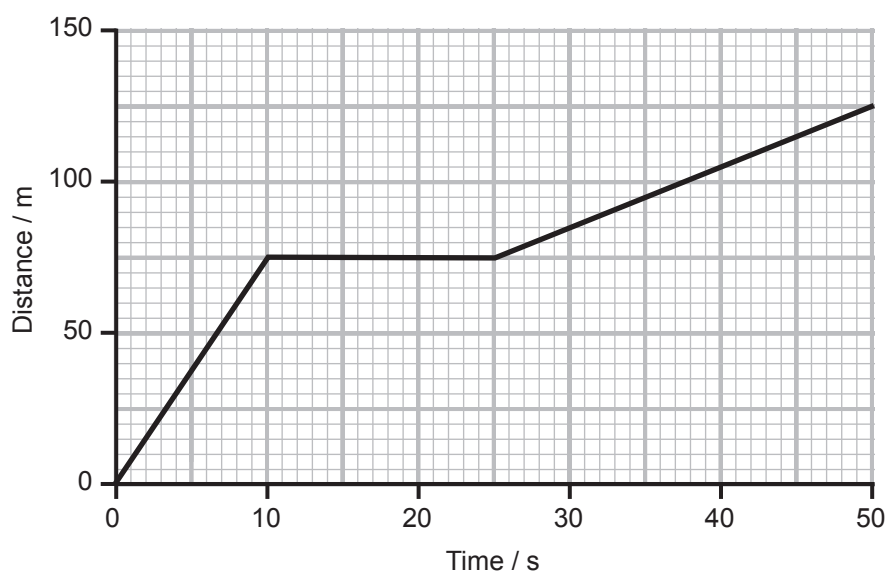
- (ii) Later in the journey, the forces acting on the car are **balanced**.

What is the acceleration of the car at this time?

Acceleration of car = _____ m/s² [1]



(b) The graph of distance against time for part of a car journey is shown below.



(i) Describe the motion of the car during the time period 25 to 50 seconds.

_____ [1]

(ii) During which time period is the car travelling the fastest?

_____ to _____ s [1]

(iii) Describe the motion of the car during the time period 10 to 25 seconds.

What is the distance travelled during the time period 10 to 25 seconds?

_____ m [2]

[Turn over



(c) The mass of a car tyre is 8200 g.

Calculate the weight of the tyre.

You are advised to show your working out.

Weight of tyre = _____ N [3]





BLANK PAGE

DO NOT WRITE ON THIS PAGE

(Questions continue overleaf)

14369

[Turn over



16GDW3205

2 This question is about the dangers of radioactivity.

(i) Some radioactive emissions cause ionisation.

What is meant by the term ionisation?

Why might ionisation of living cells be dangerous?

 [3]

(ii) Name the two types of radioactive emissions that can pass through the skin.

1. _____

2. _____ [2]

(iii) Give four **different** precautions that should be taken when working with radioactive sources.

1. _____

2. _____

3. _____

4. _____ [4]



3 Atoms are made of protons, neutrons and electrons.

For each of these particles, state:

- their location within the atom;
- their relative charge.

In this question you will be assessed on your written communication skills including the use of specialist scientific terms.

Protons: _____

Neutrons: _____

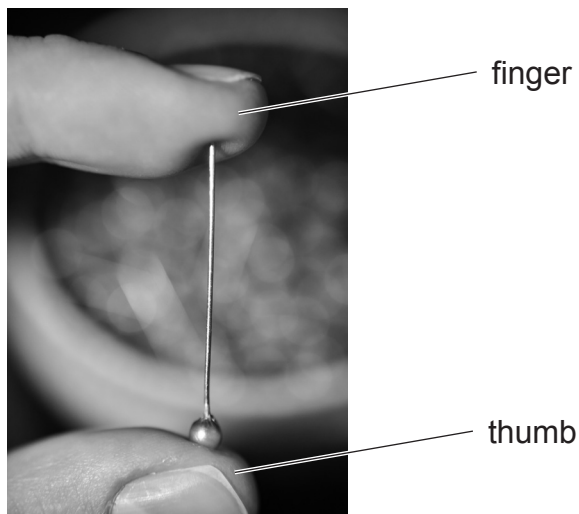
Electrons: _____

_____ [6]

[Turn over



- 4 A person holds a pin **at rest** between their finger and thumb as shown below.



- (i) Is the size of the force exerted by the finger greater, smaller or equal to the force exerted by the thumb?

_____ [1]

- (ii) Is the pressure exerted on the finger greater, smaller or equal to the pressure exerted on the thumb?

The pressure is: _____

Explain your answer:

_____ [2]



(iii) The area of the pin in contact with the finger is 0.01 cm^2 and the force is 2 N .

Calculate the pressure exerted by the pin on the finger.

Include the unit in your answer.

Do not change any units.

You are advised to show your working out.

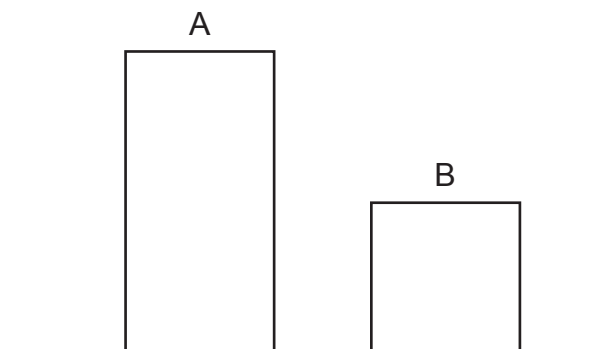
Pressure = _____ [4]



5 (a) State what is meant by the term centre of gravity.

[2]

(b) Two uniform objects are shown below.



(i) Place a cross (X) in the position of the centre of gravity of object B.

[1]

(ii) Which object, A or B, is the least stable?

Explain your answer in terms of the centre of gravity.

Object: _____

Explanation _____

[2]



6 A forklift truck is used to lift a load.



- (a) The load has a weight of 800 N and is lifted vertically through a distance of 120 cm.

Calculate the work done in lifting the load.

You are advised to show your working out.

Work done = _____ J [4]

- (b) On another occasion, the forklift truck does 1080 J of work and generates 360 W of power in lifting a load.

Calculate the time taken to lift the load.

You are advised to show your working out.

Time taken = _____ s [3]

[Turn over



7 This question is about radioactivity.

(a) Explain **in terms of particles** what an isotope is.

_____ [2]

(b) Which type of radiation is used to sterilise medical equipment?

Which type of radiation is used in smoke alarms?

_____ [2]

(c) Explain the meaning of the term half-life.

_____ [2]

(d) Californium-252 can be used to determine the moisture content of soil.

A 16 g sample of californium-252 decays to 1 g in 10.4 years.

Calculate the half-life of californium-252.

You are advised to show your working out.

Half-life = _____ years [3]



8 This question is about the efficiency of electrical appliances.

(a) A television set converts electrical energy into other forms of energy.

State the two useful forms of energy produced by a television set.

1. _____

2. _____ [2]

(b) (i) A kettle is used to heat water.

The kettle wastes 48 000 J of electrical energy and the efficiency of the kettle is 80%.

Calculate the total input energy supplied to the kettle.

Give your answer in kilojoules (kJ).

You are advised to show your working out.

Total input energy = _____ kJ [3]

(ii) State the name of the physics principle used in (b)(i).

_____ [1]

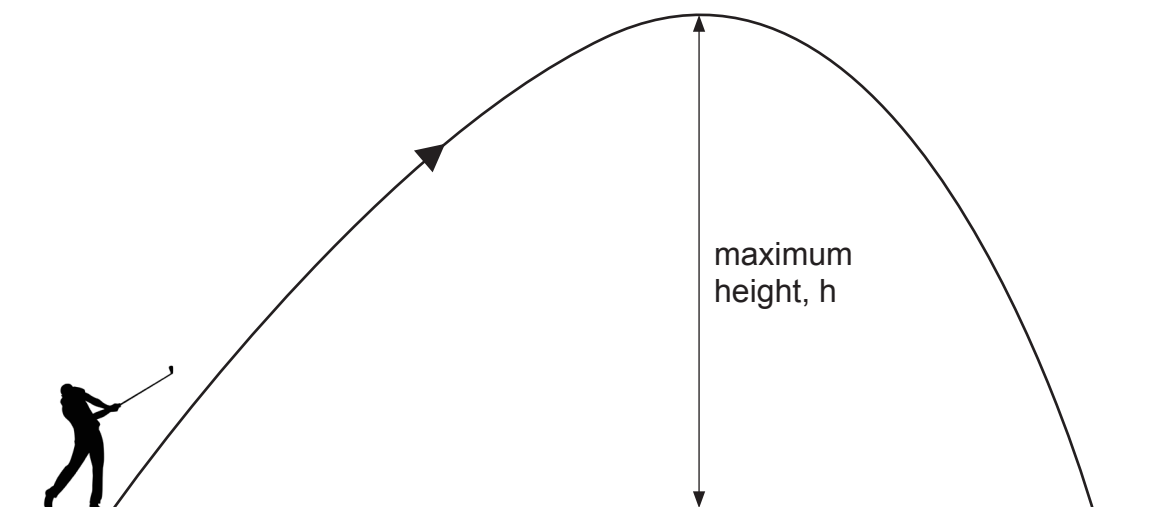
(iii) How does the distance between the particles change as the water in the kettle is boiled and turns to steam?

_____ [1]

[Turn over]



- 9 A golfer strikes a golf ball as shown in the diagram below.



The ball has a mass of 0.045 kg and at its maximum height it has 11.25 J of gravitational potential energy.

- (i) Calculate the maximum height, h , of the ball.

You are advised to show your working out.

Maximum height, h = _____ m [3]



(ii) At its maximum height, the ball also has 28.75 J of kinetic energy.

By first finding the total energy of the ball at its maximum height, calculate the velocity with which it hits the ground.

Assume there are no energy losses.

Give your answer to one decimal place.

You are advised to show your working out.

Total energy = _____ J

Velocity = _____ m/s [5]

THIS IS THE END OF THE QUESTION PAPER



Sources:

Q1. © Getty Images

Q4. © Getty Images

Q6. © Getty Images

Q9. © Getty Images

DO NOT WRITE ON THIS PAGE

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	

Total Marks	
-------------	--

Examiner Number

Permission to reproduce all copyright material has been applied for.
In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA
will be happy to rectify any omissions of acknowledgement in future if notified.

