PEARSON EDEXCEL GCSE COMBINED SCIENCE (HIGHER) · 1SC0

PHYSICS



EXAM QUESTION PACK

TOPIC 1: KEY CONCEPTS OF PHYSICS (PAPER 1)

SCORE	PERCENTAGE
/28	%

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Q1.

A steel ball has a volume of 3.6 cm^3 and a mass of 28 g.

(i) Calculate the density of steel in kg/m3.

(3)

density = ... kg/m^3

(ii) The steel ball is at a room temperature of 20 °C.

It is then put in a pan of boiling water maintained at 100 °C.

Calculate how much thermal energy the ball gains as its temperature increases from 20 °C to 100 °C.

Specific heat capacity of steel = 510 J/kg °C

Use an equation selected from the list of equations at the end of this paper.

(2)

thermal energy gained = ... J

(iii) The steel ball is put into a furnace where it melts.

Compare the motion of particles in the steel when they are in the solid state with their motion when in the molten (liquid) state.

(3)

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(Total for question = 8 marks)

(**Q04a 1SC0/2PH/S2, SAM**)

Q2.

Some students are investigating forces.

They use a newton meter to keep a trolley stationary on a sloping runway, as shown in Figure 10.

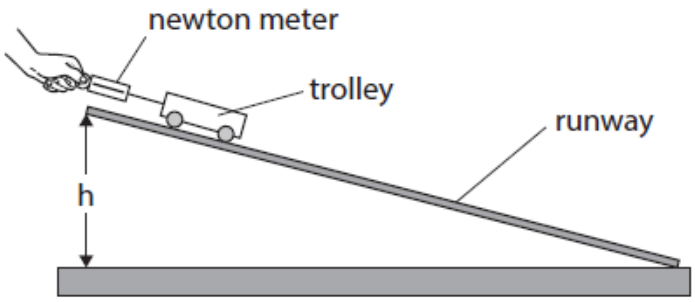


Figure 10

They measure the force needed to keep the trolley stationary on the sloping runway.

(i) They do this at four different places on the runway.

When the height, h, of the runway is 0.60 m, their four readings for force are

2.1 N 2.7 N 2.5 N 2.2 N

Calculate the mean value of these forces.

(1)

mean force = ... N

The students then measure values of the force, F, for several different values of h, the height of the runway.

Figure 11 is a graph of F against h.

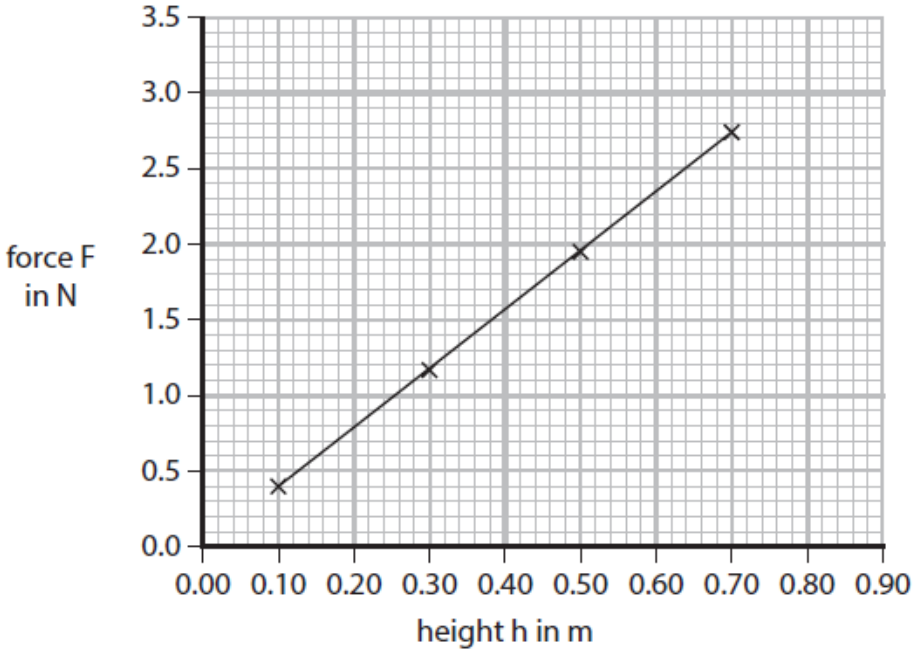


Figure 11

(ii) Use the graph in Figure 11 to determine the value of F when h = 0.80 m.

(2)

F = ... N

(iii) Determine the gradient of the graph in Figure 11.

(2)

gradient = ... N/m

(Total for question = 5 marks)

(**QU05c 1SC0/1PF, June 2025**)

Q3.

Figure 12 is a speed limit sign from a European motorway.

The speeds shown are in km/h (kilometres per hour).

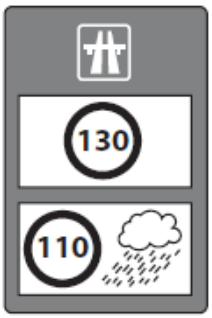


Figure 12

(i) The sign tells drivers to drive at a slower speed in wet weather.

Explain why it is safer for drivers to drive at a slower speed in wet weather.

(2)

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(ii) Show that a speed of 31 m/s is less than a speed of 130 km/h.

(2)

(iii)

The driver's reaction time is the time between the driver seeing an emergency and starting to brake.

A car is travelling at a speed of 31 m/s.

The car travels 46 m between the driver seeing an emergency and starting to brake.

Calculate the driver's reaction time.

Give your answer to 2 significant figures.

(3)

driver's reaction time = ... s

(Total for question = 7 marks)

(**QU06a 1SC0/1PF, June 2022**)

Q4.

Figure 3 is a speed limit sign from a European motorway.

The speeds shown are in km/h (kilometres per hour).

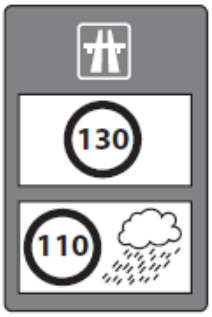


Figure 3

(i) The sign tells drivers to drive at a slower speed in wet weather.

Explain why it is safer for drivers to drive at a slower speed in wet weather.

(2)

.....

.....

.....

.....

(ii) Show that a speed of 31 m/s is less than a speed of 130 km/h.

(2)

(iii)

The driver's reaction time is the time between the driver seeing an emergency and starting to brake.

A car is travelling at a speed of 31 m/s.

The car travels 46 m between the driver seeing an emergency and starting to brake.

Calculate the driver's reaction time.

Give your answer to 2 significant figures.

(3)

driver's reaction time ..... s

(Total for question = 7 marks)

(**QU02a 1SC0/1PH, June 2022**)

Q5.

Answer the question with a cross in the box you think is correct (☒). If you change your mind about an answer, put a line through the box (☒) and then mark your new answer with a cross (☒).

A voltmeter has four different scales.

Which one of these scales would be most suitable to measure a voltage of 0.85 V?

(1)

☐ **A** 0 to 20 mV

☐ **B** 0 to 200 mV

☐ **C** 0 to 2 V

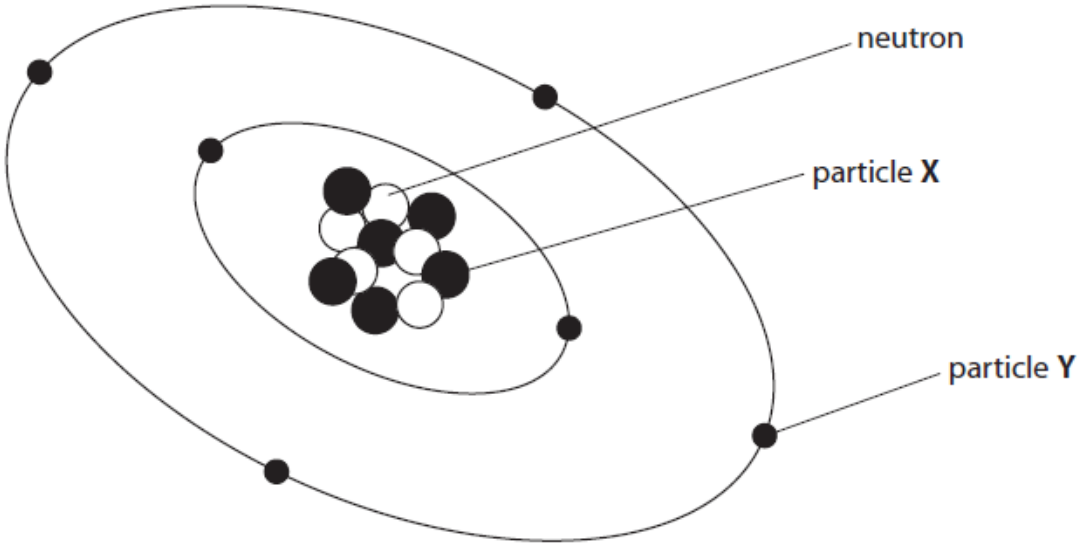
☐ **D** 0 to 20 V

(Total for question = 1 mark)

(**QU06b 1SC0/2PH, June 2025**)

Q6.

(a) The diagram represents an atom of carbon.



NOT to scale

(i) State the name of particle **X**.

(1)

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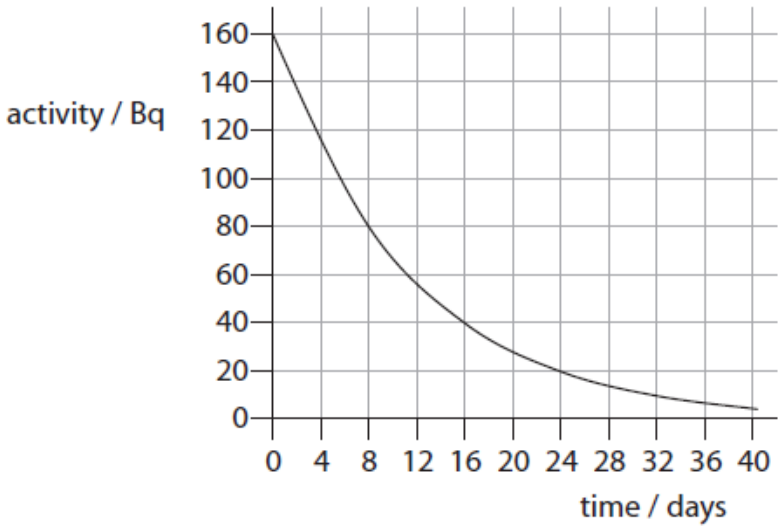
(ii) State the name of particle **Y**.

(1)

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(b) Iodine-131 is a radioactive isotope of iodine.

The graph shows how the activity of a sample of iodine-131 decreases with time.



(i) Use the graph to calculate the half-life of iodine-131.

(2)

half-life = ... days

(ii) Another sample of iodine-131 has an activity of 800 Bq.

Calculate how long it will take before its activity decreases to 200 Bq.

(2)

time = ... days

*(c) There are plans to build more nuclear power stations to supply electricity to the National Grid.

Discuss the advantages and disadvantages of using nuclear power to generate electricity.

(6)

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(Total for Question = 12 marks)

(**Q03 1SC0/1PF, June 2014**)

Q7.

Complete the sentence by putting a cross (☒) in the box next to your answer.

A student correctly estimated the length of a bee.

The length of a bee is about 2.0

(1)

☒ **A** mm

☒ **B** cm

☒ **C** m

☒ **D** km

(**Q03 1SC0/1PF, June 2015**)

Q8.

Complete the sentence by putting a cross (☒) in the box next to your answer.

A student correctly estimated the length of a bee.

The length of a bee is about 2.0

(1)

☒ **A** mm

☒ **B** cm

☒ **C** m

☒ **D** km

(**Q06 1SC0/2PF, June 2015**)