New Specification

Centre Number

Candidate Number

cea
Rewarding Learning

General Certificate of Secondary Education
2018–2019

Double Award Science:
Physics

Unit P1

Higher Tier

[GDW32]

FRIDAY 9 NOVEMBER 2018, MORNING

GDW32

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
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 **2(a)**.

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

12162

1 The incomplete table below shows some of the results in a spring investigation.

(a) Complete the table by entering the missing values.

Force/N	10.5	21.0	31.5		52.5
Extension/cm	2		6	8	10

[2]

(b) (i) In the space below write the equation which relates the force, F, and the extension, e, of a spring.

_____ [1]

The spring in a toy extends by 10 cm when a force of 5 N is applied.

(ii) Calculate the value of the spring constant.
Include the unit with your answer.

You are advised to show your working out.

Spring constant = _____ Unit _____ [3]

2

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(Questions continue overleaf)

3

[Turn over

2 A piece of jewellery, of irregular shape, is made from a certain type of metal.

(a) Describe an experiment you would carry out to find the density of the metal.

In your description you should include the following:

- the measuring instruments you will use and the measurements you will take;
- the equation for density;
- a precaution you will take to ensure accuracy; and
- what you will do to ensure reliability.

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

Measuring instruments and measurements: _____

_____

_____

_____

_____

_____

The equation for density: _____

_____

_____

Precaution: _____

_____

_____

Reliability: _____

_____

_____

_____ [6]

(b) (i) Which of the three materials below will have the largest density?

       gold   **air**   **water**

_____ [1]

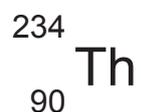**(ii)** Give a reason for your choice in terms of the distance between the particles.

_____ [1]

12162   **5**   **[Turn over**

3 **(a)** The table below contains some information about the three particles which make up an atom.
Complete the table.

Particle	Relative mass	Location
Neutron		
		Nucleus
	$\dfrac{1}{1840}$	

[6]

(b) The thorium (Th) nucleus is represented below.

$$^{234}_{90}\text{Th}$$

State the number of positively charged particles in the nucleus.

_____

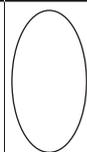State the number of negatively charged particles in the nucleus.

_____

State the number of uncharged particles in the nucleus.

_____ [3]

4 **(a)** **(i)** Why do some nuclei disintegrate?

_____

_____ [1]

(ii) When a radioactive nucleus disintegrates it can emit any one of three types of radiation. List the three types below.

1. _____

2. _____

3. _____ [3]

(iii) One type of radiation emitted from the nucleus is an electromagnetic wave.
State which type.

_____ [1]

One way of producing energy involves the splitting of a heavy nucleus.

(b) **(i)** What is the name of this process?

_____ [1]

(ii) Before the heavy nucleus can split it must absorb a particle. Name the particle.

_____ [1]

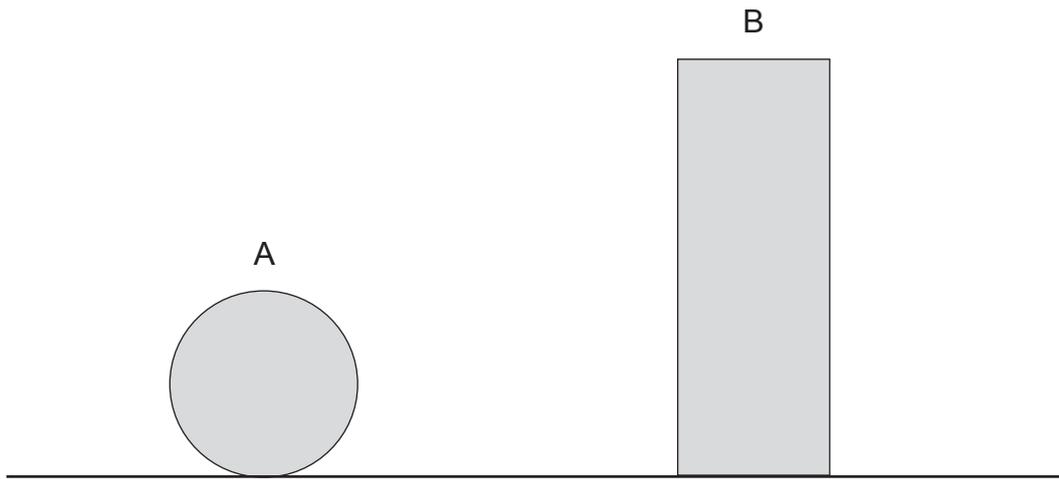**(iii)** Name a nuclear fuel used for this process.

_____ [1]

(iv) Name the particle which sustains the chain reaction.
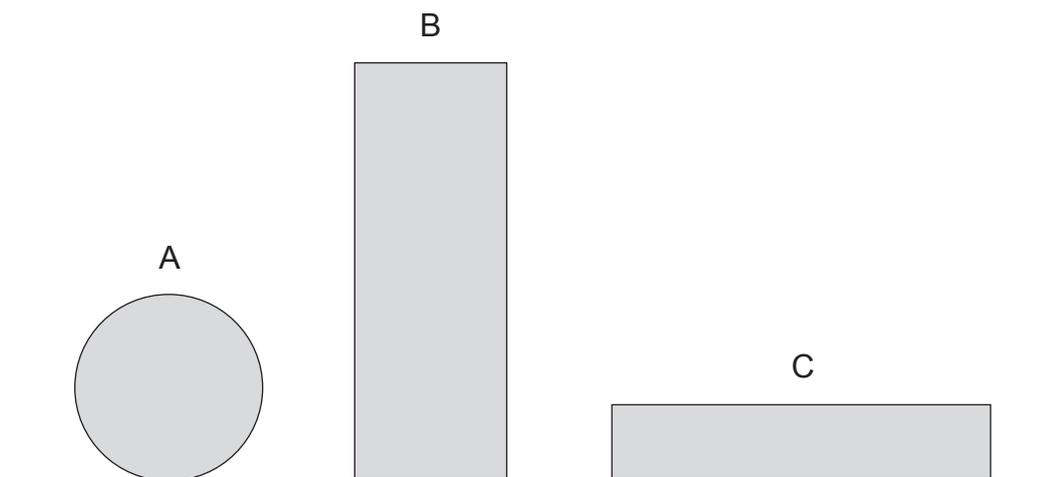
_____ [1]

12162

7

[Turn over

5 Two objects, A and B are placed on a level surface as shown.

B

A

(i) Mark with an X the position of the centre of gravity of each object. [1]

A third object, C, is now added.

B

A

C

(ii) State which object, A, B or C is the most stable and give two reasons to explain why.
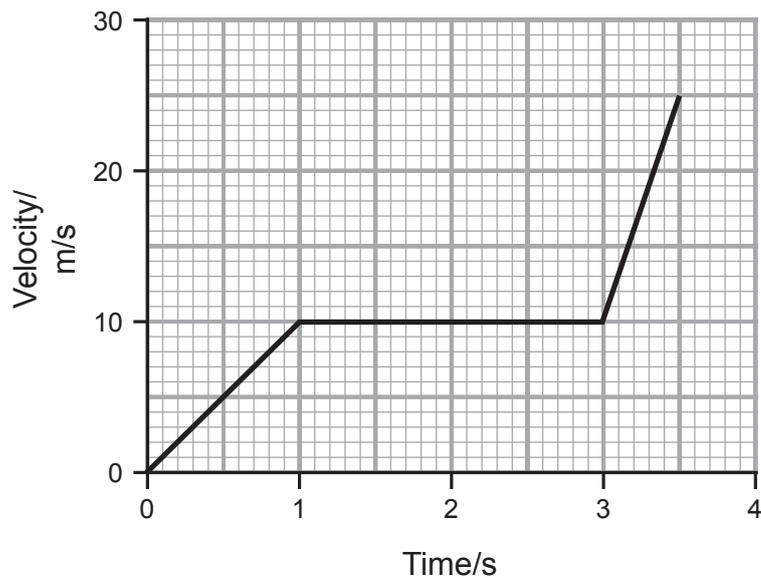
Object _____ is the most stable because

1. _____

2. _____ [3]

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(Questions continue overleaf)

6 The velocity-time graph for a test car is shown below.

(a) (i) Calculate the distance travelled by the car during the first 3 seconds.

You are advised to show your working out.

Distance = _____ m [4]

(ii) Calculate the maximum acceleration of the car.

You are advised to show your working out.

Acceleration = _____ m/s^2 [3]

12162

10

(b) The resultant force acting on a different car and its driver is 11 250 N, and its acceleration is 15 m/s^2.

If the driver has a mass of 60 kg, calculate the mass of the car.

You are advised to show your working out.

Mass of car = _____ kg [4]

Examiner Only	
Marks	**Remark**

12162   **11**   **[Turn over**

7 A man performs pull-ups on a bar.

© Motortion / iStock / Thinkstock

During one pull-up, the man rises by 60 cm.
The man has a mass of 70 kg.

(a) Calculate the work done.

You are advised to show your working out.

Work = _____ J [4]

On another occasion the man generates 140 W of power whilst doing pull-ups for 1 minute.

(b) Calculate the total work done by the man during this time.

You are advised to show your working out.

Work = _____ J [4]

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13

8 A rope is used to raise a bucket of water.

© Dorling Kindersley / Thinkstock

The mass of the bucket and water is 4 kg but before its journey upwards some water spills out. The bucket and the remaining water are raised to a height of 15 m and gain 570 J of potential energy.

(a) Calculate the mass of water that has spilt out of the bucket.
Give your answer to one decimal place.

You are advised to show your working out.

Mass of water spilt = _____ kg   [4]

An empty bucket of mass 4 kg is raised and gains 392 J of potential energy and then stops. The string holding the bucket then snaps and the bucket falls to the ground.

(b) By applying the Principle of Conservation of Energy, calculate the velocity of the bucket as it hits the ground.
Assume no energy losses.

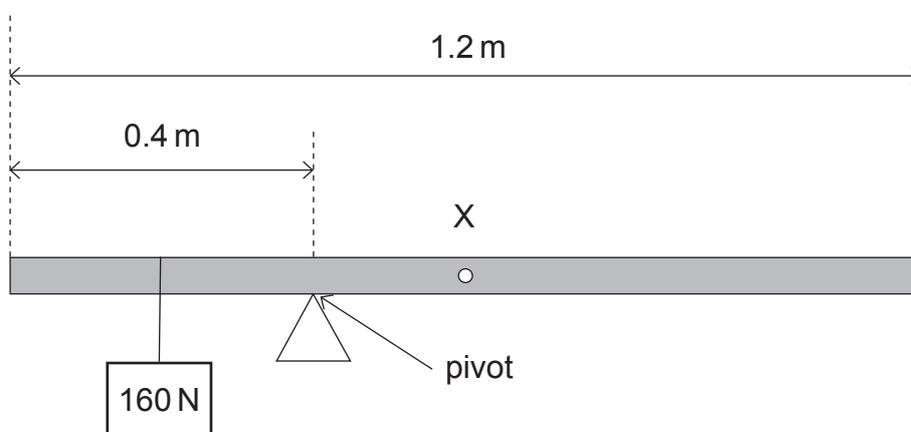**You are advised to show your working out.**

Velocity = _____ m/s   [4]

12162

15

9 **(a)** State, in words, the Principle of Moments.
Include the unit in which a moment is measured.

_____

_____

_____

_____

Unit = _____ [4]

A 160 N weight is hung on a uniform rectangular beam so that it is balanced as shown below.

Source: CCEA

The centre of gravity of the beam is labelled X.
The beam has a weight of 200 N.

(b) Calculate the distance from the pivot to the 160 N weight.

You are advised to show your working out.

Distance = _____ m [3]

THIS IS THE END OF THE QUESTION PAPER

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