Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2018–2019

Double Award Science
Physics

Unit P1

Foundation Tier

MV18

[GDW31]

WEDNESDAY 22 MAY 2019, AFTERNOON

Time

1 hour, plus your additional time allowance.

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 on blank pages.
Complete in black ink only.
Answer **all nine** questions.

Information for Candidates

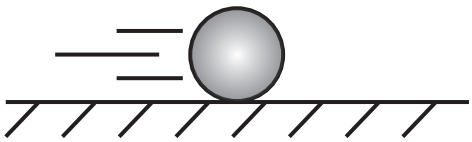
The total mark for this paper is 60.
Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.
Quality of written communication will be assessed in Question **6**.

1 What type of energy is shown in the examples below? [1 mark for each]

(a) (i) A stretched rubber band.

_____ energy

(ii) A rolling ball.

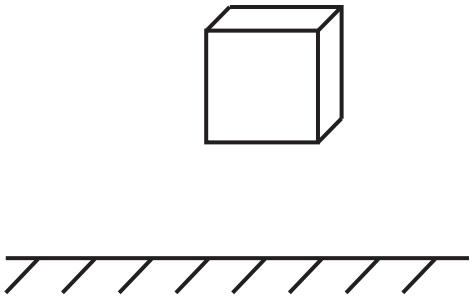


_____ energy

(iii) A packet of crisps.

_____ energy

(iv) A block of wood held at a height.



_____ energy

An energy resource can be renewable or non-renewable.

(b) Complete the table below by putting one tick (✓) in each row. [3 marks]

One entry has been completed for you.

Energy resource	**Renewable**	**Non-renewable**
Nuclear		✓
Tidal		
Wind		
Coal		

2 Old-fashioned light bulbs are being replaced by energy saving LED bulbs.
Information for both types of bulb is shown in the table below.

Type of bulb	Electrical input energy/J	Heat energy produced/J	Light energy produced/J
Old-fashioned light bulb	100	90	
LED bulb		30	170

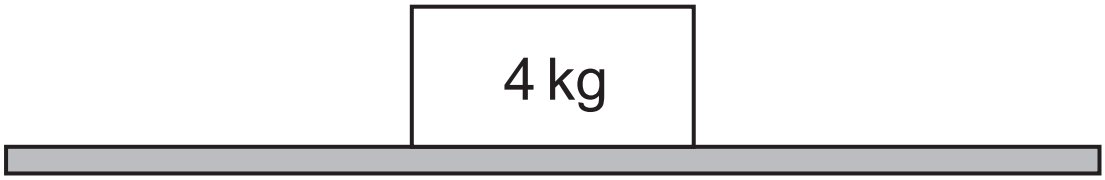
(a) Complete the table. [2 marks]

(b) Another bulb produces 20 J of light energy for every 100 J of electrical input.
Calculate the efficiency of this bulb. [3 marks]

You are advised to show your working out.

Efficiency = _____

3 An object of mass 4 kg sits on a bench.



The object exerts a force on the bench.

(a) (i) What is this force called? [1 mark]

_____

(ii) Calculate the size of this force. [2 marks]

You are advised to show your working out.

Force = _____ N

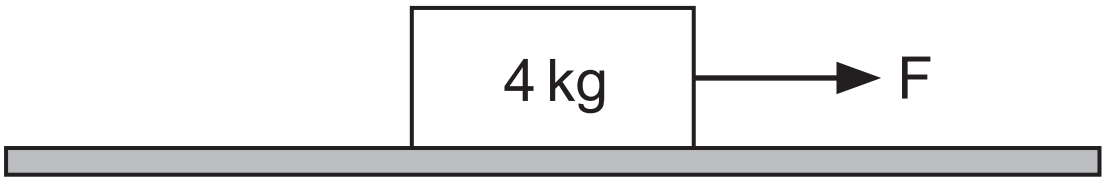
The bench exerts a force on the object.

(iii) Give the size and direction of this force. [2 marks]

Size = _____ N

Direction = _____

The object is now pulled from left to right at a **constant speed** over the bench by a force F.
A force of 2 N acts from **right to left** opposing this motion.



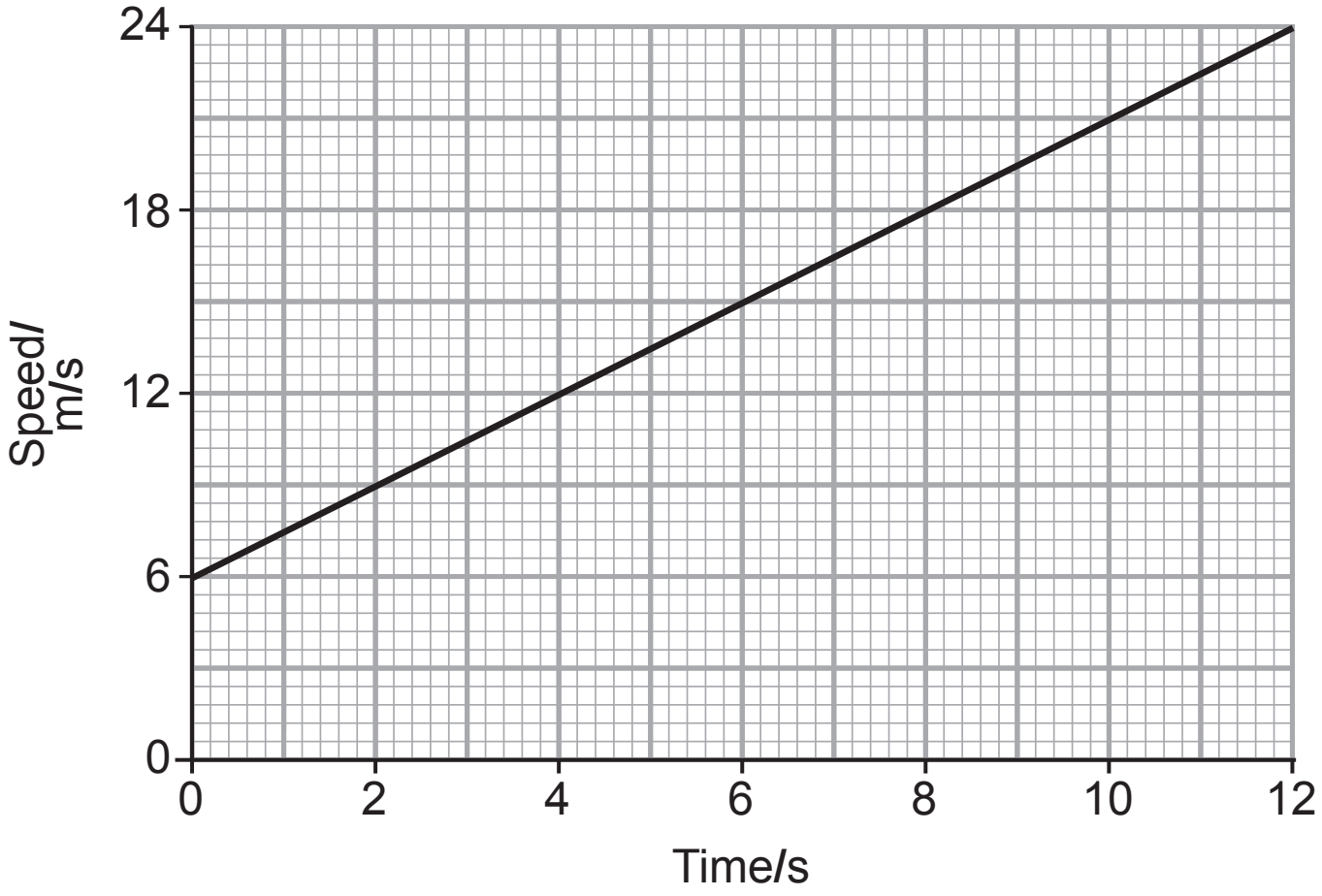
(b) (i) Give the name of the force of 2 N which opposes the motion. [1 mark]

Force is called _____

(ii) Give the size of the force F. [1 mark]

Force F = _____ N

4 The speed–time graph for a car journey is shown below.



(i) Use the graph to calculate the rate of change of speed of the car over the 12 s interval. [5 marks]
Include the unit with your answer.

You are advised to show your working out.

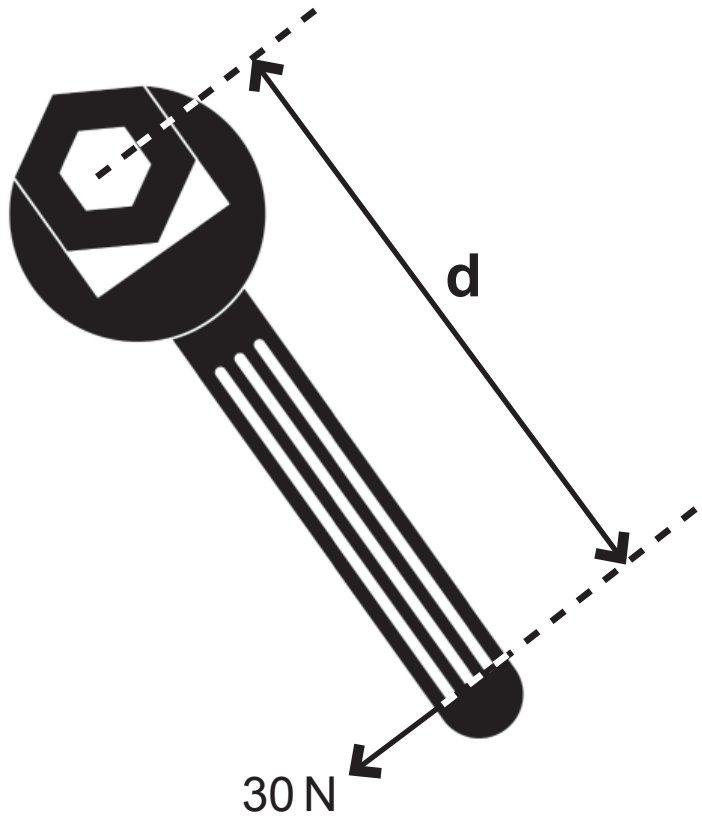
Rate of change of speed = _____

(ii) Use the graph to calculate the average speed of the car over the 12 s interval. [3 marks]

You are advised to show your working out.

Average speed = _____ m/s

5 An engineer wants to tighten a nut on a bolt.



She exerts a force of 30 N and produces a moment of 1200 N cm.

(i) Calculate the distance **d** in the diagram. [3 marks]

You are advised to show your working out.

Distance = _____ cm

(ii) Give your answer in metres. [1 mark]

Distance in metres = _____ m

6 A student wants to find the density of milk. Describe the experiment she would carry out. [6 marks]

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

Your account should include:

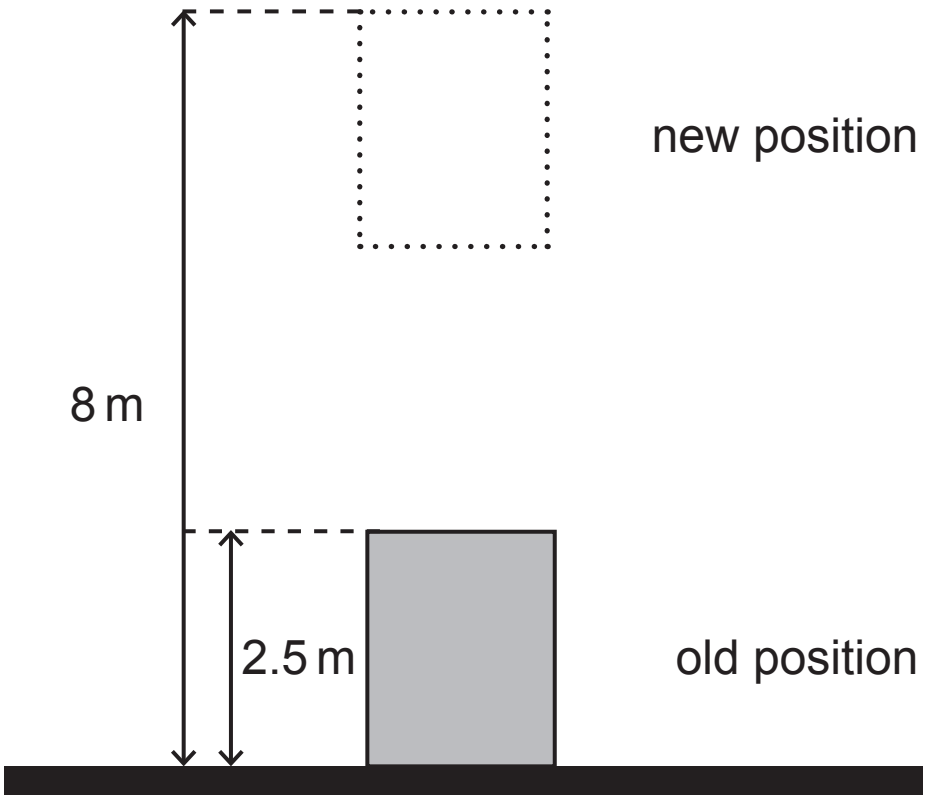
The two measuring instruments the student would use.

The two readings which must be taken to allow the mass of the milk to be found.

The equation for density in **words**.

A precaution to ensure accuracy.

7 A crane lifts a crate of weight 4000 N to a new position above the ground.



(a) Calculate the work done by the crane. [4 marks]

You are advised to show your working out.

Work done = _____ J

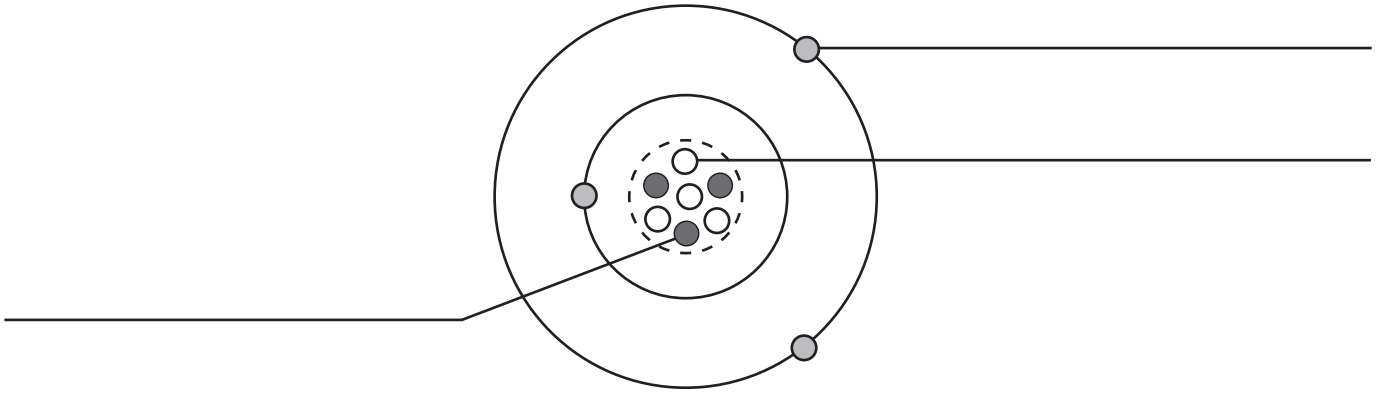
On another occasion the crane does 30 000 J of work in lifting a crate and develops 2000 W of power.

(b) Calculate how long it takes to lift the crate. [3 marks]

You are advised to show your working out.

Time = _____ s

8 The diagram shows a neutral atom.



(a) (i) Write the names of the different particles in the correct spaces. [3 marks]

(ii) Explain why this atom is neutral. [1 mark]

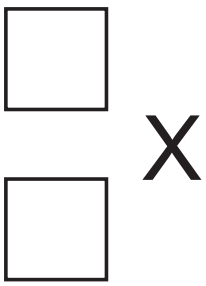
_____

(iii) What change, in terms of particles, will occur to this atom if it is to become an ion? [2 marks]

_____

_____

The nucleus of another atom X has 6 protons and 8 neutrons.



(b) Insert the correct numbers in the two boxes to represent this nucleus. [2 marks]

9 An isotope of a certain metal has a half-life of 46 days.

(a) (i) Complete the statement below by circling one answer from each box. [2 marks]

After a time of

23 days
46 days
92 days

the number of

decayed atoms
decayed nuclei
undecayed nuclei

will have decreased to half of their original number.

(ii) A sample of this isotope has an activity of 32 counts per second.
How much time has passed since its activity was 512 counts per second? [3 marks]

You are advised to show your working out.

Time = _____ days

We can get energy from nuclear reactions.

In each case below, give the name of the nuclear reaction to which the statement refers.

(b) (i) This reaction occurs when light nuclei are combined. [1 mark]

_____

(ii) This reaction is currently used in reactors to supply electricity commercially. [1 mark]

_____

(iii) This reaction uses fuel that can be found in seawater. [1 mark]

_____

This is the end of the question paper

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

Examiner Number