



## FORMULAE

You may find the following formulae useful.

$$\text{average velocity} = \frac{\text{displacement}}{\text{time}}$$

$$v = \frac{s}{t}$$

$$\text{acceleration} = \frac{\text{change in velocity}}{\text{time}}$$

$$a = \frac{(v-u)}{t}$$

$$\text{force} = \text{mass} \times \text{acceleration}$$

$$F = m \times a$$

$$\text{change in potential energy} = \text{mass} \times \text{gravitational field strength} \times \text{change in height} \quad PE = m \times g \times h$$

$$\text{kinetic energy} = \frac{1}{2} \times \text{mass} \times (\text{velocity})^2$$

$$KE = \frac{1}{2} \times m \times v^2$$

$$\text{electrical energy} = \text{voltage} \times \text{current} \times \text{time}$$

$$E = V \times I \times t$$

$$\text{power} = \frac{\text{work done}}{\text{time taken}}$$

$$P = \frac{W}{t}$$

$$\text{work done} = \text{force} \times \text{distance moved in the direction of the force}$$

$$W = F \times s$$



Leave blank

1.



Asmara is doing some revision on X-rays and gamma rays.

(a) Draw **one** line from each radiation on the left to the correct box on the right.

**radiation**

**used for**

X-rays

• killing cancer cells

gamma rays

• night vision goggles

• photographing bones

(2)

(b) Draw **one** line from each radiation on the left to the correct box on the right.

**radiation**

**produced by**

X-rays

• a high voltage machine

gamma rays

• a microwave oven

• the nucleus of an atom

(2)

Q1

(Total 4 marks)

3

Turn over



N 3 4 8 4 9 A 0 3 1 2

Leave blank

2. Dmitri's family have got a new car. Dmitri thinks that it will have good acceleration.



- (a) Dmitri wants to calculate the car's acceleration. Which of the following quantities **must** he measure to calculate the acceleration? Tick the **three** correct answers.

quantity	must measure to calculate acceleration
direction	<input type="checkbox"/>
final velocity	<input type="checkbox"/>
starting position	<input type="checkbox"/>
starting velocity	<input type="checkbox"/>
time taken	<input type="checkbox"/>

(3)

- (b) Which controls can cause the car to accelerate? Tick the correct answers. One has been done for you.

controls	can cause acceleration
accelerator pedal	<input type="checkbox"/>
air conditioning	<input type="checkbox"/>
brake pedal	<input type="checkbox"/>
steering wheel	<input checked="" type="checkbox"/>
turn indicator	<input type="checkbox"/>
windscreen wiper	<input type="checkbox"/>

(2)

Q2

(Total 5 marks)



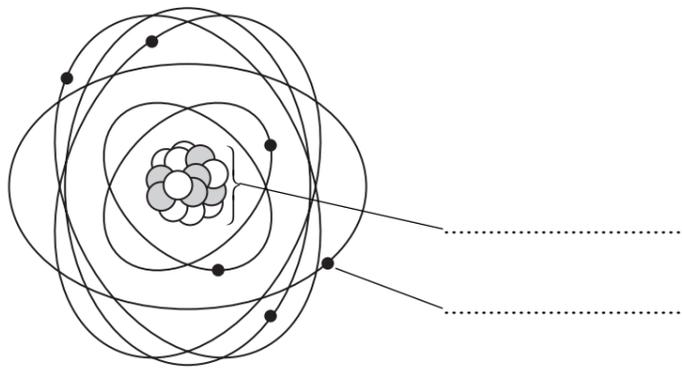
Leave blank

3. (a) The diagram shows the structure of a carbon-14 atom.

Key

● = proton

○ =



Use **three** words from the box to complete the diagram.

cell    centre    electron    molecule    neutron    nucleus

(3)

(b) The carbon atom is unstable and emits beta particles.

Complete the sentence by putting a cross (☒) in the correct box.

0    ☒

Beta particles have a charge of    -1    ☒

+2    ☒

(1)

(c) There are three types of ionising radiation.

Complete each sentence by putting a cross in the correct box.

alpha    ☒

The type of radiation that can penetrate the most is    beta    ☒

gamma    ☒

(1)

alpha    ☒

The radiation that produces the most ionisation is    beta    ☒

gamma    ☒

(1)

Q3

(Total 6 marks)

5

Turn over



N 3 4 8 4 9 A 0 5 1 2

Leave blank

4. Malik and Bianca are discussing nuclear power.

Malik says:

I think that we should have more nuclear power stations. They are better for the environment.



Bianca says :

I disagree. I think that nuclear power is unsafe.

(a) Explain why nuclear power is better for the environment than using fossil fuels.

.....  
.....  
(1)

(b) Suggest why some people think that nuclear power is unsafe.

.....  
.....  
(1)

(c) Which of these are suitable methods for disposing of waste from a nuclear power station?

Tick the **two** correct methods.

method for disposal of nuclear waste	suitable?
burn it	
bury it down a deep mine	
pump it out with the cooling water	
put it in a landfill site	
turn it into glass and sink it in an ocean	

(2)

Q4

(Total 4 marks)



**BLANK PAGE**



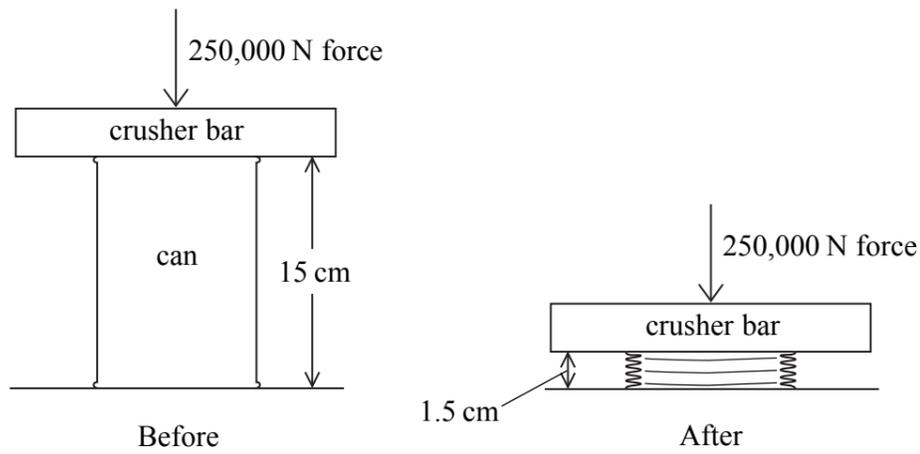
5.



Russ uses an electric can-crusher at his local recycling centre.



The diagram shows a can before and after crushing.



(a) Calculate the distance, in m, that the force has moved.

Distance = ..... m  
**(1)**

(b) Calculate the work done by the force.  
State the units in your answer.

Work done .....  
**(3)**

(c) State the maximum energy transferred to the can by the force.

.....  
**(1)**



Leave  
blank

- (d) The motor of the can crusher works at 230 V and 21 A.  
It takes 12 s to crush the can.  
Calculate the electrical energy transferred by the motor.

Electrical energy transferred .....J  
(2)

- (e) Not all the energy supplied to the motor is used to crush the can.  
Explain what happens to the energy that is not used to crush the can.

.....  
.....  
.....

(1)

Q5

(Total 8 marks)



Leave blank

6.



Babs and Sunita are investigating the physics of ten-pin bowling.

Babs measures the time taken for the ball to travel down the bowling alley.

The length of the alley is 18 m.  
The time taken for the ball to travel down the alley is 2.4 s.

(a) Calculate the average velocity of the ball.

average velocity = ..... m/s  
(2)

(b) Explain why this is an **average** velocity.

.....  
.....  
(1)

Q6

(Total 3 marks)

**TOTAL FOR PAPER: 30 MARKS**

**END**



**BLANK PAGE**



**BLANK PAGE**

