Name of the Student:_____

Max. Marks : 18 Marks **Time : 18 Minutes**

Q1.

(a) The names of the three types of nuclear radiation are given in **List A**.
Some properties of these types of radiation are given in **List B**.

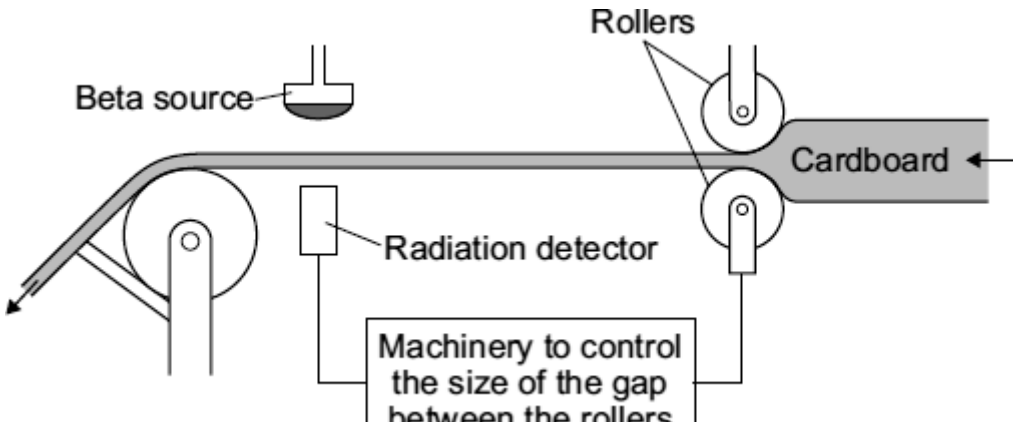
Draw a straight line to link each type of radiation in **List A** to its correct property in **List B**.

Draw only **three** lines.

List A **Type of nuclear radiation**	**List B** **Property of radiation**
	Has the same mass as an electron
Alpha	
	Very strongly ionising
Beta	
	Passes through 10 cm of aluminium
Gamma	
	Deflected by a magnetic field but not deflected by an electric field

(3)

(b) The diagram shows a system used to control the thickness of cardboard as it is made.



The cardboard passes through a narrow gap between a beta radiation source and a radiation detector.

The table gives the detector readings over 1 hour.

Time	Detector reading
08:00	150
08:15	148
08:30	151
08:45	101
09:00	149

(i) Between 08:00 and 08:30, the cardboard is produced at the usual, correct thickness.

Explain how you can tell from the detector readings that the cardboard produced at 08:45 is thicker than usual.

_____

_____

_____

_____

(2)

(ii) Which would be the most suitable half-life for the beta source?

Draw a ring around your answer.

six days **six months** **six years**

(1)

(iii) This control system would **not** work if the beta radiation source was replaced by an alpha radiation source.

Why not?

_____

_____

(1)

(Total 7 marks)

Q2.

The names of three different processes are given in **List A**.
Where these processes happen is given in **List B**.

Draw a line to link each process in **List A** to where the process happens in **List B**.

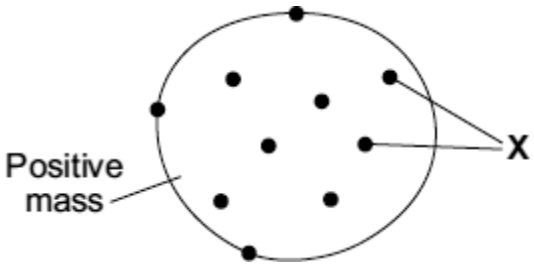
Draw only **three** lines.

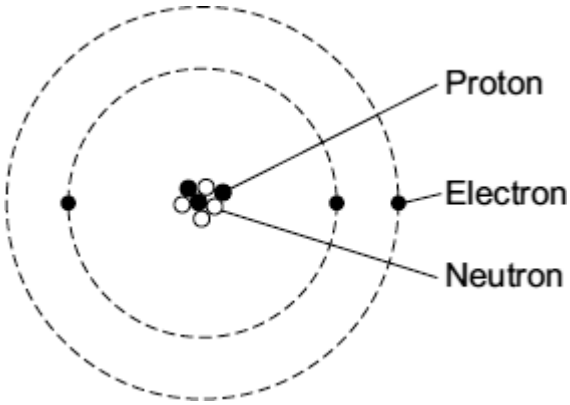
List A	**List B**
Process	**Where it happens**
	in a star
fusion	
	in a nuclear reactor
chain reaction	
	in a smoke precipitator
alpha decay	
	in the nucleus of an atom

(Total 3 marks)

Q3.

The diagrams show two different models of an atom.





'Plum pudding' model **Model used today**

(a) The particles labelled '**X**□ in the plum pudding model are also included in the model of the atom used today.

What are the particles labelled '**X**' ?

_____

(1)

(b) Scientists decided that the 'plum pudding' model was wrong and needed replacing.

Which **one** of the following statements gives a reason for deciding that a scientific model needs replacing?

Tick (✓) **one** box.

The model is too simple. ☐

The model has been used by scientists for a long time. ☐

The model cannot explain the results from a new experiment. ☐

(1)

(c) The table gives information about the three types of particle that are in the model of the atom used today.

Particle	Relative mass	Relative charge
	1	+1

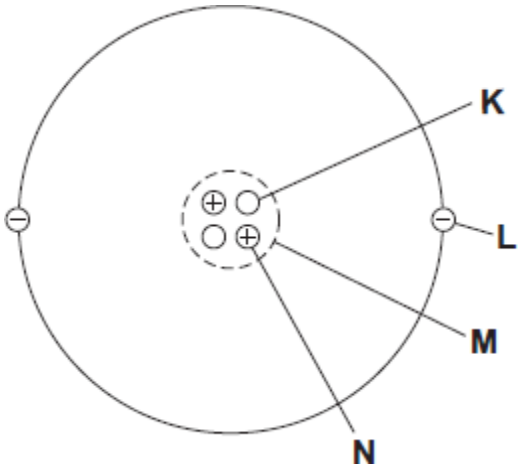
	very small	–1
	1	0

Complete the table by adding the names of the particles.

(2)
(Total 4 marks)

Q4.

(a) The diagram represents a helium atom.



(i) Which part of the atom, **K**, **L**, **M** or **N**, is an electron?

Part ☐

(1)

(ii) Which part of the atom, **K**, **L**, **M** or **N**, is the same as an alpha particle?

Part ☐

(1)

(b) A radioactive source emits alpha particles.

What might this source be used for?

Put a tick (✓) in the box next to your answer.

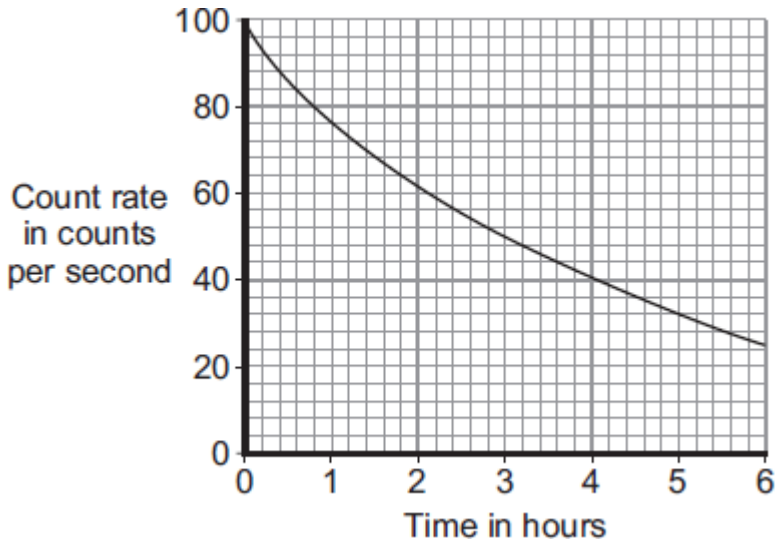
to monitor the thickness of aluminium foil as it is made in a factory ☐

to make a smoke detector work ☐

to inject into a person as a medical tracer

(1)

(c) The graph shows how the count rate from a source of alpha radiation changes with time.



What is the count rate after 4 hours?

_____ counts per second

(1)

(Total 4 marks)