Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Q1.

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

Draw a 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 radiation	List B Property of radiation
	not dangerous
alpha (α)	
	stopped by paper
beta (β)	
	travels at 300 000 000 m/s
gamma (γ)	
	travels up to 1 metre in air

(3)

(b) This sign warns people that a radioactive source is being used in a laboratory.

Why is it important to warn people that a radioactive source is being used?

_____

_____

(1)

(c) To study the blood flow in a patient's lungs, a doctor injects some technetium-99 compound into the patient. The gamma radiation given out by the technetium-99 atoms is detected using a gamma camera outside the patient's body.

Which statement gives the reason why gamma radiation is used? Put a tick (✓) in the box next to your choice.

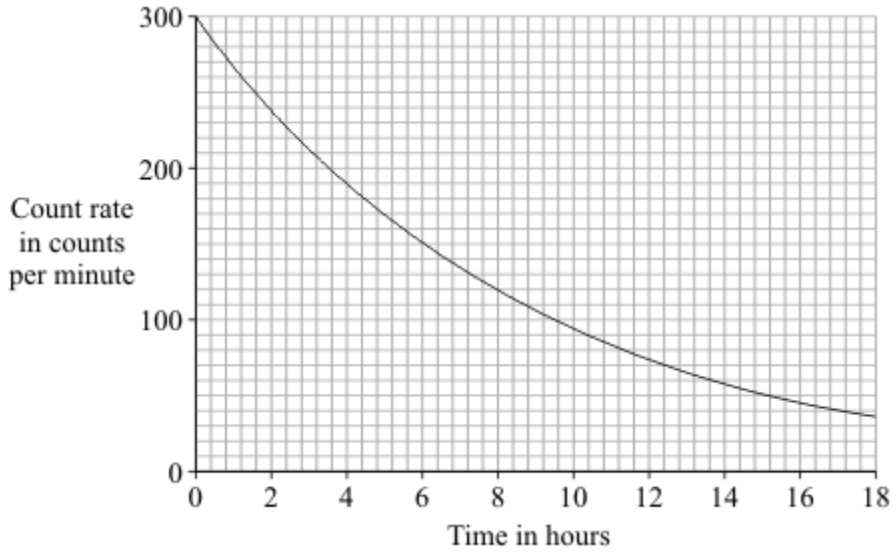
It can travel through a vacuum. ☐

It is not affected by a magnet. ☐

It can pass through the human body. ☐

(1)

(d) The graph shows how the count rate from a sample of technetium-99 changes with time.



(i) How many hours does it take for the count rate to fall from 300 counts per minute to 150 counts per minute?

Time = _____ hours

(1)

(ii) What is the half-life of technetium-99?

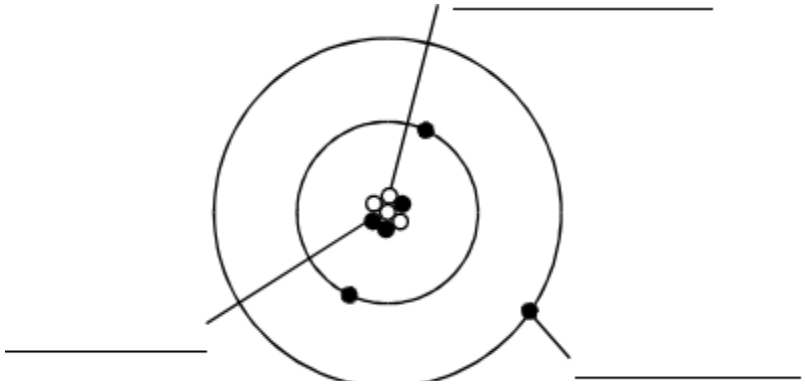
Half-life = _____ hours

(1)

(Total 7 marks)

Q2.

The diagram represents an atom of lithium.



(i) Complete the diagram by writing in the spaces the name of each type of particle. Use only words given in the box. Each word may be used once or not at all.

electron	**neutron**	**nucleus**	**proton**

(3)

(ii) Which type of particle found inside the atom is uncharged?

_____

(1)

(iii) What is the mass number of this atom, 3, 4, 7 or 10?

_____

Give a reason for your choice.

_____

_____

(2)

(Total 6 marks)

Q3.

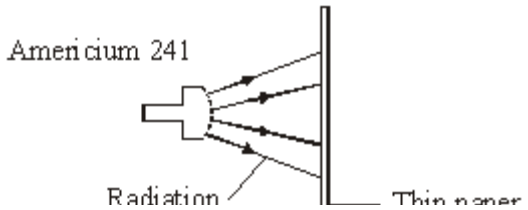
A smoke detector fitted inside a house contains a radioactive source, americium 241.

(a) Complete the following table of information for an atom of americium 241.

Number ofneutrons	146
Number ofprotons	95
Number ofelectrons	

(1)

(b) The diagram shows that the radiation given out by americium 241 does not go through paper.



Which type of radiation, alpha (α), beta (β), or gamma (γ) is given out by americium 241?

_____

(1)

(c) Explain why the radiation given out by the americium 241 is unlikely to do any harm to people living in the house.

_____

_____

_____

_____

(2)

(d) Complete the sentence by choosing an answer from the box.

less than	**more than**	**the same as**

After many years the radiation emitted by americium 241 will be _____

when the smoke detector was new.

(1)

(Total 5 marks)