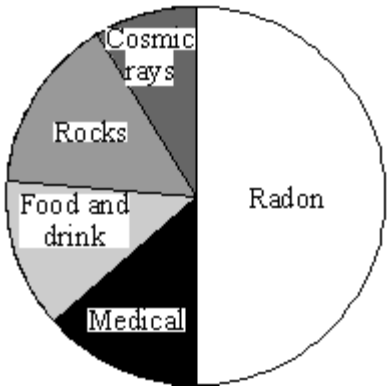
Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Q1.

The pie chart shows the main sources of *background radiation.* Each source contributes to the average yearly radiation dose.



(i) What is meant by the term *background radiation?*

_____

_____

(1)

(ii) Suggest why an airline pilot is likely to get a higher than average yearly radiation dose.

_____

_____

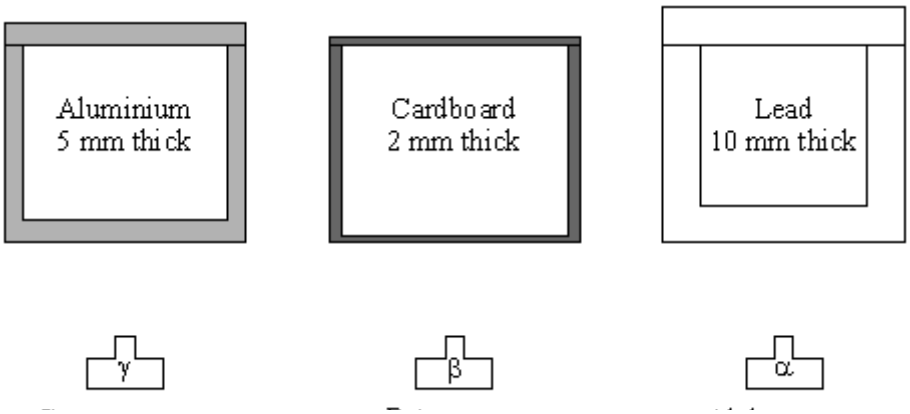
_____

(2)

(Total 3 marks)

Q2.

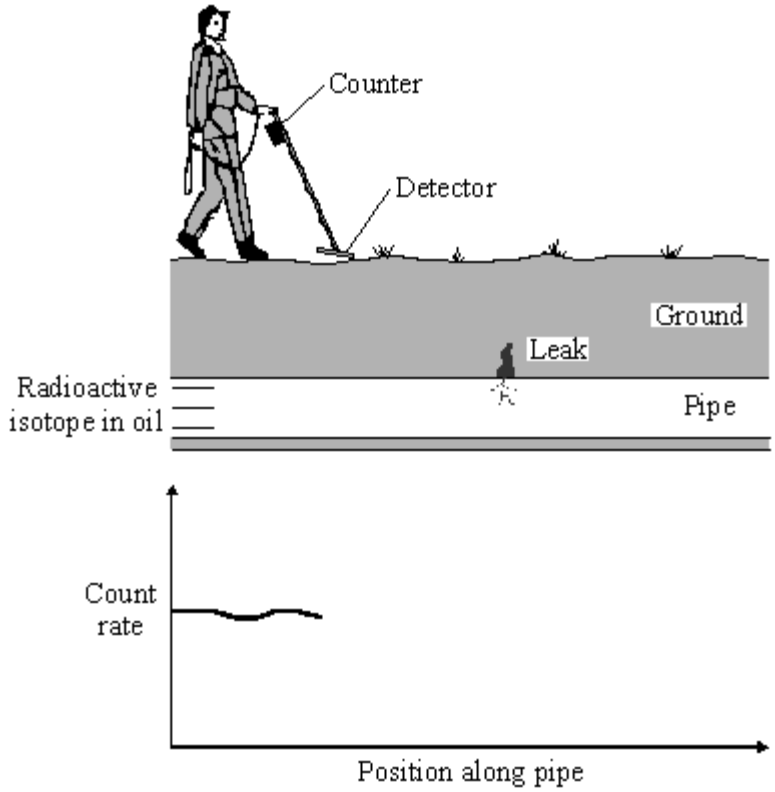
(a) The diagram shows three different boxes and three radioactive sources. Each source is stored in a different box.



Draw lines to show which source should be stored in each box so that the risk of radiation leakage is a minimum.

(2)

(b) A leak in an underground oil pipe can be found by injecting a radioactive isotope into the oil. The ground is then tested with a radiation detector and counter.



(i) State the type of detector used.

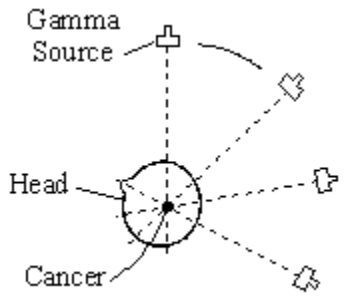
_____

(1)

(ii) Complete the sketch graph to show how the reading on the detector will change as it passes along the ground above the pipe.

(1)

(c) Gamma radiation can be used to kill cancer cells inside a person's head. During the treatment the patient is kept perfectly still while the source of gamma radiation moves in a circle.



(i) Why is a source of gamma radiation the most suitable for this treatment?

_____

(1)

(ii) Suggest why a moving source of radiation is used rather than one which is kept stationary.

_____

_____

_____

_____

(2)

(iii) Gamma radiation is an electromagnetic wave. Give **two** properties common to all electromagnetic waves.

1. _____

_____

2. _____

_____

(2)

(Total 9 marks)

Q3.

(a) Two sources of radiation look identical. One source emits only alpha radiation, the other only beta radiation. Describe **one** way to find out which source emits the alpha radiation. You can assume a radiation detector and counter are available. You may wish to draw a diagram to help with your answer.>

_____

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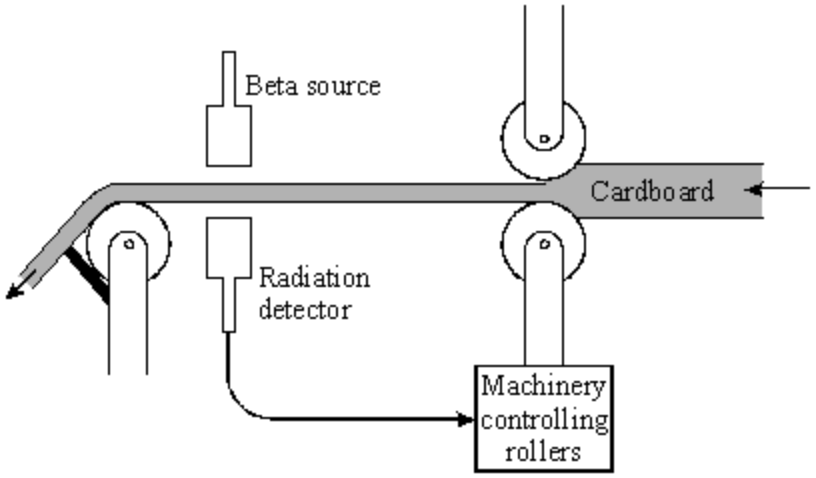
_____

(3)

(b) The diagram shows a beta radiation source and detector used to measure the thickness of cardboard as it is made. The table gives the detected count rate at different times.



Time	Count rate in counts/minute
09:00	120
09:30	122
10:00	119
10:30	165
11:00	118

(i) Between 09:00 and 10:00 the cardboard is produced at the correct constant thickness. Give a reason for the small variation in count rate.

_____

_____

(1)

(ii) What can you say about the thickness of the cardboard being made at 10:30?

_____

Explain the reason for your answer.

_____

_____

_____

(3)

(iii) Explain why gamma radiation is not suitable for detecting changes to the thickness of the cardboard.

_____

_____

(1)

(Total 8 marks)