Homework #1 Radioactivity

Question 1

The workers at the factory need to be able to identify the type of radiation the sample is emitting. Design an experiment that can identify the type of radiation present. Identify materials to be used and their proper placement.

[6]

Question 2

To study the blood flow in a patient's lung, a doctor injects a small quantity of a technetium-99 compound into the patient. The radiation emitted by the technetium-99 atoms is detected outside the patient's body.

Explain why a doctor would not use a radioactive isotope with a very short half-life, such as 2 seconds, as a medical tracer.

[2]

Question 3 What is meant by Radioactive decay is a random process?

(2)

Question 4

This question is about the Cathode Ray Tube (CRT).

(a) Fig. 7.1 shows a diagram of a CRT. One of the main features has been labelled for you. In the spaces provided, label the other five features. [4]

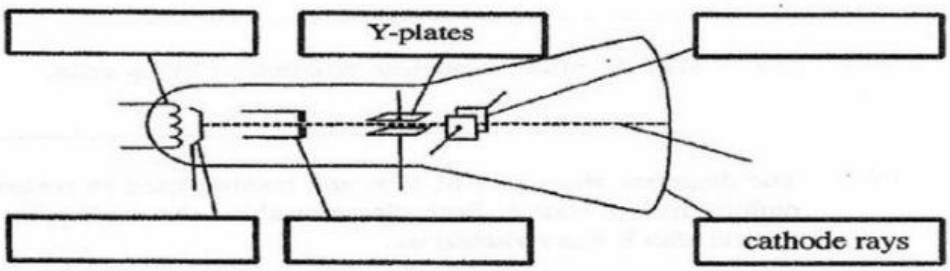

Fig. 7.1

(b) State what occupicsd the rest of the space inside the Cathode Ray Tube.

_____ [1]

(c) Briefly explain what causes the cathode to emit the cathode rays.

_____

_____ [2]

(d) What are cathode rays?

_____ [1]

(e) Name the process taking place at the cathode.

_____ [1]

(f) Give an example of a use for a cathode ray tube.

_____ [1]

Total marks [10]

Question 5

A radioactive isotope of barium has a half-life of 2 minutes. The isotope of barium has an activity rate of 200 disintegration/minute.

Calculate the activity rate of the barium isotope after 6 minutes.