8 **(a)** **(i)** Explain what is meant by *half-life*.

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.....

....[1]

(ii) Explain what is meant by *decay constant*.

.....

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.....

....[2]

(iii) Write down the nuclear notation of a nuclide with particular reference to lithium (Li) nucleus containing 3 protons and 4 neutrons.

State the meaning of any number that you write down.

[2]

(b) Naturally occurring radioactivity results in the emission of three types of ionising radiation - alpha, beta and gamma.

Distinguish between the three types in terms of their relative charges, masses and speeds.

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.. [6]

(c) In the early years of this century Mdm Curie drew an illustration similar to the Fig. 8.1 below which indicated how the three radiations travelled in air in a uniform magnetic field.

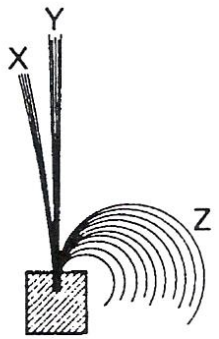

Fig. 8.1

(i) Identify the radiations X, Y and Z.

X: ……

Y: ……

Z: ……

[3]

(ii) Explain what is shown by the fact that the lines for X all have approximately the same length.

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....[2]

(iii) Explain what is shown by the fact that the lines for Z have different curvatures?

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....[2]

(iv) Give two reasons why it is difficult, if not impossible, to take a photograph which is like the figure.

1. .....

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2. .....

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[2]

[Total: 20]