8 **(a)** Define the term radioactive *decay constant*.

.....

.....

.....[2]

(b) State the relation between the activity A of a sample of a radioactive isotope containing N atoms and the decay constant λ of the isotope.

.....[1]

(c) Radon is a radioactive gas with half-life 56 s. For health reasons, the maximum permissible level of radon in air in a building is set at 1 radon atom for every 1.5×10^{21} molecules of air. 1 mol of air in the building is contained in 0.024 m^3.

Calculate, for this building,

(i) the number of molecules of air in 1.0 m^3,

number = ...

(ii) the maximum permissible number of radon atoms in 1.0 m^3 of air,

number = ...

(iii) the maximum permissible activity of radon per cubic metre of air.

activity = ... Bq

[5]

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