

- 6 The isotopes Radium-224 ($^{224}_{88}\text{Ra}$) and Radium-226 ($^{226}_{88}\text{Ra}$) both undergo spontaneous α -particle decay. The energy of the α -particles emitted from Radium-224 is 5.68 MeV and from Radium-226, 4.78 MeV.

(a) (i) State what is meant by the *decay constant* of a radioactive nucleus.

.....

[2]

(ii) Suggest, with a reason, which of the two isotopes has the larger decay constant.

.....

[3]

(b) Radium-224 has a half-life of 3.6 days.

(i) Calculate the decay constant of Radium-224, stating the unit in which it is measured.

decay constant =[2]

(ii) Determine the activity of a sample of Radium-224 of mass 2.24 mg .

activity = Bq [4]

- (c) Calculate the number of half-lives that must elapse before the activity of a sample of a radioactive isotope is reduced to one tenth of its initial value.

number of half-lives =[2]