2002 HIGHER SCHOOL CERTIFICATE EXAMINATION

Chemistry

Section I – Part B (continued)

Marks

Question 19 (5 marks)

(a) Describe the conditions under which a nucleus is unstable. **2**

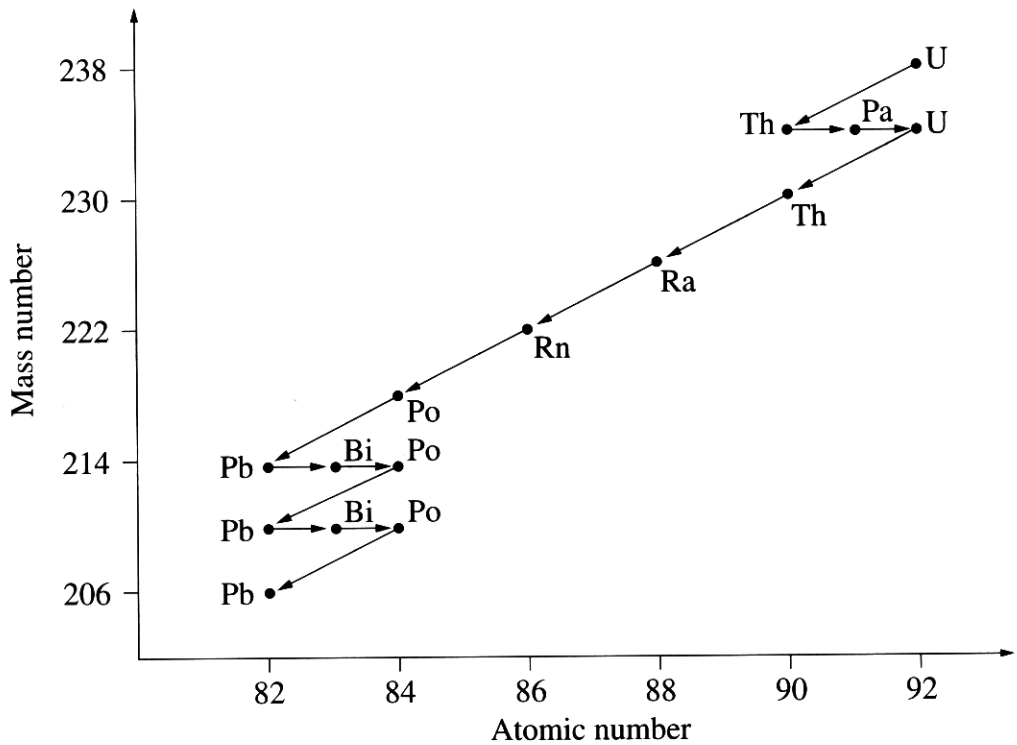
The nucleus is unstable of an element when the protons are not in the relevant ratios. The atom must then emit radiation to result in the nucleus becoming stable.

Question 19 continues on page 14

Marks

Question 19 (continued)

(b) The following is a flow diagram showing the sequence of products released during the decay of uranium. **3**



Use examples from the flow diagram to describe processes by which an unstable isotope undergoes radioactive decay.

Unstable isotopes undergo radioactive decay by emitting patricles. For example Uranium decays by α particles emmisions to produce Thorium. This involves an emmision of $^{4}_{2}He$ particle $^{238}_{92}U \rightarrow {}^{4}_{2}He + {}^{234}_{90}Th$

End of Question 19

Similarly they can undergo Beta emission emitting a beta particle, for example.

$^{232}_{90}Th \rightarrow {}^{0}_{-1}e + {}^{232}_{91}Pa$