

Chemistry

Section I – Part B (continued)

Marks

Question 19 (5 marks)

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

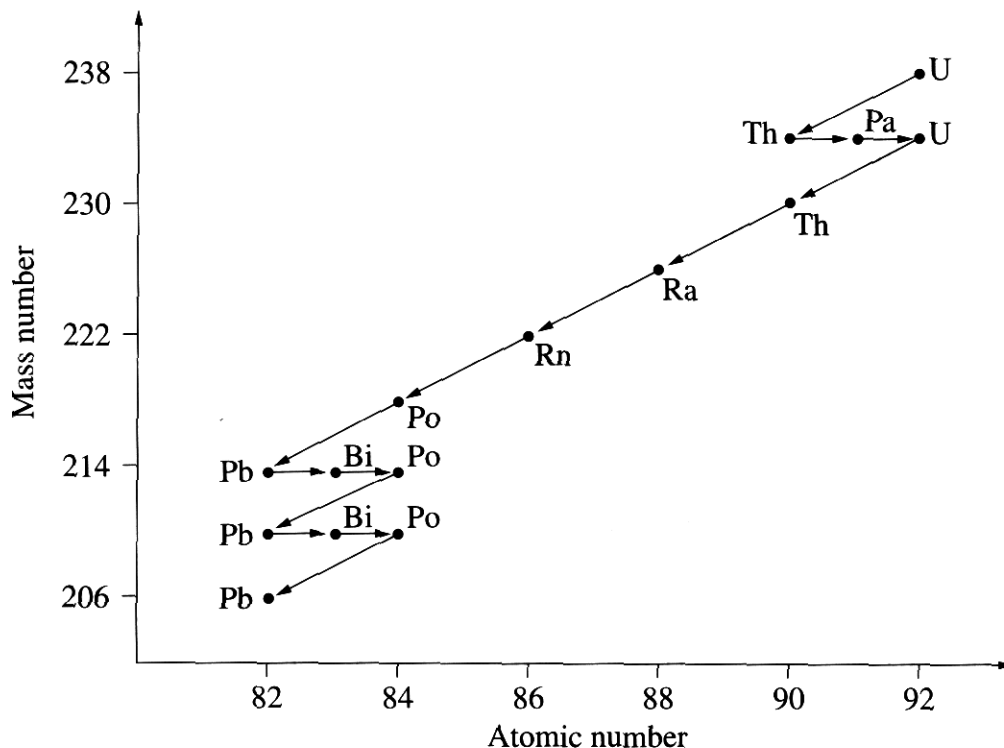
2

An atoms nucleus becomes unstable when it obtains or loses more protons or neutrons than it can handle. When it contains more p's or n's it undergoes radioactive decay until it enters a stable form. The difference in p's or n's in an element forms various stable and unstable isotopes such as the carbon series C^{12} , C^{13} & C^{14} .

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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.

U_{92}^{238} undergoes alpha decay to become Th_{90}^{234} . Th_{90}^{234} beta decays to Pa_{91}^{234} which also beta decays to U_{92}^{234} . The element continues to decay via Alpha (He^4) or beta decay (e^-) until it reaches a stable state. U_{92}^{238} eventually decays to the stable state of Pb_{82}^{206} .

End of Question 19