

37 A uranium atom with a charge of $+2e$ has a nucleon number of 235 and a proton number of 92.
 e is the elementary charge.

What is the total number of protons, neutrons and electrons in this charged atom?

- A 235
- B 325
- C 327
- D 329

39 Which particle is **not** a lepton?

- A electron
- B neutrino
- C neutron
- D positron

37 What is a general description of a baryon?

- A It consists of three quarks that **must** all be the same flavour.
- B It consists of three quarks that do **not** need to be the same flavour.
- C It consists of two quarks that **must** both be the same flavour.
- D It consists of two quarks that do **not** need to be the same flavour.

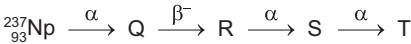
39 What is the change to the quark composition of a nucleus that takes place during β^+ decay?

- A down to antiup
- B down to up
- C up to antidown
- D up to down

40 What is the charge, in terms of the elementary charge e , on a charm quark?

- A $-\frac{2}{3}e$
- B $-\frac{1}{3}e$
- C $+\frac{1}{3}e$
- D $+\frac{2}{3}e$

38 The diagram shows a sequence of radioactive decays involving three α -particles and a β^- particle.



What is nuclide T?

- A ${}^{225}_{88}\text{Ra}$
- B ${}^{231}_{88}\text{Ra}$
- C ${}^{225}_{90}\text{Th}$
- D ${}^{229}_{90}\text{Th}$

39 The number of electrons in a neutral atom of an isotope of plutonium, ${}^{239}_{94}\text{Pu}$, is changed to produce a charged atom (ion) W.

W has an overall charge of $+1.6 \times 10^{-19}\text{C}$.

How many protons, neutrons and electrons are in W?

	protons	neutrons	electrons
A	94	145	93
B	94	145	95
C	238	94	239
D	239	94	238

38 An up quark in a hadron changes to a down quark.

The elementary charge is e .

What is the magnitude of the change in the charge of the hadron?

- A $\frac{1}{3}e$
- B $\frac{2}{3}e$
- C e
- D zero

39 A nucleus of magnesium-23 decays to form a nucleus of sodium-23, emitting a β^+ particle and particle X.

What is particle X?

- A an antineutrino
- B an electron
- C a neutron
- D a neutrino

40 A nucleus of ${}^{238}_{92}\text{U}$ decays in stages by emitting α -particles and β^- particles, eventually forming a nucleus of ${}^{206}_{82}\text{Pb}$.

How many α -particles and how many β^- particles are emitted during the decay chain?

	α -particles	β^- particles
A	8	6
B	8	10
C	16	6
D	16	22