

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.

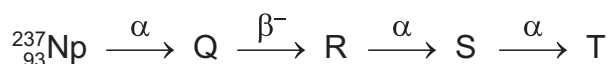
39 What is the change to the quark composition of a nucleus that takes place during β^+ decay?

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

- 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