

Multiple Choice Answers

Q38: A

Q39: A

Multiple Choice Answers

Q39: D

Q40: A

Multiple Choice Answers

Q38: D

Q39: A

6(a)(i)	numbers of protons and electrons both = 1
	number of neutrons = 2
6(a)(ii)	diagram shows 2 neutrons and 1 proton labelled and forming a nucleus
	diagram shows 1 electron labelled and separated from the nucleus (not touching the proton and neutrons)
6(b)(i)	helium nucleus: top line = 3 and bottom line = 2
	beta particle: top line = 0 and bottom line = -1
6(b)(ii)	(electron) antineutrino
6(c)	proton: up up down or neutron: up down down
	(tritium:) 4 up, 5 down

6(a)(i)	W deflects upwards
	W has deflection that is the mirror image of X
	Y deflects downwards less than X or path of Y is parallel to particle Z
6(a)(ii)	nucleus has most of the mass of the atom or nucleus is charged
6(a)(iii)	atom is mostly empty space or nucleus occupies a <u>very</u> small proportion of the space in the atom
6(b)	mass = 4 u
	charge = (+)2e
6(c)(i)	baryon
6(c)(ii)	charge on up quark = $(+)\frac{2}{3}(e)$ and charge on down quark = $(-)\frac{1}{3}(e)$
	(proton is up up down and neutron is up down down) $\left(2 \times \frac{2}{3}\right)e - \left(1 \times \frac{1}{3}\right)e = 1e$ and $\left(1 \times \frac{2}{3}\right)e - \left(2 \times \frac{1}{3}\right)e = 0$

Multiple Choice Answers

Q39: C

Multiple Choice Answers

Q38: B

7(a)	${}^{12}_7\text{N} \rightarrow {}^{12}_6\text{C} + {}^0_1\beta^+ + {}^0_0\bar{\nu}$	
	beta-plus shown	
	neutrino shown	
	symbols, nucleon numbers and proton numbers all correct	
7(b)(i)	+1	
7(b)(ii)	Lepton(s)	
7(b)(iii)	flavour	charge / e
	up / u	$-\frac{2}{3}$
	up / u	$-\frac{2}{3}$
	down / d	$(+)\frac{1}{3}$
	3 correct quark flavours	
	Charge on anti-up quark $-\frac{2}{3}(e)$	
	Charge on anti-down quark $(+)\frac{1}{3}(e)$	

5(a)(i)	$P = 40$ and $R = 0$
	$Q = 20$ and $S = -1$
5(a)(ii)	(electron) antineutrino
5(a)(iii)	leptons
5(b)	(alpha particle consists of) 2 protons and 2 neutrons
	quark composition of proton = up up down or quark composition of neutron = up down down
	quark composition (of alpha particle) = 6 up, 6 down