

Answers:

Question 1:

Ans:

- (a) electron
- (b) plum pudding
- (c) alpha
- (d) Bohr
- (e) protons
neutrons
protons (and) electrons
either order
- (f) a sports arena of radius 100 m

Question 2:

Ans:

- (a) any **three** from: (nuclear model)
 - mostly empty space

allow the plum pudding model has no empty space
allow the plum pudding model is solid
 - the positive charge is (all) in the nucleus
allow in the plum pudding model the atom is a ball of positive charge (with embedded electrons)
do not accept reference to protons

- the mass is concentrated in the nucleus
allow in the plum pudding model the mass is spread out
*do **not** accept reference to neutrons*
- the electrons and the nucleus are separate
allow in the plum pudding model the electrons are embedded
allow in the nuclear model the electrons are in orbits

- (b) electrons orbit the nucleus
*do **not** accept reference to protons / neutrons*
allow electrons are in energy levels around the nucleus
or
allow electrons are in shells around the nucleus

electrons are at specific distances from the nucleus

- (c) atomic number is the number of protons

(and) protons were not discovered until later
ignore electrons / neutrons were not discovered until later

- (d) so their properties matched the rest of the group
allow converse

Question 3:

Ans:

(a) (neutron)	1	0	
	<i>both needed</i>		
	<i>allow (neutron)</i>	1	<i>neutral</i>
proton	1	(+1)	
	<i>both needed</i>		

- (b) number of protons plus neutrons
allow number of protons and neutrons
ignore protons and neutrons unqualified
*do **not** accept references to mass or*
relative mass of protons and / or
neutrons

- (c) (the isotopes contain) different numbers of neutrons

- (d) most (alpha) particles passed (straight) through (the gold foil)

(so) the mass of the atom is concentrated in the nucleus / centre

or

(so) most of the atom is empty space

some (alpha) particles were deflected / reflected

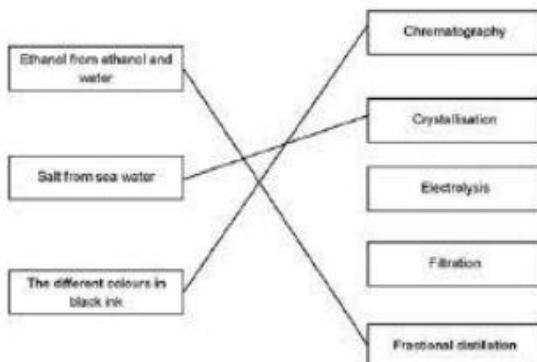
(so) the atom has a (positively) charged nucleus / centre

if not awarded for MP2 allow (so) the
mass of the atom is concentrated in the

Question 4:

Ans:

(a)



(b) include a (filter) funnel

allow funnel drawn on the diagram

ignore clamp stand

(c) evaporate

condense

must be this order

(d) $\frac{2}{20} \times 100$

= 10 (%)

*an answer of 10 (%) scores 2 marks
an answer of 11.1(%) or 90 (%) scores
1 mark*

(e) an alloy

(f) the layers in the mixture are distorted

(g) 8000 nm³

Question 5:

Ans:

- (a) B
- (b) C
- (c) A
- (d) sum of protons and neutrons
allow number of protons and neutrons
- (e) between 69.5 and 70.0
- (f) Chadwick provided the evidence to show the existence of neutrons
allow Chadwick discovered neutrons

(this was necessary because) isotopes have the same number of protons

*allow (this was necessary because)
isotopes have the same atomic number*

or

(this was necessary because) isotopes are atoms of the same element

*ignore isotopes have the same number
of electrons*

but with different numbers of neutrons

allow but with different mass (numbers)