Name of the Student:_____
Max. Marks : 23 Marks **Time : 23 Minutes**

Mark Schemes

Q1.

(a) B/Boron

Any 2 from:

Protons in the centre of the atom/nucleus

Electrons are in shells/energy levels (around the nucleus)

Neutrons in the centre of the atom/nucleus

Most of the atom is empty space/most of mass in nucleus

3

(b) **Definition**

Average / mean mass of 1 atom (of an element) (1)
1/12 mass of one atom of ^{12}C (1)

Or

Average / mean mass of atoms of an element
1/12 mass of one atom of ^{12}C

Or

Average / mean mass of atoms of an element × 12
mass of one atom of ^{12}C

Or

(Average) mass of one mole of atoms
1/12 mass of one mole of ^{12}C

Or

(Weighted) average mass of all the isotopes
1/12 mass of one atom of ^{12}C

Or

Average mass of an atom/isotope
compared to/relative to C-12 on a scale in which an atom of C-12 has a mass of 12

Justification

Tellurium has Z = 52 but iodine has Z = 53

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Or
Te has **one** fewer proton than I / I has **one** more proton
Or
Tellurium has 6 outer shell electrons/valence electrons but iodine has 7
Or
Te has similar chemistry/chemical properties to other Group 6 elements
Or
I has similar chemistry/chemical properties to other Group 7 elements

3

(c) $Te(g) + e^- \rightarrow Te^+(g) + 2\ e^-$

Or

$Te(g) \rightarrow Te^+(g) + e^-$

1

(d)

M1 $v = \frac{d}{t} = 4.17 \times 10^6\ (m\ s^{-1})$

M2 $m = \frac{2KE \times t^2}{d^2}$ or $m = \frac{2KE}{v^2}$ or $\frac{2 \times 1.88 \times 10^{-12}}{(4.17 \times 10^6)^2}$

M3 m = 2.16 x 10^{-25} to 2.17 × 10^{-25} (kg)

M4 mass of 1 mole of ions = *L* × 1000 × M3 = 130.4 (g)

M4 Allow 130 to 131 (3 or more significant figures)

M5 y = 130 or 131

M5 Must be an integer

5

(e) The *KE* of $^{126}Te^+$ is the same as the *KE* of $^{124}Te^+$

1

[13]

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Q2.

(a) (To make sure that) as much as possible/maximum amount (of solid) dissolves
OR
(To ensure that) the solution/it is saturated

Do not accept reacted

Ignore references to right/correct concentration

1

(b) otherwise, the titre would be larger
OR
would need a larger volume of acid/HCl
OR
because undissolved strontium hydroxide will react (with the acid/HCl).

Allow (solid) could block pipette

Ignore references to changes in concentration and pH

1

(c) To prevent reaction with carbon dioxide (in the air)

Allow so flask can inverted/shaken (to ensure homogeneous mixture)

OR
To prevent evaporation (of water/from solution)

Ignore contamination

1

(d) Answer **C**

1

(e) **M1** $Sr(OH)_2 + 2\ HCl \rightarrow SrCl_2 + 2\ H_2O$

M1 Equation

M2 32.43 (cm^3)

M2 Allow 32.425

M3 n HCl in mean titre = $3.24(3) \times 10^{-3}$ mol

M3 Allow 0.1 x M2 ÷ 1000

M4 n $Sr(OH)_2$ in 25 cm^3 = 1.62×10^{-3} mol

M4 Allow M3 ÷ 2

M5 n $Sr(OH)_2$ in 100 cm^3 of solution = 6.48×10^{-3} mol

M5 Allow M4 × 4

M6 mass = (6.48×10^{-3} mol x 121.6) = 0.788 (g per 100 cm^3 solution)

M6 Allow = M5 × 121.6
M6 Allow 0.79

Allow M5 and M6 in either order

6

[10]

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