

Structure {Paper02}

[SPM10-03]

a. (i) sodium // magnesium // aluminium

(ii) sodium : group 1, period 3

Magnesium : group 2, period 3

Aluminium : group 13, period 3

b. (i) argon

(ii) 1. The **atom has 8 valence electrons** // **atom achieve octet** electron arrangement // atom has electron arrangement 2.8.8

[Word ATOM must Have]

2. the atom cannot donate, receive or share electrons

c. (i). $4\text{Na} + \text{O}_2 \rightarrow 2\text{Na}_2\text{O}$

(ii)

4	7	11
		✓

d. Chlorine // Cl

Explain :

1. Smaller atomic size

2. **Strong nucleus attraction on the valence electron** //

3. Easier // more ready // higher tendency to receive electron

A: strong attraction between nucleus and electron

[MRSM10-02b]

(b) (i) Beaker X

(ii) Hydrogen Gas

(iii) Colourless change to Pink.

Because the solution is alkali // contains hydroxide ions

(iv) $2\text{Na} + 2\text{H}_2\text{O} \rightarrow \dots 2\text{NaOH} + \text{H}_2$

(v) **Group 1 is less dense than water**

[SPM11-03]

- (a) (i). 1
(ii) solid
- (b) (i). V
(ii) $2V + 2H_2O \rightarrow 2VOH + H_2$
- (c) (i) 2.8.6
(ii) period 3
(iii) has 3 shells occupied with electrons
- (d) (i). W
(ii). W has more proton number/ number of proton, in the nucleus of atom W. then the strong force between nucleus to attract valance electron, make it shriks or pull inside

[SBPmidyearF507-01]

- (a) 17 1
- (b) (i) 2.7 [wrong 2 : 7] 1
(ii) 2.8.7 [wrong 2: 8:7] 1
- (c) (i) 2 1
(ii) 3 1
- (d) 36
17 Q 1
- (e) (i) increase/ bigger 1
(ii) decrease 1
(iii) increase 1
- (f) $2Fe + 3Q_2 \rightarrow 2FeQ_3$ / $2Fe + 3Cl_2 \rightarrow 2FeCl_3$ 1

[SBPdiag07-01]

- (a) P: 2.8 Q: 2.7 R: 2.1 1
- (b) (i) Group; 18, Period 2 1
(ii) Group ; 17, Period 2 1
(iii) Group: 1, Period 2 1
- (c) (i) P 1
(ii) Has achieved a octet (stable) electron arrangement 1
- (d) $Q_2 + H_2O \rightarrow HQ + HOQ$ 1

[SBPmidyearF407-04]

- | | | |
|----------|--|---|
| (a)(i) | A / B | 1 |
| (a)(ii) | Alkaline | 1 |
| (a)(iii) | $2A + 2H_2O \rightarrow 2AOH + H_2$ / $2B + 2H_2O \rightarrow 2BOH + H_2$ | 1 |
| | Correct formula of reactants and products | 1 |
| | Balanced equation | 1 |
| (b)(i) | C | 1 |
| (b)(ii) | Show different oxidation number in their compounds / Form coloured ions or compounds / Can act as catalyst / Form complex ions | 1 |
| (c) | 8 | 1 |
| (d) | Used in advertising lights / television tubes | 1 |
| (e) | M located in Group 2, Period 3 | 1 |
| (f)(i) | Molecule | 1 |
| (f)(ii) | The attraction forces between molecules / particles in E / chlorine are weak. The attraction forces between molecules / particles in H / bromine are stronger. | 1 |

[SBPmidyearF406-04]

- | | | | |
|----------|---|-----|---|
| (a) | Diagram of electron arrangement | 2.3 | 1 |
| (b)(i) | A | | 1 |
| (b)(ii) | T | | 1 |
| (b)(iii) | T | | 1 |
| (c) | Show different oxidation numbers in their compound/ Form colour ions or compound/ Elements in their compounds are useful catalysts
(any one of these answers) | | 1 |
| (d) | B and Q or D and R | | 1 |
| (e)(i) | B/Q | | 1 |
| (e)(ii) | $2B + 2H_2O \rightarrow 2BOH + H_2$ / $2Q + 2H_2O \rightarrow 2QOH + H_2$ | | 1 |
| (f)(i) | Ionic | | 1 |
| (f)(ii) | XT_2 | | 1 |

[SBPmidyearF406-05]

- (a) (i) Yes, 1
Rubidium and potassium have 1 valence electron 1
- (a) (ii) Paraffin oil 1
- (b) (i) Liquid 1
- (b) (ii) • The size of bromine molecules is bigger than chlorine. 1
• The attraction by the nucleus on the outer electrons is weaker 1
• The strength to received electron decreases 1
- (c) (i) Na, Mg, Al 1
- (c) (ii) An oxide that can react with both acid and alkali/bases 1
- (c) (iii) $\text{Na}_2\text{O} + \text{H}_2\text{O} \rightarrow 2\text{NaOH}$ 1

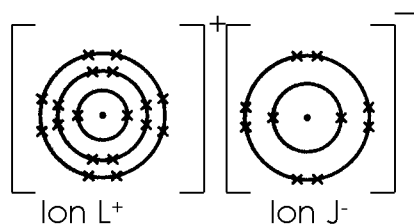
SBPdiag08-03]

- (a) W 1
T 1
V 1
- (b) P^{2+} 1
- (c) R 1
- (d) • The atoms have the **same valence electron.** 1
• alkaline 1
• **R is more reactive** than Q 1
- (e) V, U, P and T 1
- (f) Forms coloured compound/ion// 1
can act as catalyst//
has variable oxidation number

[SBPmidyearF507-03]

- (a) (i) L^+ // K^+ 1
(ii) E^{2-} // O^{2-} 1
- (b) 1. G 1
2. Electron arrangement for G is 2.8 // outermost shell is fully occupied with electrons/ is full with electrons. 1

- (c) (i) ionic bond 1
 (ii) LJ // (KCl)
 reject/wrong: JL 1
 (iii) [able to draw the diagram of electron arrangement correctly]



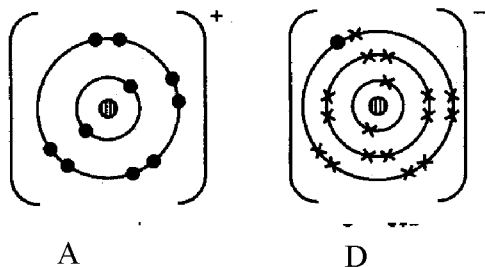
j must 3 shell

1. [all electrons and shells shown correctly] 1
 2. [atoms labeled and charges shown] 1

- (iv) 1. In aqueous solution // molten state 1
 2. Ions can move freely // free to move ion 1

[SBPtrial04-01] {Translate}

- a) D 1
 b) 2.8.8 1
 c)



1. Bilangan elektron pada petala luar dan bilangan petala berisi elektron betul 1
 2. Cas A⁺, D⁻ 1
 d) 1. A, B, C, D, E 1
 2. merentas kala dari kiri ke kanan , bil elektron bertambah/ bil proton bertambah 1
 3. daya tarikan nukleus terhadap elektron dalam petala bertambah 1
 e) (i) A₂O 1
 (ii) A₂O + H₂O → 2AOH 1
 (iii) Tak berwarna ke merah jambu 1

[MRSM03-01]

- (a) (i) 2.8.7
 (ii) $35 - 17 = 18$

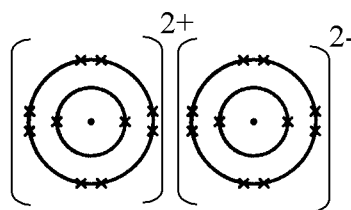
(b) (i) Atom that is same element and has same proton number but different nucleon number/ number of neutrons

(ii) They have same valence electron

(c) He, O, C, Li, Mg

(d) (i) $2 \text{Mg} + \text{O}_2 \rightarrow 2 \text{MgO}$

(ii)



(e) He atom already achieved duplet.

So He atom does not to donate, receive or share electron with Li.

[SPM09-02]

(a) Nucleon number //

A: Relative Atomic Mass (RAM) // the total number of proton and neutron

(b) (i) Lithium: 2.1 Oxygen : 2.6

(ii) Oxygen atom is smaller than lithium atom

(c)

Element	Period	Group
Li	2	1
O	2	16

(d) (i) Li^+ , O^{2-}

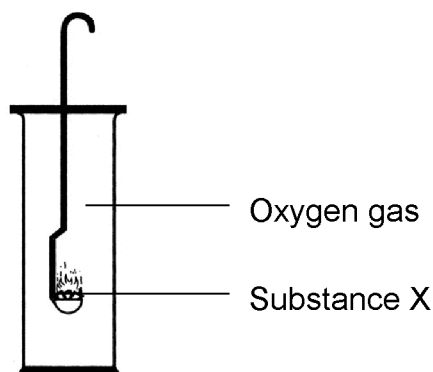
(ii) Lithium atom donate 1 electron to form lithium ion, Li^+

Oxygen atom receive 2 electron to form oxide ion, O^{2-}

(iii) Solid at room temperature // dissolve in water // high melting/boiling point// can conduct electricity in molten or aqueous

[SPM07-05]

- (a) 11
 (b) (i) Group 1 and period 3
 (ii) 2.8.1 Valence electron is 1 and have 3 shell filled with electrons
 (c) (i) X atom has strong attractive force between valence electron and nucleus.
 Therefore X atom is difficult to donate electron than Y atom
 (ii)



- (d) (i) $2.3 / 23 = 0.1 \text{ mol}$
 (ii) $4 \text{ mol X produce } 2 \text{ mol X}_2\text{O}$
 $0.1 \text{ mol X produce } 0.05 \text{ mol}$
 $\text{Mass X}_2\text{O} = 0.05 \times [23 \times 2 + 16]$

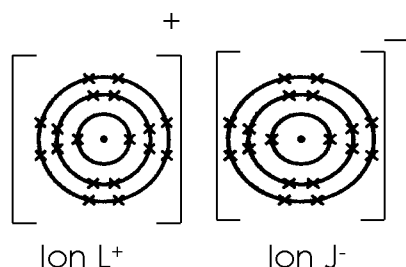
[SPM05-01]

- (a) (i) Y (ii) R (iii) X
 (b) R, Q, Y, X, T
 (c) 2.4
 (d) Y⁻
 (e) Q and R have same 2 shell occupied with electrons
 (f) red litmus paper turns to blue
 (g) Transition elements/ metal

[SBPdiag07-03]

- (a) (i) L⁺ ; reject : if give name element 1
 (ii) E²⁻ 1
 (b) (i) 10 1
 (ii) 2.8 1

- (c) M 1
- (d) (ii) LJ r: JL, equation 1
(ii) [can draw the diagram of electron arrangement correctly]



1. [all electrons and number of shells filled with electron correct] 1
2 [nucleus of atom labelled and charges of ion shown correctly] 1

- (iii) In aqueous solution // molten state 1
ions can move freely // free to move 1

[SPM03-02]

		X	X	X	X	X	Fe	X	X	X	X						
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- (a) Iron
- (b) [from no 3 to 12]
- (c) coloured solution // as catalyst // have different oxidation numbers // forms complex ions
- (d) 2.8.2
- (e) (i) $4\text{Al} + 3\text{O}_2 \rightarrow 2\text{Al}_2\text{O}_3$
(ii) Aluminium atom **donate 3** electron and form Al^{3+} ion.
Oxygen atom receive **2 electron** form aluminium to form O^{2-} ion. - 1
 Al^{3+} ion will attract O^{2-} ion with **Electrostatic force** to form Al_2O_3 compounds. - 2
- (f) Helium Gas.
Helium gas is not reactive compare to hydrogen gas that can flammable.

[SBPdiag06-01]

- (a) A,B 1
- (b) 2.8 1
- (c) D^{3+} (**false, if give equation**) 1

- (d)(i) C 1
- (ii) Form complex ions // Act as catalysts // Exhibit different oxidation numbers 1
- (e) E // H 1
- (f) F, A, G, E, D, B 1
- (g)(i) $2A + 2H_2O \rightarrow 2AOH + H_2$ (**False if A change to name**) 1
- (ii) Alkaline/ alkali 1
- (h) 1. Atom E has a smaller size 1
 2. The attraction forces between nucleus and electrons are stronger 1
 OR **2**
 1. Atom H has a bigger size 1
 2. The attraction forces between nucleus and electrons are weaker. 1

[SBPmidyearF407-05]

- (a)(i) Solid to gas 1
- (ii) Increase 1
- (b)(i) Chlorine 1
- (b)(ii) The nuclei attraction on the valence electrons of chlorine atom is stronger / The attraction by the nucleus of chlorine atom on valence electrons is stronger // The positive charges of nucleus of chlorine atom is higher. Electrons are arranged closer to the nucleus of chlorine atom. 1
- (c)(i) Oxide with both basic and acidic properties. // An oxide which can reacts with both acids and bases to form salts and water. 1
- (c)(ii) Aluminium 1
 Silicon/phosphorus/sulphur/chlorine 1

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