



**EXAM PAPERS PRACTICE**

Boost your performance and confidence  
with these topic-based exam questions

Practice questions created by actual  
examiners and assessment experts

Detailed mark scheme

Suitable for all boards

Designed to test your ability and  
thoroughly prepare you

2002

**XVIII**

1583

Time allowed  
**38 Minutes**

**Score**

**/32**

**Percentage**

**%**

**CHEMISTRY**

**AQA  
AS & A LEVEL**

**Mark Scheme**

**3.2 Inorganic chemistry**

1

- (a) Elements in the p block have their outer electron(s) in p orbital(s) or levels or sub-shells (1)  
 example of element (1)  
 correct electronic configuration (1)

3

- (b) Pattern in the change in the properties of a row of elements (1)  
*OR Trend in the properties of elements across a period*

Repeated in the next row (1)

*OR element underneath (or in same group) has similar properties*

#### **atomic radius**

decreases across the row (1)

*CE if trend is wrong*

number of protons increases (1) (or nuclear charge increases)  
more attraction for electrons in the same shell (1)

#### **electronegativity**

increases across the row (1)

number of protons increases (1) (or nuclear charge)

atomic radius decreases (1) (or shielding remains the same or electrons in the same shell) more attraction for bonding or shared electrons (1)

#### **conductivity**

decreases row (1)

*OR significant drop from Al to Si*

Na–Al metals (1)

*OR metallic bonding or description of metallic bonding*

Two of Si - Ar non metals (1)

*OR molecular or covalent*

EITHER electrons free to move (or delocalised) in metals  
 OR electrons unable to move in non-metals (1)

13

[16]

2

(a)

Particle	Relative charge	Relative mass	
Proton	+1 <b>or</b> 1+	1	<b>(1)</b>
Neutron	0 <b>or</b> no charge/neutral/zero	1 ( <u>not</u> – 1)	<b>(1)</b>
Electron	–1 or 1–	1/1800 to 1/2000	<b>(1)</b>

**or** negligible

**or** zero

**or**  $5.0 \times 10^{-4}$  to  $5.6 \times 10^{-4}$

*if 'g' in mass column - wrong  
penalise once*

3

(b)  $^{38}_{18}\text{Ar}$  **(1)(1)**

*Allow numbers before or after Ar*

2

(c) S:  $1s^2 2s^2 2p^6 3s^2 3p^4$  **(1)**

*Allow upper case letters*

$\text{S}^{2-}$ :  $1s^2 2s^2 2p^6 3s^2 3p^6$  **(1)**

*If use subscript penalise once*

2

(d) Block: p **(1)**

*Explanation:* Highest energy or outer orbital is (3) p

*OR outer electron, valency electron in (3) p  
NOT 2p etc.*

2

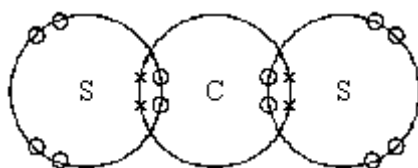
(e) (i) Bonding in  $\text{Na}_2\text{S}$ : ionic **(1)**

Bonding in  $\text{CS}_2$ : covalent **(1)**

*ignore other words such as dative / polar / co-ordinate*

- (ii) Clear indication of electron transfer from Na to S **(1)**  
 1 e<sup>-</sup> from each (of 2) Na atoms or 2 e<sup>-</sup> from 2 Na atoms **(1)**  
*QoL correct English*

(iii)



Correct covalent bonds **(1)**  
All correct including lone pairs (1)  
*Allow all •s or all ×s*  
*M2 tied to M1*  
*NOT separate e<sup>-</sup>s in S•- 2 l p*

- (iv)  $\text{CS}_2 + 2\text{H}_2\text{O} \rightarrow \text{CO}_2 + 2\text{H}_2\text{S}$  **(1)**  
*Ignore state symbols even if wrong*