

Name of the Student: _____

Max. Marks : 17 Marks

Time : 17 Minutes

Mark Schemes

Q1.

This question is marked using Levels of Response. Examiners should apply a 'best-fit' approach to the marking.	
Level 3 5-6 marks	All stages are covered and the explanation of each stage is generally correct and virtually complete. Answer is communicated coherently and shows a logical progression from stage 1 to stage 2 and then stage 3. Coherent communication requires that there is a comparison between the types of bonding and that the bonding is correct for each substance.
Level 2 3-4 marks	All stages are covered but the explanation of each stage may be incomplete or may contain inaccuracies OR two stages are covered and the explanations are generally correct and virtually complete. Answer is mainly coherent and shows some progression from stage 1 to stage 2 and then stage 3.
Level 1 1-2 marks	Two stages are covered but the explanation of each stage may be incomplete or may contain inaccuracies OR only one stage is covered but the explanation is generally correct and virtually complete. Answer shows some progression between two stages
Level 0 0 marks	Insufficient correct chemistry to gain a mark.

Indicative chemistry content. Contradictions (eg molecules, IMFs, covalent bonding,) negate statements.

Stage 1 - Na

1a) Na has metallic bonding

1b) there is attraction/ bonding between the positive nucleus/ ion and the delocalised electrons in Na

1c) Na has a giant/lattice structure

Stage 2 – NaBr or NaI

2a) Ionic bonding in NaBr and/or NaI

2b) There is attraction/ bonding between the + and – ions in NaBr and/or NaI

2c) NaBr and/or NaI have a giant/lattice structure

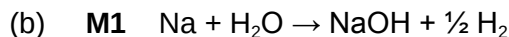
Stage 2 – comparison of bonding

3a) The ionic bonds are stronger (or write) than the metallic bonds

3b) there is stronger attraction (or write) between the + and – ions in NaBr than in NaI

3c) since the Br[–] ion is smaller than the I[–] ion

6



Allow multiples

1

M2 (Mass Na = 0.250 g so moles Na = $0.250/23.0$) = 0.0109

CE: If not divided by 23, max 3/5 calculation marks – M3, M4 and M5

AE: If not divided by 1000 and final answer is $1.33 \times 10^5 \text{ cm}^3$ 4/5

1

M3 moles H₂ = 5.43×10^{-3} to 5.45×10^{-3}

M3 = M2 / 2

CE: If incorrect ratio used max 3/5 calculation marks – M2, M4 and M5

1

M4 T = 298 (K) and P = 101000 (Pa)

1

M5 $V = nRT/P$ or $(5.435 \times 10^{-3} \times 8.31 \times 298)/101000$ or $1.33 \times 10^{-4} \text{ (m}^3\text{)}$

1

M6 $V = 133 - 134 \text{ cm}^3$

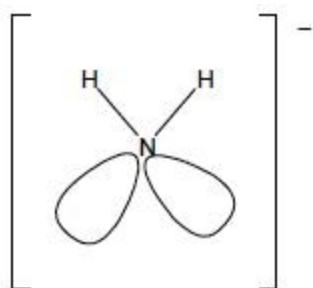
Allow to 2 significant figures or more

1

(c) Conc = $0.0109/500 \times 10^{-3} = 0.0217\text{--}0.022 \text{ (mol dm}^{-3}\text{)}$

Allow M2 from question (b)

1



(d) **M1**

Ignore charge and brackets

1

M2 104.5°

Allow 104-106

1

M3 (4) electron pairs repel to be as far apart as possible

1

M4 lp/lp repulsion > lp/bp repulsion (> bp/bp repulsion)

For M4 allow lone pairs repel more than bonding pairs

Mark independently

1

[16]