CHEMISTRY MULTIPLE CHOICE QUESTIONS

K. Group VII

2002 -2014

1.

The concepts of bond energy, bond length and bond polarity are useful when comparing the behaviour of similar molecules, e.g. thermal stability.

For example, it could be said

*"Compared with the HCl molecule, the bond .....**X**..... of the HI molecule is .....**Y**..... ."*

Which pairs of words correctly complete the above sentence?

	X	Y
1	energy	greater
2	length	greater
3	polarity	less

[2002 M/J (33)]

2.

Which sodium salts form a precipitate when $AgNO_3(aq)$ followed by dilute $NH_3(aq)$ is added to its aqueous solution?

1 chloride

2 bromide

3 iodide

[2002 M/J (37)]

3.

The element astatine lies below iodine in Group VII of the Periodic Table.

What will be the properties of astatine?

1 It forms diatomic molecules which dissociate more readily than chlorine molecules.

2 It reacts explosively with hydrogen.

3 It is a good reducing agent.

[2002 O/N (35)]

4.

Ammonia and chlorine react in the gas phase.

$$8NH_3 + 3Cl_2 \rightarrow N_2 + 6NH_4Cl$$

Which statements are correct?

1 Ammonia behaves as a reducing agent.

2 Ammonia behaves as a base.

3 The oxidation number of the hydrogen changes.

[2002 O/N (36)]

5.

Chlorine compounds show oxidation states ranging from –1 to +7.

What are the reagent(s) and conditions necessary for the oxidation of elemental chlorine into a compound containing chlorine in the +5 oxidation state?

A $AgNO_3(aq)$ followed by $NH_3(aq)$ at room temperature

B concentrated H_2SO_4 at room temperature

C cold dilute NaOH(aq)

D hot concentrated NaOH(aq)

[2003 M/J (16)]

6.

Which gaseous hydride most readily decomposes into its elements on contact with a hot glass rod?

A ammonia

B hydrogen chloride

C hydrogen iodide

D steam

[2003 M/J (17)]

7.
Why is the addition of concentrated sulphuric acid to solid potassium iodide **unsuitable** for the preparation of hydrogen iodide?

1 Hydrogen iodide is not displaced by sulphuric acid.

2 Iodide ions are oxidised to iodine.

3 The product is contaminated by sulphur compounds.

[2003 M/J (36)]

8.
In what order does the reducing power of the hydrogen halides increase?

A HC*l*, HBr, HI

B HC*l*, HI, HBr

C HBr, HI, HC*l*

D HI, HBr, HC*l*

[2003 M/J (17)]

9.
Which statement is most likely to be true for astatine, which is below iodine in Group VII of the Periodic Table?

A Astatine and aqueous potassium chloride react to form aqueous potassium astatide and chlorine.

B Potassium astatide and hot dilute sulphuric acid react to form white fumes of only hydrogen astatide.

C Silver astatide reacts with dilute aqueous ammonia in excess to form a solution of a soluble complex.

D Sodium astatide and hot concentrated sulphuric acid react to form astatine.

[2004 M/J (17)]

10.
When a hot glass rod is placed in a gas jar of hydrogen iodide, there is an immediate reaction as the hydrogen iodide decomposes.

Which statements about this reaction are correct?

1 Hydrogen iodide is purple coloured.

2 The hot rod provides the activation energy.

3 One of the products is a solid.

[2004 M/J (36)]

11.
The following report appeared in a newspaper.

> Drums of bromine broke open after a vehicle crash on the motorway. Traffic was diverted as purple gaseous bromine drifted over the road (it is denser than air), causing irritation to drivers' eyes. Firemen sprayed water over the scene of the accident, dissolving the bromine and washing it away.

What is **wrong** with the report?

A Bromine does not dissolve in water.

B Bromine does not vapourise readily.

C Bromine is less dense than air.

D Bromine is not purple.

[2004 O/N (17)]

12.
Which properties in the sequence hydrogen chloride, hydrogen bromide and hydrogen iodide steadily increase?

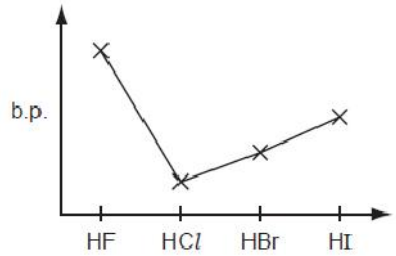
1 thermal stability

2 bond length

3 ease of oxidation

[2004 O/N (36)]

13.
The diagram shows the variation of the boiling points of the hydrogen halides.



What explains the higher boiling point of hydrogen fluoride?

A The bond energy of HF molecules is greater than in other hydrogen halides.

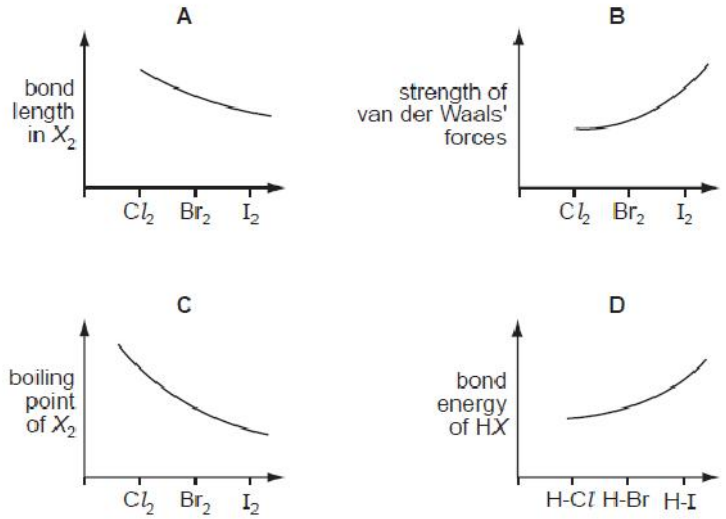
B The effect of nuclear shielding is much reduced in fluorine which polarises the HF molecule.

C The electronegativity of fluorine is much higher than for other elements in the group.

D There is hydrogen bonding between HF molecules.

[2005 M/J (5)]

14.
Which graph correctly describes a trend found in the halogen group?



[2005 M/J (16)]

15.
What happens when chlorine is bubbled through aqueous potassium iodide?

A Chlorine is oxidised to chloride ions.

B Hydrochloric acid is formed.

C Iodide ions are oxidised to iodine.

D Potassium iodide is reduced to iodine.

[2006 M/J (17)]

16.
Which of the following is **not** a correct statement about iodine?

A A crystal of iodine contains covalent bonds and van der Waals' forces.

B Iodine vapour is purple.

C The first ionisation energy of iodine is less than that of bromine.

D The hydride of iodine is of greater thermal stability than that of bromine.

[2006 O/N (15)]

17.
Mixing aqueous silver nitrate and aqueous sodium chloride produces a precipitate.

Addition of which reagent to the mixture gives a colourless solution?

A aqueous ammonia

B aqueous potassium iodide

C dilute hydrochloric acid

D dilute nitric acid

[2006 O/N (16)]

18.
Which is the complete list of all the products from the reaction of concentrated sulphuric acid with potassium bromide?

A potassium hydrogensulphate and hydrogen bromide

B potassium hydrogensulphate, hydrogen bromide and bromine

C potassium hydrogensulphate, hydrogen bromide, bromine and water

D potassium hydrogensulphate, hydrogen bromide, bromine, water and sulphur dioxide

[2006 O/N (17)]

19.

Use of the Data Booklet is relevant to this question.

The element astatine lies below iodine in Group VII of the Periodic Table.

What will be the properties of astatine?

1 It forms diatomic molecules which dissociate more readily than chlorine molecules.

2 It reacts explosively with hydrogen.

3 It is a good reducing agent.

[2007 M/J (36)]

20.

Gaseous nitrogen is less reactive than gaseous fluorine.

What is the reason for this difference in reactivity?

A The boiling point of nitrogen is lower than that of fluorine.

B The relative molecular mass of nitrogen is lower than that of fluorine.

C The atomic radius of nitrogen is greater than that of fluorine.

D The bond strength in the molecule is greater in nitrogen than in fluorine.

[2007 O/N (18)]

21.

Why is the addition of concentrated sulphuric acid to solid potassium iodide **unsuitable** for the preparation of hydrogen iodide?

1 Hydrogen iodide is not displaced by sulphuric acid.

2 Iodide ions are oxidised to iodine.

3 The product is contaminated by sulphur compounds.

[2007 O/N (36)]

22.

Properties of chlorine, iodine and their compounds are compared.

Property **Q** for chlorine is smaller than for iodine.

What is property **Q**?

A oxidising ability of the element

B solubility of the silver halide in $NH_3(aq)$

C strength of van der Waals' forces between the molecules of the element

D thermal stability of the hydrogen halide

[2008 M/J (16)]

23.

A student observed the reactions when sodium chloride and sodium iodide were each reacted separately with concentrated sulphuric acid and concentrated phosphoric acid. The observations are recorded in the table.

	sodium chloride	sodium iodide
conc. H_2SO_4	colourless acidic gas formed	purple vapour formed
conc. H_3PO_4	colourless acidic gas formed	colourless acidic gas formed

Which deduction can be made from these observations?

A Concentrated phosphoric acid is a stronger oxidising agent than concentrated sulphuric acid.

B Concentrated phosphoric acid is a stronger oxidising agent than iodine.

C Concentrated sulphuric acid is a stronger oxidising agent than chlorine.

D Concentrated sulphuric acid is a stronger oxidising agent than iodine.

[2008 O/N (17)]

24.

Chlorine is a greenish-yellow gas, bromine is a dark red liquid and iodine is a dark grey solid.

What causes these differences in volatility?

1 the halogen-halogen bond energy

2 the magnitude of the van der Waals' forces between the molecules

3 the number of electrons in the halogen molecule

[2008 O/N (35)]

25.

A crystal of iodine produces a purple vapour when gently heated.

Which pair of statements correctly describes this process?

	type of bond broken	formula of purple species
A	covalent	I
B	covalent	I_2
C	induced dipole-dipole	I_2
D	permanent dipole-dipole	I_2

[2009 M/J (7)]

26.

Over half a million tonnes of bromine are manufactured annually and are mainly used for making other compounds. One important use is for agricultural chemicals.

What is another important use for bromine?

A antiseptic agents

B bleaches for textiles and the paper industry

C flame-retardants and fire extinguishers

D water purification

[2009 M/J (14)]

27.

Which statement is most likely to be true for astatine, which is below iodine in Group VII of the Periodic Table?

A Astatine and aqueous potassium chloride react to form aqueous potassium astatide and chlorine.

B Potassium astatide and hot dilute sulfuric acid react to form white fumes of only hydrogen astatide.

C Silver astatide reacts with dilute aqueous ammonia in excess to form a solution of a soluble complex.

D Sodium astatide and hot concentrated sulfuric acid react to form astatine.

[2009 M/J (16)]

28.

Which properties in the sequence hydrogen chloride, hydrogen bromide and hydrogen iodide steadily increase?

1 thermal stability

2 bond length

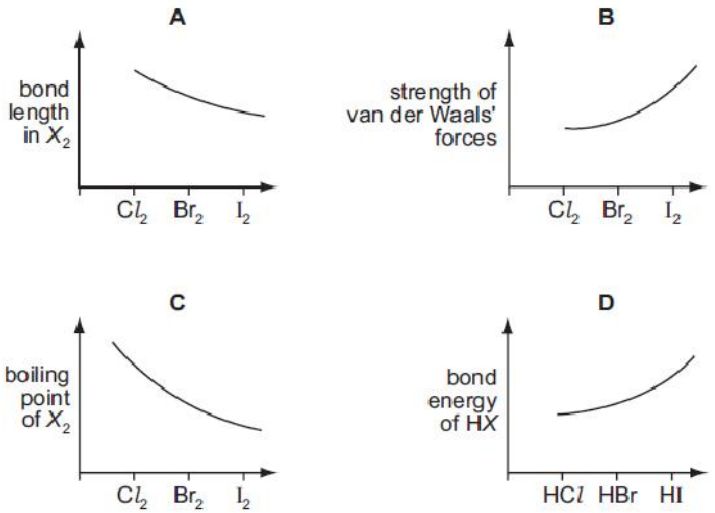
3 ease of oxidation

[2009 M/J (36)]

29.

Which graph correctly describes a trend found in the halogen group?

[*X* represents a halogen atom.]



[2009 O/N-11 (15)]

30.

Which statements about the reaction of solid sodium bromide with concentrated sulfuric acid are correct?

1 Hydrogen bromide is a product of the reaction.

2 Sulfuric acid is oxidised to sulfur dioxide.

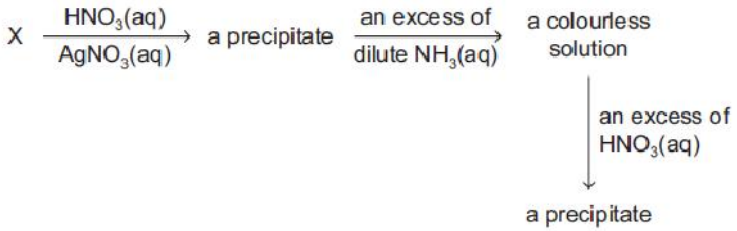
3 Bromide ions are reduced to bromine.

[2009 O/N-11 (36)]

31.

X is a salt of one of the halogens chlorine, bromine, iodine, or astatine (proton number 85).

The reaction scheme shows a series of reactions using a solution of X as the starting reagent.



What could X be?

A sodium chloride

B sodium bromide

C potassium iodide

D potassium astatide

[2010 M/J-11 (14)]

32.

Chile saltpetre, $NaNO_3$, contains sodium iodide as an impurity.

Aqueous silver nitrate is added to an aqueous solution of Chile saltpetre. Concentrated aqueous ammonia is then added.

Which observations are made?

	with acidified silver nitrate	with concentrated aqueous ammonia
A	no precipitate	no further reaction
B	no precipitate	precipitate forms
C	precipitate forms	precipitate dissolves
D	precipitate forms	precipitate remains

[2010 O/N-11 (16)]

33.
Which statement describes the halogens chlorine, bromine and iodine?

A Their bond energies decrease with increasing proton number.

B Their first ionisation energies increase with increasing proton number.

C They are all coloured gases at room temperature.

D They are all good reducing agents.

[2010 O/N-11 (17)]

34.
What happens when chlorine is bubbled through aqueous potassium iodide?

A Chlorine is oxidised to chlorate(V) ions.

B Chlorine is oxidised to chloride ions.

C Iodide ions are oxidised to iodine.

D There is no observable reaction.

[2010 O/N-12 (16)]

35.
Which statement about bromine is correct?

A Bromine is insoluble in non-polar solvents.

B Bromine vapour is more dense than air.

C Bromine will not vapourise significantly under normal conditions.

D Gaseous bromine is purple.

[2010 O/N-12 (18)]

36.
Concentrated sulfuric acid reacts with both solid sodium chloride at room temperature and with solid sodium iodide at room temperature.

Which row correctly describes how concentrated sulfuric acid behaves in each of these reactions?

	with sodium chloride	with sodium iodide
A	as an oxidising agent only	as an oxidising agent only
B	as a strong acid and as an oxidising agent	as a strong acid only
C	as a strong acid only	as a strong acid and as an oxidising agent
D	as a strong acid only	as a strong acid only

[2010 O/N-12 (19)]

37.
X, Y and Z represent different halogens. The table shows the results of nine experiments in which aqueous solutions of X_2, Y_2 and Z_2 were separately added to separate aqueous solutions containing X^-, Y^- and Z^- ions.

	$X^-(aq)$	$Y^-(aq)$	$Z^-(aq)$
$X_2(aq)$	no reaction	no reaction	no reaction
$Y_2(aq)$	X_2 formed	no reaction	Z_2 formed
$Z_2(aq)$	X_2 formed	no reaction	no reaction

Which row in the following table contains the ions X^-, Y^- and Z^- in order of their decreasing strength as reducing agents?

	strongest ⟶		weakest
A	X^-	Y^-	Z^-
B	X^-	Z^-	Y^-
C	Y^-	Z^-	X^-
D	Z^-	X^-	Y^-

[2011 M/J-11 (15)]

38.
A student observed the reactions when sodium chloride and sodium iodide were each reacted separately with concentrated sulfuric acid and with concentrated phosphoric acid. The observations are recorded in the table.

	sodium chloride	sodium iodide
conc. H_2SO_4	colourless acidic gas formed	purple vapour formed
conc. H_3PO_4	colourless acidic gas formed	colourless acidic gas formed

Which deduction can be made from these observations?

A Concentrated phosphoric acid is a stronger oxidising agent than concentrated sulfuric acid.

B Concentrated phosphoric acid is a stronger oxidising agent than iodine.

C Concentrated sulfuric acid is a stronger oxidising agent than chlorine.

D Concentrated sulfuric acid is a stronger oxidising agent than iodine.

[2011 M/J-11 (16)]

39.
Which statements are correct?

1 Aluminium chloride dissolves in water to give an acidic solution.

2 Magnesium chloride dissolves in water to give a slightly acidic solution.

3 Sodium chloride dissolves in water to give an alkaline solution.

[2011 M/J-11 (34)]

40.
Use of the Data Booklet is relevant to this question.

The element astatine lies below iodine in Group VII of the Periodic Table.

What will be the properties of astatine?

1 It forms diatomic molecules which dissociate more readily than chlorine molecules.

2 It reacts explosively with hydrogen.

3 It can oxidise iodide to iodine.

[2011 M/J-11 (36)]

41.
Why do the halogens become less volatile as Group VII is descended?

A The halogen-halogen bond energy decreases.

B The halogen-halogen bond length increases.

C The number of electrons in each molecule increases.

D The van der Waals' forces between molecules become weaker.

[2011 O/N-11 (17)]

42.
Which of the halide ions, chloride, bromide or iodide, acts as a reducing agent when its sodium salt reacts with concentrated sulfuric acid?

1 at least one of Cl^-, Br^- and I^-

2 at least two of Cl^-, Br^- and I^-

3 all three of Cl^-, Br^- and I^-

[2011 O/N-11 (35)]

43.
What trend is observed on descending Group VII?

A The colours of the elements become lighter.

B The elements become more volatile.

C The hydrides of the elements become more thermally stable.

D The reactions of the elements with hydrogen become less vigorous.

[2012 M/J-11 (17)]

44.

The following two experiments are carried out with anhydrous potassium chloride and observations X and Y are made at the end of each experiment.

Concentrated sulfuric acid is added to the potassium chloride and the fumes produced are bubbled into aqueous potassium iodide solution - observation X.

The potassium chloride is dissolved in aqueous ammonia and this is then added to aqueous silver nitrate - observation Y.

What are the observations X and Y?

	X	Y
A	brown solution	colourless solution
B	brown solution	white precipitate
C	colourless solution	colourless solution
D	colourless solution	white precipitate

[2012 M/J-11 (18)]

45.

Which statements are correct for all three halogens, chlorine, bromine and iodine?

1 They all form hydrides that are strong acids in aqueous solution.

2 They all react with aqueous sodium hydroxide to form oxo-anions.

3 They all require one more electron to fill the p orbitals of their outer shells.

[2012 M/J-11 (35)]

46.

Chlorine shows oxidation states ranging from –1 to +7 in its compounds.

What are the reagent(s) and conditions necessary for the oxidation of elemental chlorine into a compound containing chlorine in the +5 oxidation state?

A $AgNO_3(aq)$ followed by $NH_3(aq)$ at room temperature

B concentrated H_2SO_4 at room temperature

C cold dilute NaOH(aq)

D hot concentrated NaOH(aq)

[2012 M/J-12 (16)]

47.

Silver chloride dissolves in aqueous ammonia.

What happens in this process?

1 A co-ordinate bond is formed.

2 The oxidation number of nitrogen is unchanged.

3 Ammonia acts as a Brønsted-Lowry base.

[2012 M/J-12 (34)]

48.

Compared with the HC*l* molecule, the bond .....**X**..... of the HBr molecule is .....**Y**.....

Which pairs of words correctly complete the above sentence?

	X	Y
1	energy	less
2	polarity	less
3	length	greater

[2012 M/J-12 (35)]

49.

The element astatine, At, is below iodine in Group VII of the Periodic Table.

Which statements concerning At will be correct?

1 It is a dark-coloured solid at room temperature.

2 It is a more powerful oxidising agent than iodine.

3 Its hydride is thermally stable.

[2012 O/N-11 (34)]

50.
What happens when iodine solution is added to a solution of sodium bromide?

A A reaction occurs without changes in oxidation state.

B Bromide ions are oxidised, iodine atoms are reduced.

C Bromide ions are reduced, iodine atoms are oxidised.

D No reaction occurs.

[2013 M/J-11 (14)]

51.
Element 85, astatine, is in Group VII. Concentrated sulfuric acid is added to sodium astatide. The mixture of products includes astatine, hydrogen astatide, hydrogen sulfide, and sodium sulfate.

Which product is formed by the oxidation of one of the constituents of sodium astatide?

A astatine

B hydrogen astatide

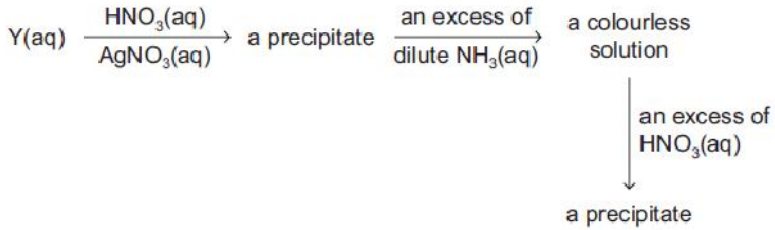
C hydrogen sulfide

D sodium sulfate

[2013 M/J-11 (15)]

52.
Y is a salt of one of the halogens chlorine, bromine, iodine, or astatine (element 85).

The reaction scheme shows a series of reactions using a solution of Y as the starting reagent.



What could Y be?

A sodium chloride

B sodium bromide

C potassium iodide

D potassium astatide

[2013 M/J-11 (17)]

53.
When a red-hot platinum wire is plunged into a test tube of hydrogen iodide, the gas is decomposed into its elements. If the experiment is repeated with hydrogen chloride, no change occurs.

Which factors contribute to this behaviour?

1 the strength of the hydrogen-halogen bond

2 the size of the halogen atom

3 the standard enthalpy of formation, $\Delta H_f^\ominus$, of each of the products of decomposition

[2013 M/J-11 (36)]

54.
Many modern cars are fitted with halogen lamps. When such lamps are first switched on, a distinct purple colour can be seen.

Which species is responsible for this purple colour?

A $I_2(s)$ **B** $I_2(l)$ **C** $I_2(g)$ **D** $I(g)$

[2013 M/J-12 (15)]

55.
What happens when bromine solution is added to a solution of sodium iodide?

A A reaction occurs without changes in oxidation state.

B Bromine atoms are oxidised, iodide ions are reduced.

C Bromine atoms are reduced, iodide ions are oxidised.

D No reaction occurs.

[2013 M/J-12 (18)]

56.
The halogens exist as diatomic molecules, X_2.

The boiling points of the Group VII elements increase as the group is descended from chlorine to iodine.

Which statement helps to explain this increase in boiling point as Group VII is descended?

A The electronegativity of X decreases as the group is descended.

B The number of electrons in each X_2 molecule increases as the group is descended.

C The size of the permanent dipole in the X_2 molecule increases as the group is descended.

D The X–X bond strength increases as the group is descended.

[2013 M/J-12 (19)]

57.
Which properties increase in the sequence hydrogen chloride, hydrogen bromide and hydrogen iodide?

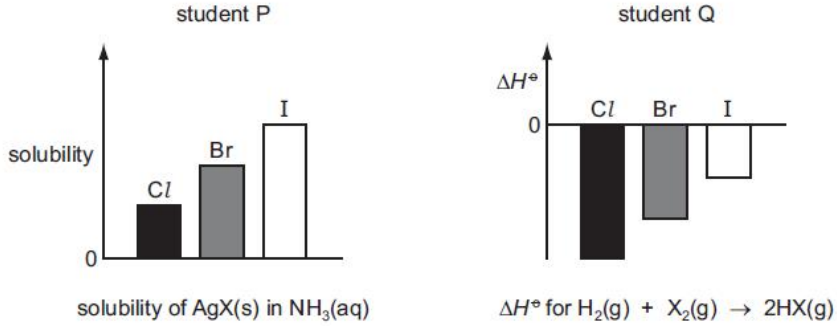
1 thermal stability

2 bond length

3 ease of oxidation

[2013 M/J-12 (35)]

58.
Two students, P and Q, were asked to draw bar charts to represent how some properties of the halogens and their compounds differ in magnitude. Their diagrams are shown.



solubility of AgX(s) in $NH_3(aq)$ $\Delta H^\ominus$ for $H_2(g) + X_2(g) \rightarrow 2HX(g)$

Which of the student's diagrams are correct?

A both P and Q

B P only

C Q only

D neither P nor Q

[2013 M/J-13 (14)]

59.
When iodine is heated, a vapour is produced.

Which row of the table correctly identifies the species in the vapour and its colour?

	species	colour
A	I(g)	brown
B	I(g)	purple
C	$I_2(g)$	brown
D	$I_2(g)$	purple

[2013 M/J-13 (15)]

60.
How do the strengths of the covalent bonds within molecules, and the van der Waals' forces between molecules, vary going down Group VII from chlorine to bromine to iodine?

	strength of covalent bonds	strength of van der Waals' forces
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

[2013 M/J-13 (16)]

61.
Solid potassium halides react with concentrated sulfuric acid, according to the following equations.

reaction 1 $2KCl + H_2SO_4 \rightarrow K_2SO_4 + 2HCl$

reaction 2 $2KBr + 2H_2SO_4 \rightarrow K_2SO_4 + SO_2 + Br_2 + 2H_2O$

reaction 3 $8KI + 5H_2SO_4 \rightarrow 4K_2SO_4 + H_2S + 4I_2 + 4H_2O$

What is the largest **change** in the oxidation number of sulfur in each of these reactions?

	reaction 1	reaction 2	reaction 3
A	0	0	4
B	0	2	4
C	0	2	8
D	0	4	8

[2013 O/N-11 (16)]

62.
Which statement explains the observation that magnesium hydroxide dissolves in aqueous ammonium chloride, but not in aqueous sodium chloride?

A The ionic radius of the NH_4^+ ion is similar to that of Mg^{2+} but not that of Na^+.

B NH_4Cl dissociates less fully than $NaCl$.

C The Na^+ and Mg^{2+} ions have the same number of electrons.

D The NH_4^+ ion can donate a proton.

[2013 O/N-11 (17)]

63.
Redox reactions occur very frequently in the chemistry of Group VII.

Which statement is correct?

A Chlorine will oxidise bromide ions but not iodide ions.

B Fluorine is the weakest oxidising agent out of F_2, Cl_2, Br_2 and I_2.

C Iodide ions are the weakest reducing agent out of F^-, Cl^-, Br^- and I^-.

D When chlorine reacts with water, chlorine is both oxidised and reduced.

[2014 M/J-11 (12)]

64.
A test-tube of HI gas and a test-tube of HBr gas are placed together in an environment at temperature, T.

Which combinations of observations are possible depending on the temperature, T?

1 A brown vapour appears in one of the test-tubes. No change is apparent in the other test-tube.

2 A brown vapour appears in one of the test-tubes. A purple vapour appears in the other test-tube.

3 No change is apparent in either test-tube.

[2014 M/J-11 (36)]

65.

When solid sodium iodide reacts with concentrated sulfuric acid, the products include $NaHSO_4$, H_2S, SO_2 and S.

In the formation of which product has the oxidation state of sulfur changed by a value of 8?

A H_2S **B** $NaHSO_4$ **C** S **D** SO_2

[2014 M/J-12 (17)]

66.

Use of the Data Booklet is relevant to this question.

In an experiment, 0.125 mol of chlorine gas, Cl_2, is reacted with an excess of cold aqueous sodium hydroxide. One of the products is a compound of sodium, oxygen, and chlorine.

Which mass of this product is formed?

A 9.31 g **B** 13.3 g **C** 18.6 g **D** 26.6 g

[2014 M/J-12 (19)]

67.

The intermolecular forces between iodine molecules are instantaneous dipole-induced dipole forces.

Which statements explain why iodine has these intermolecular forces?

1 An iodine molecule is polar and experiences an attraction from a lone pair of electrons on an adjacent molecule.

2 An iodine molecule has a fluctuating dipole because the electrons in a molecule are more mobile than the nuclei.

3 The electron charge cloud within an I_2 molecule may become unsymmetrical and may then attract other I_2 molecules.

[2014 M/J-13 (36)]

68.

Chlorine gas reacts with cold aqueous sodium hydroxide. It can also react with hot aqueous sodium hydroxide.

What are the oxidation numbers of chlorine in the products of these reactions?

	cold aqueous sodium hydroxide	hot aqueous sodium hydroxide
A	–1, +1	–1, +5
B	–1, +1	+1, +6
C	–1, +2	–1, +5
D	–1, +2	+1, +6

[2014 O/N-11 (16)]

69.

Under standard conditions, which statement is correct?

A $Cl^-(aq)$ can oxidise $Br_2(aq)$.

B $Cl^-(aq)$ can reduce $Br_2(aq)$.

C $Cl_2(aq)$ can oxidise $Br^-(aq)$.

D $Cl_2(aq)$ can reduce $Br^-(aq)$.

[2014 O/N-11 (17)]

70.

On being heated, hydrogen iodide breaks down more quickly than hydrogen chloride.

Which statements explain this faster rate?

1 The HI bond is weaker than the HCl bond.

2 The reaction of the breakdown of HI has a smaller activation energy than that of HCl.

3 The breakdown of HI is more exothermic than that of HCl.

[2014 O/N-11 (35)]

71.
A powder is known to be either a single sodium halide or a mixture of two sodium halides. A sample of the powder was dissolved in water. Aqueous silver nitrate was added, and a pale yellow precipitate was formed. When concentrated aqueous ammonia was added, the precipitate partly dissolved leaving a darker yellow precipitate.

What might the powder have consisted of?

A sodium bromide only

B sodium iodide only

C a mixture of sodium chloride and sodium bromide

D a mixture of sodium chloride and sodium iodide

[2014 O/N-13 (15)]

72.
In a solution that contains both Br_2 and Cl_2, a process takes place that produces BrO_3^- ions.

The process is represented by the following equations.

equation 1 $Br_2 + H_2O \rightarrow HBr + HBrO$

equation 2 $3HBrO + Cl_2 \rightarrow 2Cl^- + BrO_3^- + Br_2 + 3H^+$

Which statements about these reactions are correct?

1 Chlorine is reduced in equation 2.

2 Bromine is oxidised in both equation 1 and equation 2.

3 Bromine is reduced in both equation 1 and equation 2.

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73.
Compared with the HI molecule, the bond ……P…… of the HBr molecule is ……Q……

Which pairs of words correctly complete the above sentence?

	P	Q
1	energy	greater
2	length	less
3	polarity	greater

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