Q1.

Which involves the formation of a dative covalent bond?

A $PCl_3 + Cl_2 \rightarrow PCl_5$ ○

B $Na^+ + H^- \rightarrow NaH$ ○

C $Mg + Cl_2 \rightarrow MgCl_2$ ○

D $BH_3 + H^- \rightarrow BH_4^-$ ○

(Total 1 mark)

Q2.

Which element has the lowest melting point?

A Na ○

B Mg ○

C K ○

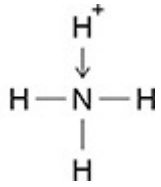
D Ca ○

(Total 1 mark)

Q3.

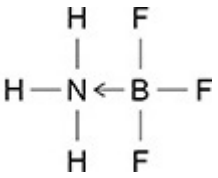
Which diagram shows the formation of a dative covalent bond?

A



○

B



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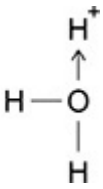
C



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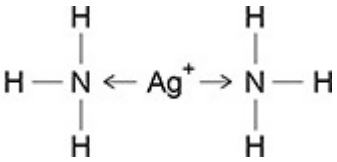
D



○

(Total 1 mark)

Q4.

Which substance does **not** have any bond angles of 120°?

A Benzene ○

B Boron trifluoride ○

C Cyclohexane ○

D Graphite ○

(Total 1 mark)

Q5.

Which molecule does **not** have a permanent dipole?

A NH_3 ○

B PCl_3 ○

C SCl_2 ○

D $SiCl_4$ ○

(Total 1 mark)

Q6.

Which molecule has a permanent dipole?

A NCl_3 ○

B CCl_4 ○

C PF_5 ○

D SF_6 ○

(Total 1 mark)

Q7.

Which molecule can accept an electron pair during the formation of a coordinate bond?

A NH_3 ○

B $AlCl_3$ ○

C SiH_4 ○

D PCl_3 ○

(Total 1 mark)

Q8.

Which reaction results in an overall change in shape around a carbon atom?

A oxidation of propanal with acidified potassium dichromate(VI) ○

B polymerisation of tetrafluoroethene ○

C reaction of bromoethane with an excess of concentrated ammonia ○

D reaction of methane with an excess of chlorine in ultraviolet radiation ○

(Total 1 mark)

Q9.

Which substance has significant electron delocalisation?

A graphite ○

B iodine ○

C sodium chloride ○

D tetrachloromethane ○

(Total 1 mark)

Q10.

What happens when water is vaporised?

A Covalent bonds break within molecules. ○

B Intermolecular forces are overcome. ○

C The enthalpy of the molecules decreases. ○

D The disorder of the molecules decreases. ○

(Total 1 mark)

Q11.

Which statement about the shapes of ions is **not** correct?

A $[CoCl_4]^{2-}$ is square planar. ○

B NH_4^+ is tetrahedral. ○

C $[Co(H_2NCH_2CH_2NH_2)_3]^{2+}$ is octahedral. ○

D $[Co(H_2O)_6]^{2+}$ is octahedral. ○

(Total 1 mark)

Q12.

The equation for a reaction is

$$AsH_3 + H^+ \rightarrow AsH_4^+$$

What type of interaction forms in this reaction?

A Co-ordinate bond ○

B Dipole–dipole force ○

C Hydrogen bond ○

D Ionic bond ○

(Total 1 mark)

Q13.

Which is **not** responsible for conducting electricity?

A The sodium ions in molten sodium chloride ○

B The electrons between layers of carbon atoms in graphite ○

C The bonding electrons in a metal ○

D The lone pair electrons in liquid water molecules ○

(Total 1 mark)

Q14.

Which reaction does **not** result in a change in the shape around a carbon atom?

A chloromethane with aqueous sodium hydroxide ⬭

B ethene with bromine ⬭

C propane with excess oxygen ⬭

D propan-1-ol with acidified potassium dichromate(VI) ⬭

(Total 1 mark)

Q15.

Which substance has **no** delocalised electrons?

A graphite ⬭

B methylbenzene ⬭

C poly(propene) ⬭

D sodium ⬭

(Total 1 mark)

Q16.

Which pair of reagents reacts to form a tetrahedral complex?

A $CoCl_2$(aq) and concentrated NH_3(aq) ⬭

B $CuSO_4$(aq) and concentrated NH_3(aq) ⬭

C $CuSO_4$(aq) and sodium ethanedioate(aq) ⬭

D $FeCl_3$(aq) and concentrated HCl(aq) ⬭

(Total 1 mark)