

Q1. Which of these species has a trigonal planar structure?

- A PH_3
- B BCl_3
- C H_3O^+
- D CH_3^-

(Total 1 mark)

Q2. Use your understanding of intermolecular forces to predict which of these compounds has the highest boiling point.

- A HF
- B HCl
- C HBr
- D HI

(Total 1 mark)

Q3. Which type of bond is formed between N and B when a molecule of NH_3 reacts with a molecule of BF_3 ?

- A Ionic.
- B Covalent.
- C Co-ordinate.
- D Van der Waals.

(Total 1 mark)

Q4. Which of these atoms has the highest electronegativity?

A Na

B Mg

C Cl

D Ar

(Total 1 mark)

Q5. Which of these substances does **not** show hydrogen bonding?

A HF

B NH₃

C CH₃COOH

D CHF₃

(Total 1 mark)

Q6. What is the formula of calcium nitrate(V)?

A CaNO₃

B Ca(NO₃)₂

C Ca₂NO₂

D Ca(NO₂)₂

(Total 1 mark)

Q7. Which of these substances has permanent dipole-dipole attractions between molecules?

A CCl_4

B C_2F_4

C $(\text{CH}_3)_2\text{CO}$

D CO_2

(Total 1 mark)

Q8. Which compound has the highest boiling point?

A C_2H_4

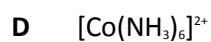
B C_2H_6

C CH_3NH_2

D CH_3F

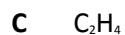
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Q9. In which one of the following species is the shape influenced by the presence of one or more lone pairs of electrons?



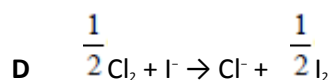
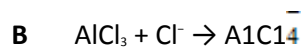
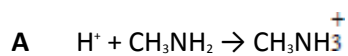
(Total 1 mark)

Q10. Which one of the following molecules is **not** planar?



(Total 1 mark)

Q11. Which one of the following reactions does **not** involve donation of an electron pair?



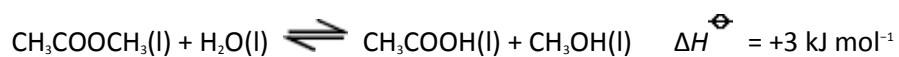
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Q12. Which one of the following statements is **not** correct?

- A** The first ionisation energy of iron is greater than its second ionisation energy.
- B** The magnitude of the lattice enthalpy of magnesium oxide is greater than that of barium oxide.
- C** The oxidation state of iron in $[\text{Fe}(\text{CN})_6]^{3-}$ is greater than the oxidation state of copper in $[\text{CuCl}_2]^-$.
- D** The boiling point of C_3H_8 is lower than that of $\text{CH}_3\text{CH}_2\text{OH}$.

(Total 1 mark)

Q13. The ester methyl ethanoate is hydrolysed as shown in the following equation.

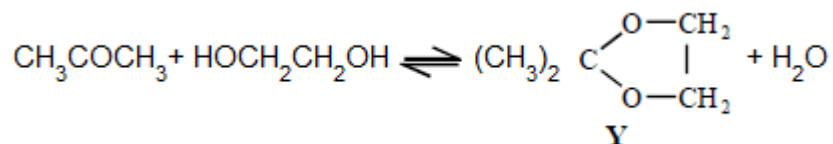


Which one of the following compounds from the reaction mixture has no hydrogen bonding between its molecules when pure?

- A** $\text{CH}_3\text{COOCH}_3(\text{l})$
- B** $\text{H}_2\text{O}(\text{l})$
- C** $\text{CH}_3\text{COOH}(\text{l})$
- D** $\text{CH}_3\text{OH}(\text{l})$

(Total 1 mark)

Q14. This question is about the reaction between propanone and an excess of ethane-1,2-diol, the equation for which is given below.



In a typical procedure, a mixture of 1.00 g of propanone, 5.00 g of ethane-1,2-diol and 0.100 g of benzenesulphonic acid, $\text{C}_6\text{H}_5\text{SO}_3\text{H}$, is heated under reflux in an inert solvent. Benzenesulphonic acid is a strong acid.

Which one of the following statements is **not** true?

- A Ethane-1,2-diol and water can form hydrogen bonds.
- B Ethane-1,2-diol is soluble in water.
- C Propane has a higher boiling point than ethane-1,2-diol.
- D Y and water are polar molecules.

(Total 1 mark)

Q15. Which one of the following ions has three lone pairs of electrons around the central atom?

- A BF_2^-
- B NH_2^-
- C ClF_2^-
- D PF_6^-

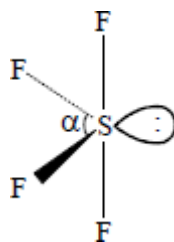
(Total 1 mark)

Q16. Which one of the following does **not** contain any delocalised electrons?

- A poly(propene)
- B benzene
- C graphite
- D sodium

(Total 1 mark)

Q17. Which one of the following is the most likely value for the bond angle α shown in the diagram of SF_4 below?



- A 118°
- B 101°
- C 90°
- D 88°

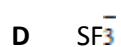
(Total 1 mark)

Q18. Predict which one of the following has the highest boiling temperature.

- A $\text{CH}_3\text{COOCH}_2\text{CH}_3$
- B $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$
- C $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$
- D $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$

(Total 1 mark)

Q19. Which one of the following molecules or ions is pyramidal in shape?



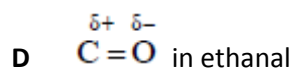
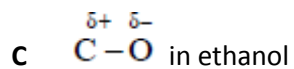
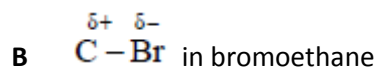
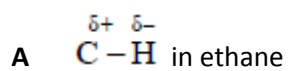
(Total 1 mark)

Q20. Which one of the following has a shape which is **not** influenced by a lone pair of electrons?



(Total 1 mark)

Q21. Which one of the following bond polarities is **not** correct?



(Total 1 mark)