

Name of the Student: _____

Max. Marks : 15 Marks

Time : 15 Minutes

Q1.

Which row contains two species with different numbers of electrons?

A NH_3 and HF

☐

B CO_3^{2-} and NO_3^-

☐

C H_3O^+ and HF_2^+

☐

D CH_4 and NH_2^-

☐

(Total 1 mark)

Q2.

What is the formula of ammonium ethanedioate?

A $\text{NH}_4(\text{C}_2\text{O}_4)_2$

☐

B $(\text{NH}_4)_2\text{C}_2\text{O}_4$

☐

C $\text{NH}_4\text{C}_2\text{O}_4$

☐

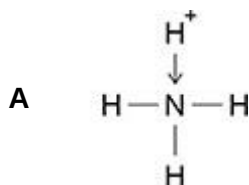
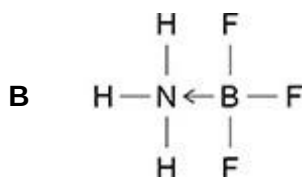
D $(\text{NH}_4)_2(\text{C}_2\text{O}_4)_3$

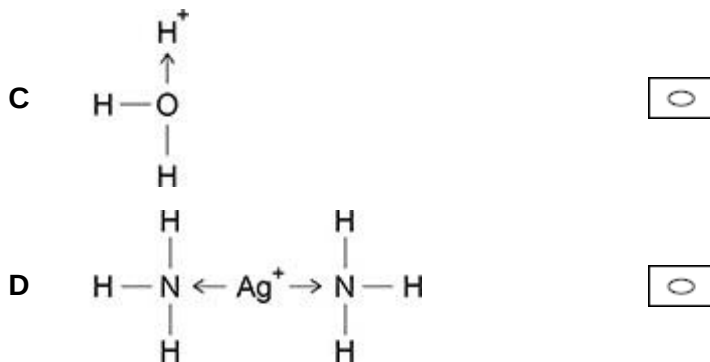
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(Total 1 mark)

Q3.

Which diagram shows the formation of a dative covalent bond?


☐

☐



(Total 1 mark)

Q4.

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

- A NH_3 ☐
- B PCl_3 ☐
- C SCl_2 ☐
- D SiCl_4 ☐

(Total 1 mark)

Q5.

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

- A Benzene ☐
- B Boron trifluoride ☐
- C Cyclohexane ☐
- D Graphite ☐

(Total 1 mark)

Q6.

Which compound forms the greatest number of hydrogen bonds per molecule in the liquid state?

- A $\text{CH}_3\text{CH}_2\text{COOH}$ ☐
- B $\text{CH}_3\text{CH}_2\text{OCH}_3$ ☐
- C $\text{CH}_3\text{CH}_2\text{CHO}$ ☐
- D $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ ☐

(Total 1 mark)

Q7.

Which statement correctly describes a trend down Group 7 from Cl to I?

X represents Cl, Br or I

- A** The boiling point of HX increases.
- B** The bond dissociation energy of H–X increases.
- C** The standard electrode potential value for $X_2(aq) + 2 e^- \rightarrow 2 X^-(aq)$ becomes more positive.
- D** The solubility of AgX in ammonia increases.

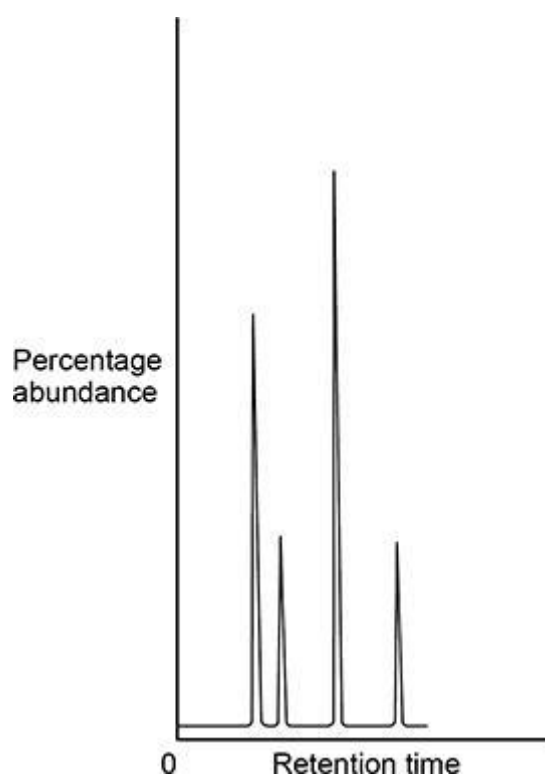
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(Total 1 mark)

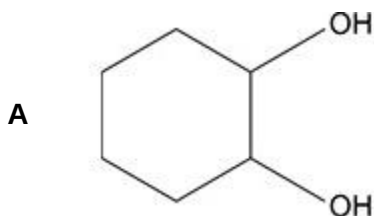
Q8.

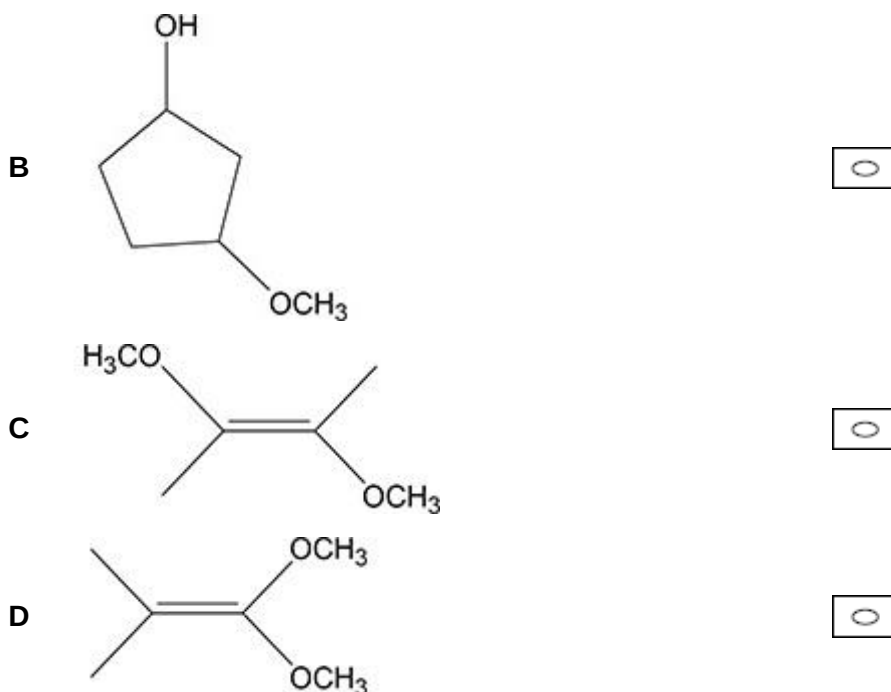
The diagram below shows a gas chromatogram for a sample containing four isomers with the molecular formula $C_6H_{12}O_2$

The carrier gas is nitrogen and the stationary phase is polar.



Which of the four isomers in this sample is the most abundant?

☐



(Total 1 mark)

Q9.

What is the relative molecular mass (M_r) of benzene-1,4-dicarboxylic acid?

- A** 164.0 ☐
- B** 166.0 ☐
- C** 168.0 ☐
- D** 170.0 ☐

(Total 1 mark)

Q10.

Which substance has significant electron delocalisation?

- A** graphite ☐
- B** iodine ☐
- C** sodium chloride ☐
- D** tetrachloromethane ☐

(Total 1 mark)

Q11.

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)

Q12.

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

A $[\text{CoCl}_4]^{2-}$ is square planar.

☐

B NH_4^+ is tetrahedral.

☐

C $[\text{Co}(\text{H}_2\text{NCH}_2\text{CH}_2\text{NH}_2)_3]^{2+}$ is octahedral.

☐

D $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$ is octahedral.

☐

(Total 1 mark)

Q13.

Which pair of reagents reacts to form a tetrahedral complex?

A $\text{CoCl}_2(\text{aq})$ and concentrated $\text{NH}_3(\text{aq})$

☐

B $\text{CuSO}_4(\text{aq})$ and concentrated $\text{NH}_3(\text{aq})$

☐

C $\text{CuSO}_4(\text{aq})$ and sodium ethanedioate(aq)

☐

D $\text{FeCl}_3(\text{aq})$ and concentrated $\text{HCl}(\text{aq})$

☐

(Total 1 mark)

Q14.

Which substance has **no** delocalised electrons?

A graphite

☐

B methylbenzene

☐

C poly(propene)

☐

D sodium

☐

(Total 1 mark)

Q15.

Which species has a lone pair of electrons on the central atom?

A CO_2

☐

B SO_2

☐

C PCl_6^-

☐

D SO_4^{2-}



(Total 1 mark)