

Q1.Which molecule is **not** able to form a co-ordinate bond with another species?

- A BH_3
- B CH_4
- C NH_3
- D H_2O

(Total 1 mark)**Q2.**

Which species has a square planar shape?

- A NH_4^+
- B SF_4
- C XeF_4
- D PCl_4^+

(Total 1 mark)**Q3.**

Which bond has the most unsymmetrical electron distribution?

- A H–O
- B H–S
- C H–N
- D H–P

(Total 1 mark)

Q4.Which statement about inorganic ionic compounds is **always** correct?

- A They dissolve in water to give neutral solutions.
- B They release energy when they melt.
- C They contain metal cations.
- D They form giant structures.

(Total 1 mark)**Q5.**

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

- A CO₂
- B SO₂
- C PCl₆⁻
- D SO₄²⁻

(Total 1 mark)**Q6.**

In which substance do covalent bonds break when it melts?

- A hexane
- B ice
- C iodine
- D silicon dioxide

(Total 1 mark)

Q7.

In which molecule are all the atoms in the same plane?

- A CH_3CHO
- B CH_3NH_2
- C $\text{C}_6\text{H}_5\text{Cl}$
- D $\text{C}_6\text{H}_5\text{CH}_3$

(Total 1 mark)**Q8.**

Which molecule has a permanent dipole?

- A BF_3
- B NH_3
- C SiCl_4
- D SO_3

(Total 1 mark)**Q9.**

Which substance contains delocalised electrons?

- A cyclohexane
- B graphite
- C iodine
- D sodium chloride

(Total 1 mark)

Q10.

Which species contains bonds that have different polarities?

- A NH_4^+
- B CCl_4
- C CH_3Cl
- D H_3O^+

(Total 1 mark)

Q11.

Which compound has hydrogen bonding?

- A NaH
- B NH_3
- C HI
- D SiH_4

(Total 1 mark)

Q12.

Which compound contains a co-ordinate bond?

- A HF
- B NH_3
- C CHCl_3
- D NH_4Cl

(Total 1 mark)

Q13.

Which molecule has a permanent dipole?

- A CF_4
- B PCl_5
- C CO_2
- D Cl_2O

(Total 1 mark)

Q14.

Which has a bond angle of 109.5° ?

- A C (diamond)
- B C (graphite)
- C NH_2^-
- D NH_3

(Total 1 mark)

Q15.

Which substance has delocalised electrons?

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

(Total 1 mark)

Q16.

Which species is **not** pyramidal in shape?

- A PF_3
- B H_3O^+
- C CH_3^-
- D BF_3

(Total 1 mark)

Q17.

Which change occurs when water is vaporised?

- A An exothermic change occurs.
- B Covalent bonds are broken.
- C Intermolecular forces are overcome.
- D The total energy of the molecules decreases.

(Total 1 mark)

Q18.

Which compound has the highest boiling point?

- A $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$
- B $\text{CH}_3\text{CH}_2\text{CH}_2\text{F}$
- C $\text{CH}_3\text{CH}_2\text{CHO}$
- D $\text{CH}_3\text{CH}_2\text{COOH}$

(Total 1 mark)

Q19.

Which is **not** responsible for conduction of 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 on water molecules

(Total 1 mark)

Q20.

Which row shows the bonding in ammonium chloride?

	Covalent	Dative covalent	Ionic	
A	✓	X	X	<input type="checkbox"/>
B	✓	✓	X	<input type="checkbox"/>
C	✓	✓	✓	<input type="checkbox"/>
D	X	X	✓	<input type="checkbox"/>

(Total 1 mark)

Q21.

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

- A CH_3Br
- B CH_2Br_2
- C CHBr_3
- D CBr_4

(Total 1 mark)

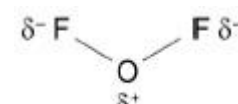
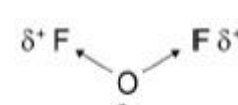
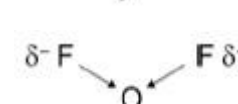
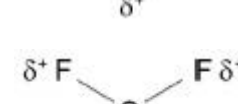
Q22.

Which compound has the highest boiling point?

- A butanal
- B butan-2-ol
- C but-2-ene
- D 1-fluorobutane

(Total 1 mark)**Q23.**

Which diagram shows the correct bonding and correct bond polarity in a molecule of oxygen difluoride?

- A 
- B 
- C 
- D 

(Total 1 mark)**Q24.**

Which species has a shape that is influenced by the presence of one or more lone pairs of electrons around the central atom?

- A AlCl_3
- B ClF_3
- C IF_6^+
- D PCl_6^-

(Total 1 mark)

Q25.

Which is the correct crystal structure for the substance named?

	Substance	Structure	
A	Iodine	Simple molecular	<input type="checkbox"/>
B	Diamond	Ionic	<input type="checkbox"/>
C	Sodium chloride	Giant covalent	<input type="checkbox"/>
D	Graphite	Metallic	<input type="checkbox"/>

(Total 1 mark)

Q26.

Which species has one or more bond angle(s) of 90° ?

- A CH_4
- B NH_4^+
- C ClF_4^-
- D AlCl_4^-

(Total 1 mark)

Q27.

Which is the most likely bond angle around the oxygen atom in ethanol?

- A 104.5°
- B 109.5°
- C 120°
- D 180°

(Total 1 mark)

Q28.

Which compound has the highest boiling point?

- A $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
- B $\text{CH}_3\text{CH}_2\text{CHO}$
- C CH_3COCH_3
- D $\text{CH}_3\text{COOCH}_3$

(Total 1 mark)

Q29.

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

- A CH_3Cl
- B CHCl_3
- C CF_4
- D CHCl_2F

(Total 1 mark)

Q30.

Which of these species is **not** planar?

- A HCHO
- B CH_3^+
- C CH_3OH
- D C_2H_4

(Total 1 mark)

Q31.

Which of these statements best describes a dative covalent bond?

- A** A pair of electrons shared between two atoms where each atom has donated one electron.
- B** A pair of electrons shared between two atoms where one atom has donated two electrons.
- C** Two pairs of electrons shared between two atoms where each atom has donated one electron.
- D** Two pairs of electrons shared between two atoms where each atom has donated two electrons.

(Total 1 mark)

Q32.

Which molecule is the least polar?

- A** Bromomethane
- B** Dibromomethane
- C** Tribromomethane
- D** Tetrabromomethane

(Total 1 mark)

Q33.

Which statement about intermolecular forces is **not** correct?

- A** Intermolecular forces exist between all simple molecules.
- B** Hydrogen bonding occurs between HBr molecules.
- C** Hydrogen bonding is the strongest intermolecular force in liquid ethanol.
- D** Hydrogen bonds occur between C=O and H-N in proteins.

(Total 1 mark)

Q34.

Which of these species has a trigonal planar structure?

A PH_3

B BCl_3

C H_3O^+

D CH_3^-

(Total 1 mark)

Q35.

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)

Q36.

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)

Q37.

Which of these atoms has the highest electronegativity?

A Na B Mg C Cl D Ar **(Total 1 mark)****Q38.**

What is the formula of calcium nitrate(V)?

A CaNO_3 B $\text{Ca}(\text{NO}_3)_2$ C Ca_2NO_2 D $\text{Ca}(\text{NO}_2)_2$ **(Total 1 mark)****Q39.**Which of these substances does **not** show hydrogen bonding?A HF B NH_3 C CH_3COOH D CHF_3 **(Total 1 mark)**

Q40.

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)