

Practice/States of Matter-IM Forces and Properties

DO NOT SUBMIT

Use the following intermolecular forces to answer the following questions.

- A) London forces
- B) Dipole-dipole interactions
- C) Hydrogen bonding
- D) Ion-dipole interactions
- E) Ionic forces

1) Determine the intermolecular force in the following molecules.

CH₃OH

H-
(C)

SO₃

London
(A)

CH₃CH₂CH₂CH₃

London
(A)

NO₂

dipole
(B)

Ar

London
(A)

2) Circle the compound in the pairs given that has a higher boiling point? Which intermolecular force is responsible for the higher value?

CO ₂ or (OCS) (B) Dipole	(SeO ₂ or SO ₂) (A) London.	CH ₃ CH ₃ or (H ₂ CO) (B) Dipole.
(CH ₃ CH ₂ OH or CH ₃ OCH ₃) (C) H-	(NaCl or H ₂ O) (E) ionic	Ne or (Kr) (A) London.

3) Arrange the following in increasing melting point.

H₂O, NH₃, CH₄, LiOH

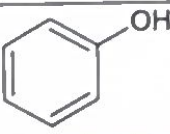
CH₄ < NH₃ < H₂O < LiOH.

4) For the compounds in the table choose the solvent it will be soluble in the solvents given below. Give the major intermolecular force responsible for the solubility.

Methanol: CH₃OH

Water: H₂O

Hexane: CH₃CH₂CH₂CH₂CH₂CH₃

Substance	Solvent	Intermolecular force
CO ₂	hexane	A
	methanol	C
CH ₃ CH ₂ OCH ₂ CH ₃	hexane.	A

- 5) Circle the compound in the following pairs that has a higher surface tension? Give the intermolecular force responsible.

CO ₂ or <u>OCS</u>	<u>SeO₂</u> or SO ₂	CH ₃ CH ₃ or <u>H₂CO</u>	<u>CH₃CH₂OH</u> or CH ₃ OCH ₃
B	A	B	C

- 6) Which of the following molecules in the pairs will have more cohesion (rather than adhesion)?

CO ₂ or <u>OCS</u>	<u>SeO₂</u> or SO ₂	CH ₃ CH ₃ or <u>H₂CO</u>	<u>CH₃CH₂OH</u> or CH ₃ OCH ₃

- 7) Classify the following molecules as molecular, ionic or metallic solids.

SO₂I₂

KCl

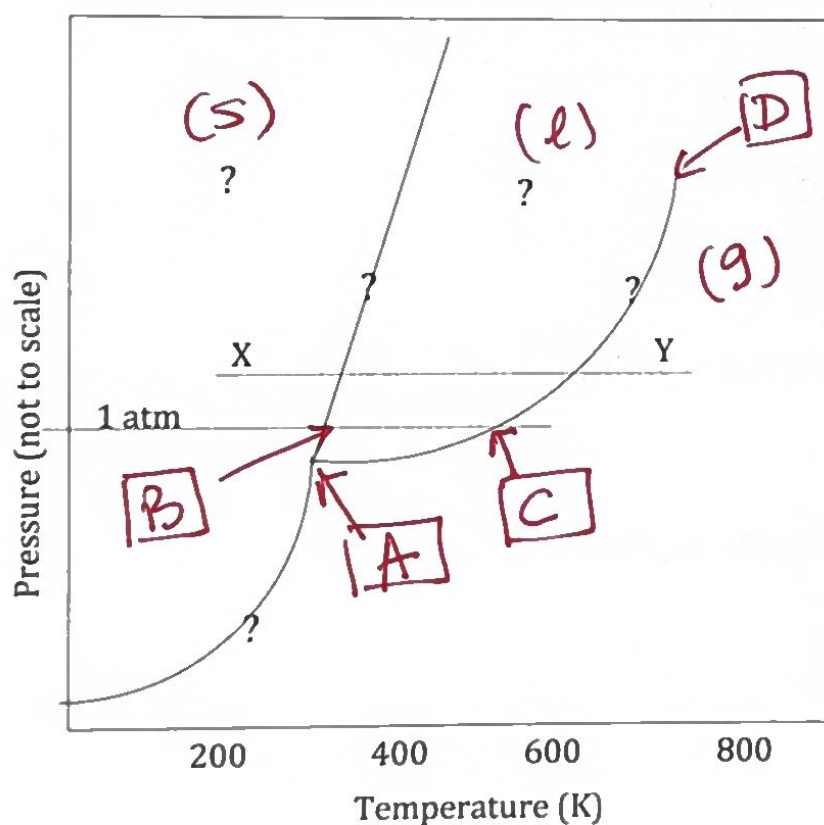
Mg

C₁₀H₂₄

molecular molecular ionic metallic molecular

- 8) The figure below is a phase diagram for iodine.

- Indicate the phases present in the portions of the diagrams marked (?);
- Use the letters A, B, C and D to represent the triple point, the normal melting point, the normal boiling point, and the critical point, respectively.
- Describe the phase changes that occur as the temperature of a sample is raised, at constant pressure, from point X to point Y.



X → Y
s → l → g