

KARACHI EDU COACHING CENTER

Chapter 5: Physical States of Matter

High-Detail Masterclass Notes for Class IX Chemistry (STBB)

States of Matter & Kinetic Molecular Theory

Fundamental overview of matter states and intermolecular forces in Karachi Edu curriculum.



Gaseous State

High kinetic energy and negligible intermolecular forces.



Liquid State

Fixed volume with moderate intermolecular attractions.



Solid State

Rigid structure with strong forces and vibrational motion.

Gaseous Behavior: Diffusion & Effusion

Core transport phenomena of gas molecules through media and small apertures.

Diffusion

Higher to lower concentration mixing.

Spontaneous random movement forming homogenous mixtures like perfume vapor in air.

Effusion

Escaping through a tiny pinhole.

Rate depends strictly on molecular mass; lighter gases effuse faster (e.g., helium balloons).

Pressure and Measurement Units

Mathematical expression and standard conversions for gas pressure.

FORMULA

$$P = F / A$$

Force exerted by gaseous particles per unit area (Nm^{-2} or Pascal).

Standard Atmosphere (atm)

1 atm: 760 mm of Hg at sea level

1 atm: 760 torr

1 atm: 101,325 Pascals (Pa)

Properties of Liquids

Examining evaporation, vapor pressure, boiling point, and freezing point.

Evaporation

Surface phenomenon occurring at all temperatures, causing cooling.

Vapor Pressure

Dynamic equilibrium pressure exerted by vapor above liquid.

Boiling Point

Temperature where vapor pressure equals external atmospheric pressure.

Solid State and Allotropy

Amorphous vs. crystalline solids and the phenomenon of allotropy.

Crystalline Solids

Definite geometric arrangement with sharp melting points (e.g., NaCl, diamond).

Allotropy

Existence of an element in more than one physical form in the same state (e.g., carbon as diamond, graphite).

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Chapter 5 Mastered Successfully

Review physical states, practice numerical problems, and excel
in your board examinations!

Prepared by Karachi Edu Academic Team