States of Matter

Q-1) Kinetic molecular theory? (KMT)

>

① The volume occupied by the gas molecules is negligible.
↳ distance between the molecules is much greater than the diameter of the molecules.

② No intermolecular forces exist between the gas molecules/atoms.
↳ no attractive & repulsive forces.

③ Gas molecules are in a state of continuous and random motion.
↳ Brownian motion.

④ The collisions between the gas molecules are ~~completely~~ perfectly elastic
↳ no energy is lost : (KE conserved)

⑤ Average energy of the gas particles depends on the temperature of the gas.

* Ideal gas : obeys KMT
↳ approaches ideal behaviour at low pressure & high temperature.

* Real gas : doesn't obey KMT
↳ approaches ideal behaviour at ~~high~~ low pressure & ~~low~~ high temperature.

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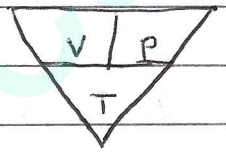
Q-2) Gas laws.

> Boyles law (temperature constant)

PV = constant



> Charles law (pressure constant)

$\frac{V}{T}$ = constant.

> Avogadro's constant

1mol = 6.02×10^{23} particles.

1 mol = 22.4 litres

> Ideal gas law

$pV = nRT$

P = pressure (Pa)

V = volume (m^3)

R = gas constant -> $8.314\ J\ K^{-1} mol^{-1}$

T = temperature (K)

Celsius $\xrightarrow{+273}$ Kelvin

Q-3) Solid, liquid & gas state.

ke ↑, intermolecular forces ↓

solid ⇌ liquid ⇌ gases.

ke ↓, intermolecular forces ↑

Pressure exerted by a vapour, in equilibrium with its liquid is called vapour pressure.

Q-4) Structures.

① Giant ionic lattice.

- NaCl
- MgO.

* hard, high MP & BP ; strong forces of attraction between

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+ve and -ve ions.

* brittle ; repulsion between ions at a point.
* soluble
* conduct electricity when molten.

② Giant metallic.
- D block in periodic table & group I & II.

* High mp & BP ; +ve ions & sea of e^-
* malleable

③ Simple molecular
- H_2, Cl_2
- CO_2
- H_2O

* weak mp & BP ; VVF.

④ Giant molecular.
- SiO_2
- graphite, diamond. → different structures of the same element are called allotropes. (carbon).

* covalent bonding.

⑤ Simple atomic
- All inert gases
  ↳ He, Ar, ...

Q-4) What are ceramics?

A ceramic is an in-organic non-metallic solid which is prepared by heating a substance or a mixture of substances to a high temperature.

→ giant molecular structure.
↳ covalent bonds

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* high MP & BP → covalent bonds
* doesn't conduct electricity or heat → no free e⁻ or ions.
* hard ↳
* chemically unreactive → no free e⁻.

Uses

Ceramics

MgO	Al_2O_3	SiO_2
refractory lining	refractory lining	refractory lining
electrical insulators	electrical insulators	–
fire-resistant wall boards	hip joint replacement	used to make glass
	abrasive to grind hard materials	abrasive ↳ eg. sandpaper

Q-5) Why recycle materials?

- saves energy
- conserves supplies of the ore
- less waste in landfills
- cheaper than extracting ore and its purification
- saves transportation costs

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