Miscellaneous concepts used in Gaseous State:

- Analysis of a reaction involving gaseous
  A(g) + B(g) → C(g)

What happens to pressure as reaction proceeds (in a closed container)

- Vapour density and degree of dissociation \( \alpha = \frac{D - d}{(n - 1)d} \)

- Payload / lifting power [based on Buoyancy]
  Payload = wt of air displaced (\( M_{air} \) g) – wt of balloon (\( m_o \) g) – wt of gas (\( m_{gas} \) g)
  \( V = \text{Volume of balloon} \)
  \( d = \text{density of outside gas} \)
  \( d = \text{density of gas in the balloon} \)
  \( M = \text{Mass of balloon} \)

- Types of vessels
  (A) Open vessel
  (B) closed vessel
  - Bubble type
  - Cylinder type (rigid)
  - Piston type (non-rigid)

(a) Bursting of containers: two concepts used depending upon type of container.

(i) Bubble type (very thin skin) cannot tolerate difference in pressure on the skin
  outside pressure = inside pressure
  Any change in these causes change in volume & the container bursts at maximum stretching.

(ii) Cylinder type (thick skin) can withstand pressure difference till a limit but cannot have volume change.
  Any change causes change in pressure when it exceeds the limits the container burst.

(b) Connecting containers having gases

On removal of nozzle the gas from higher pressure will travel so as to have equal pressure at both the containers...
from idea of total moles & final temperature each parameter can be calculated.

(c) Changes in Open vessel: Pressure of gas remains constant & so is the volume.
  \( n_1 T_1 = n_2 T_2 \)

(e) Changes in closed vessel: \( \frac{P_1}{n_1 T_1} = \frac{P_2}{n_2 T_2} \)

Kinetic theory of gases:

\( P V = \frac{1}{3} m N \ u^2 = \frac{1}{3} M \ u^2 \) (For 1 mole)

Types of speeds:

\( u^2 = u_1^2 + u_2^2 + \ldots + u_N^2 \frac{1}{N} \)

\( u = \text{root mean square speed} \)