

## B.Sc Part-II, Paper-III (A)

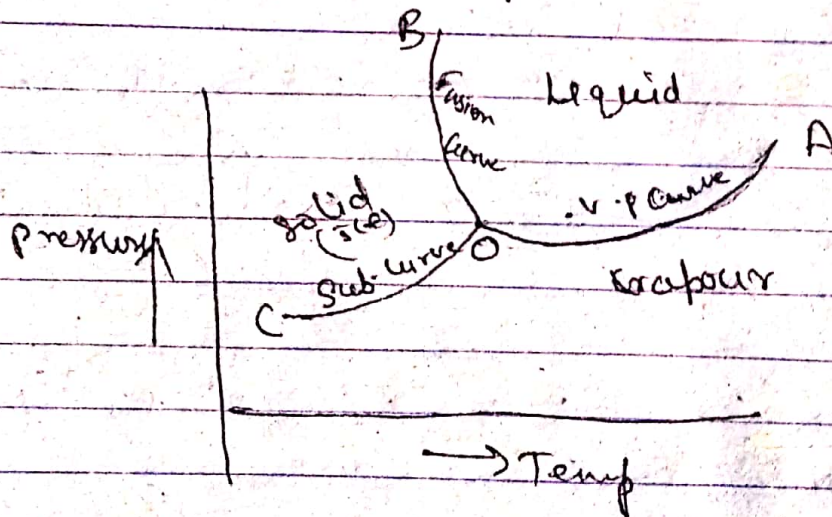
Water system →

The water is three-phase, one component system. The three phases are solid-liquid ice, liquid water & water vapour.

Therefore maximum degree of freedom for water system is 2

$$f = C - P + 2 = 1 - 1 + 2 = 2$$

hence the phase diagram of water system is represented by using only two variables viz, temp & pressure.



1)

The phase diagram of water has three curves

OA → vapour pressure curve

OB → Fusion curve

OC → Sublimation curve

Along curve OA, water & vapour phases coexist in equilibrium.

Along curve OB ice & water phases coexist in equilibrium.

Along curve OC ice & vapour phases coexist in equilibrium.

Along the curve OA, OB & OC, there are two phases in equilibrium and one component.



Hence from phase rule

$$F = C - P + 2 \\ = 1 - 2 + 2 = 1.$$

Therefore the system along line OA, OB, & OC is monovariant.

(ii) The point O is the triple point where all three phases coexist in equilibrium.

~~Since~~ there are three phases & one component hence ~~from~~ from phase rule

$$F = C - P + 2 = 1 - 3 + 2 = 0$$

Therefore the system at the triple point is non-variant.

(iii) The Phase diagram of water has three areas AOC, BOC & AOB

Area AOC represents conditions for the one phase system ~~water~~ <sup>H<sub>2</sub>O</sup> Vapour

Area BOC represents condition for the one phase system ice

Area AOB represents condition for the one phase system liq. water

In all these areas, there is only one phase & one component.

Hence from phase rule

$$F = C - P + 2 = 1 - 1 + 2 = 2$$

Therefore the system along these areas are divariant or bivalent.