Que.3

In the given figure Line I have only one point of intersection with the cubic equation of state. In same way, Line III also have only one point of intersection with cubic equation of state. Cubic equations of state have 3 volume roots. Physically meaningful values are always real, positive and greater than constant b. Now,

T<Tc:

For isotherms at T<Tc, the equation may exhibit one or three real roots,depending on the pressure.Although these roots are real and positive,They are not physically stable states for the portion of an isotherm lying between sat.liquid and sat. vapour(under the “dome”) Only for the vapour or sat.P are the roots,Vsat(liq) and Vsat(vap) stable states,lying at the ends of the horizontal portion of the true isotherm.

Line I: Corresponds to the “liquid-like” since volume is low and P is high.

Line III: Corresponds to the “Gas-like” since volume is high and also the pressure is low.

Line II: maybe mixture of both liquid and gas. And do not have physical significance.