Marks 4

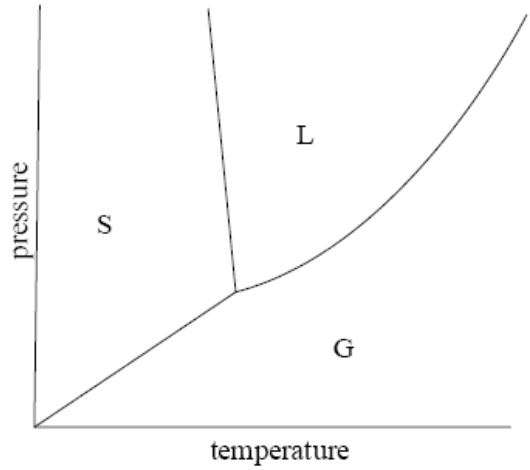
- A lecture demonstration showed that a wire with a weight attached can cut through a block of ice (solid water) without the block falling apart. Explain that phenomenon.

Liquid water is more dense than solid water (ice). When pressure is applied to the ice by the wire, it melts and gravity pulls the wire downwards through the liquid water.

Once the pressure is removed the water refreezes above the wire. The speeds of the two processes are such that the wire slowly cuts through the block without the block falling apart.

Sketch the phase diagram of water and explain how the above phenomenon manifests itself in the phase diagram.

The phase diagram with S = solid, L = liquid and G = gas is shown below:



The negative slope of the S/L equilibrium line means that, increasing the pressure with S ⇆ L moves the system into the liquid region.