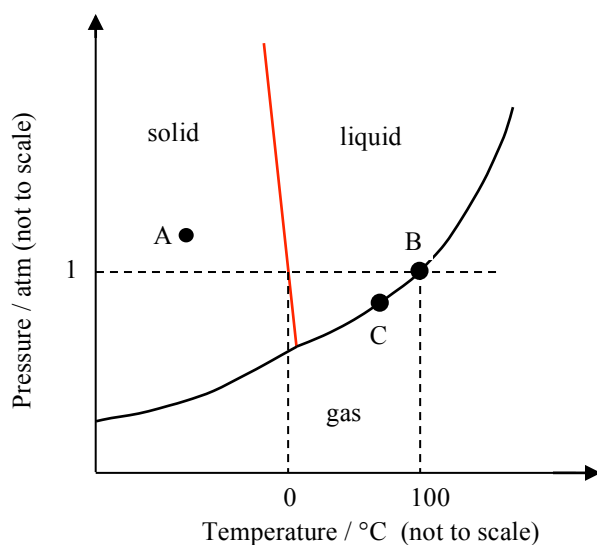


- Consider the pressure/temperature phase diagram of H<sub>2</sub>O shown below.

Marks  
6



Which phase exists at the point labelled A?

**Solid**

What are the temperature and pressure for the normal boiling point of water?

**Temperature = 100 °C or 373 K. Pressure = 1 atm. This is labelled as point B.**

Use the phase diagram to explain why it takes longer to hard boil eggs on the top of a 4000 m high mountain rather than at sea level.

**The pressure at 4000 m is considerably lower than at sea level. At lower pressure, the water boils at the temperature corresponding to the new position on the liquid – gas line in the phase diagram, represented as point C.**

**The boiling point at lower pressure is lower: water boils at a lower temperature on the mountain. It is not possible to heat the water above this temperature, as it boils away. Because the water used to cook the egg is at a lower temperature, it takes longer to cook it.**

Use the phase diagram to explain why ice cubes float in water.

**The equilibrium **line** between solid and liquid slopes slightly to the left. Increasing the pressure lowers the melting point: the liquid phase is favoured over the solid phase by increasing pressure.**

**This behaviour results from the solid occupying more volume than the liquid. If the pressure increases, the system responds by favouring the liquid as it takes up less space.**

**The solid has a lower density than the liquid form.**