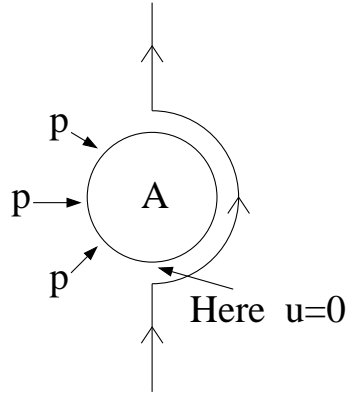**Question**

Use Bernouilli's law to explain why a ping-pong ball can be supported by an upward jet of air.

Answer

Here u=0

Bernoulli's law along the particle path shown gives $p + \frac{1}{2}\rho u^2 = p_A$, (RHS because evaluating at A) where u is the speed of flow.

Therefore $p = p_A - \frac{1}{2}\rho u^2$ (*).

As the fluid moves away from A its speed (u) increases and hence from (*) p decreases. Thus the pressure is greater on the lower half of the ping-pong ball than the upper half. Pressure acts normally on the ping-pong ball and so there is a net upward pressure force that can oppose downward gravity. As a consequence of pressure acting normally there are net opposing lateral condition on each side that ensures the ball is 'trapped'.