1 **(a)** Explain the origin of upthrust acting on a body in a fluid.

……

……

……

……[2]

(b) An object has a mass of 300 kg and a volume of 0.15 m^3. The object rests at the bottom of a lake 20 m deep.

To lift the object to the surface, a lifting balloon is tied to it and pumped with air. The lifting balloon has a mass of 5.2 kg. In order to lift the object up with an initial acceleration of 2.0 m s^{-2}, the lifting balloon is pumped up to a volume V_o. Density of lake water is 1000 kg m^{-3}.

(i) Calculate the volume V_o required.

V_o = …….. m^3 [2]

(ii) As the object accelerates upwards, state and explain:

1. one factor which can cause its acceleration to decrease continuously,

……

……

……[2]

2. one factor which can cause its acceleration to increase continuously.

……

……

……[2]