

- 1 (a) Derive, from the definitions of pressure and density, the equation $p = h\rho g$ where p is the pressure of fluid, h is the height of fluid and ρ is the density of fluid.

[2]

- (b) An empty rubber balloon of mass 2.9 g and is filled with helium gas to form a sphere of radius of 15 cm. It is being held by a string attached to a load as shown in Fig. 1.1. The densities of air and helium are 1.2 kg m^{-3} and 0.18 kg m^{-3} respectively.

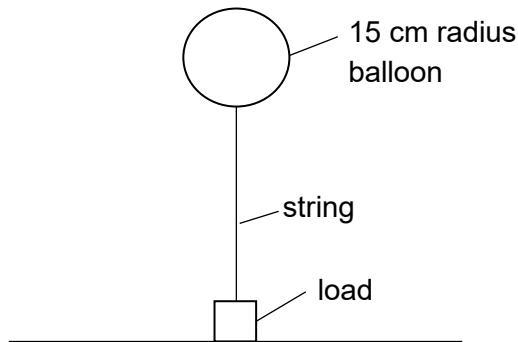


Fig. 1.1

- (i) Explain the origin of upthrust acting on the balloon.

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- (ii) Calculate the tension of the string. [2]

tension = N [3]

- (iii) Suggest why the balloon sinks to the floor after some days.

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[1]