

Barometer

U88-P4a What is **atmospheric pressure**?

- (b)Derive, from first principles, the working formula  $p = \rho gh$  for a mercury barometer.
- (c)Due to the pressure of an air bubble inside the glass tube of a mercury barometer, its reading becomes inaccurate. It gives a reading of 750 mmHg when the actual atmospheric pressure is 765 mmHg and the distance between the mercury surface inside the glass tube and the top of the glass tube is 80 mm. What is the actual atmospheric pressure if the barometric reading is 735 mmHg?  
[Assuming a constant temperature]

U96-13 A student uses a water manometer to measure the pressure of a gas in an experimental set-up as shown in Fig.1. The prevailing atmospheric pressure is  $1.00 \times 10^5$  Pa. If the water level at point Q is 10 cm lower than that at point P, then the pressure of the gas is \_\_\_\_\_ Pa.

- A.  $0.01 \times 10^5$
- B.  $0.99 \times 10^5$
- C.  $1.00 \times 10^5$
- D.  $1.01 \times 10^5$

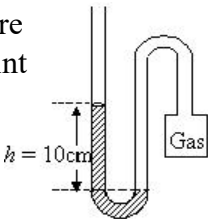


Fig.U96-13

U2k08-5 Fig.U2k08-5 shows a round flat-head PVC cupule commonly used to hang things. Upon discharging the air inside by pressing it onto the wall, it is able to hang appropriate weight of certain objects. Which of the following forces balances the force exerted by the hanging object on the cupule?

- A. The force exerted on the cupule due to atmospheric pressure.
- B. The supporting force provided by the wall to the cupule.
- C. The frictional force between the wall and the cupule.
- D. The gravitational force exerted on the hanging object.



U2k18-09 Fig.U2k18-09 shows two immiscible liquids x and y remain in the state of equilibrium in a U-tube. Find the ratio of the density of liquid x to liquid y,  $\frac{\rho_x}{\rho_y}$  ?

- A.  $\frac{1}{4}$
- B.  $\frac{1}{2}$
- C.  $\frac{3}{5}$
- D.  $\frac{5}{8}$

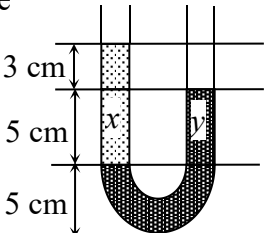


Fig.U2k18-09

U2k19-11 An enclosed uniform fine glass tube is placed vertically, as shown in Fig.U2k19-11. Some air is trapped at both ends of the tube separated by a mercury column of length  $h$ . When the glass tube is moving vertically, it is observed that the mercury column moves vertically upward relative to the tube. If the temperature is constant, which of the following statements regarding the motion of the glass tube are possible?

- I. Moving upwards with uniform velocity.
- II. Decelerating downwards.
- III. Accelerating downwards.
- IV. Decelerating upwards.

- A. I, II
- B. III, IV
- C. I, II, III
- D. II, III, IV

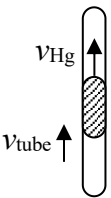


Fig.U2k19-11