Example(8): A gas occupies $500\ cm^3$ at 17°C and $785\ mmHg$ when it is collected over water. The vapour pressure of water at this temperature is $15 mmHg$. What is the pressure of the dry gas at 17°C?

Solution: :

$P_{water\ vapour}$ = $15\ mmHg$ P_{total} = $785\ mmHg$ $P_{dry\ gas}$ = ?

Using Dalton's law of partial pressure, $P_{total} = P_{dry\ gas} + P_{water\ vapour}$

$$P_{dry\ gas} = P_{total} - P_{water\ vapour} = 785\ mmHg - 15\ mmHg = 770\ mmHg$$

Check: A gas collected over water contains water vapour. So, the pressure of dry gas which is lower than the pressure of the gas collected over water is reasonable.