

13.7 A vessel of volume V contains a mixture of 1 mole of Hydrogen and 1 mole of Oxygen (both considered as ideal). Let $f_1(v)dv$, denote the fraction of molecules with speed between v and $(v + dv)$ with $f_2(v)dv$, similarly for oxygen. Then

- (a) $f_1(v) + f_2(v) = f(v)$ obeys the Maxwell's distribution law.
- (b) $f_1(v), f_2(v)$ will obey the Maxwell's distribution law separately.
- (c) Neither $f_1(v)$, nor $f_2(v)$ will obey the Maxwell's distribution law.
- (d) $f_2(v)$ and $f_1(v)$ will be the same.

By Maxwell's distribution law;

$(N_v = \frac{dn}{dv})$ depends on mass of gas molecules.

Since, mass of H_2 and O_2 are different.

Hence, they (i.e. $f_1(v)$ and $f_2(v)$) obey Maxwell's distribution law but separately.

Hence, option (b) is correct.