Given below are two statements :

Statement I : In a diatomic molecule, the rotational energy at a given temperature obeys Maxwell's distribution.

Statement II : In a diatomic molecule, the rotational energy at a given temperature equals the translational kinetic energy for each molecule.

In the light of the above statements, choose the correct answer from the options given below :

A Both Statement I and Statement II are true

B Both Statement I and Statement II are false

C Statement I is true but Statement II is false.

D Statement I is false but Statement II is true.

Both translational kinetic energy and rotational kinetic energy obey Maxwell's distribution independent of each other.

$\Rightarrow$ Translational K.E of diatomic molecule = $\frac{3}{2} k_B T$

$\Rightarrow$ Rotational K.E of diatomic molecule = $\frac{2}{2} k_B T \Rightarrow k_B T$

where k_B = Boltzmann's constant

Hence, statement I is true but statement II is false.