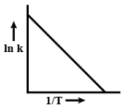
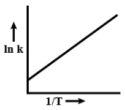
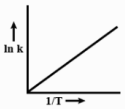
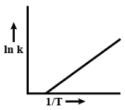
QUESTION:

According to Arrhenius equation, rate constant k is equal to $Ae^{-E_a/RT}$. Which of the following options represent the graph of ln k vs $\frac{1}{T}$?

A 

B 

C 

D 

ANSWER:

Correct option is A)

Arhenius Equation: $k = Ae^{-E_a/RT}$

$\Rightarrow \ln k = \ln (Ae^{-E_a/RT})$

$\Rightarrow \ln k = \ln (A) + \ln (e)^{-E_a/RT}$

$\Rightarrow \ln k = \ln (A) + \frac{-E_a}{RT}\ln (e)$

$\Rightarrow \ln k = \ln (A) + \frac{-E_a}{RT}(1)$

$\Rightarrow \ln k = \frac{-E_a}{R}\frac{1}{T} + \ln (A)$

It represents a straight line with a negative slope.