* Transition probabilities

2018201005

Start → E = 1.0

E → 5 = 0.1

E → E = 0.9

5 → I = 1.0

I → I = 0.9

I → End = 0.1

* Emmission Probabilities

E ⇒	5 ⇒	I ⇒
A = 0.25	A = 0.05	A = 0.4
C = 0.25	C = 0	C = 0.1
G = 0.25	G = 0.95	G = 0.1
T = 0.25	T = 0	T = 0.4

* Input DNA Sequence

" CTTCATGTGAAAGCAGACGTAAGTCA "

* State path Sequence

" EEEEEEEEEEEEEEEEEEEE 5 IIIIIIIII $ "

* Calculate Probability

$= 1.0 * 0.25 * (0.9 * 0.25)^{17} * 0.1 * 0.95 *$
$1.0 * 0.4 * 0.9 * 0.4 * 0.9 * 0.4 * 0.9 * 0.1 *$
$0.9 * 0.4 * 0.9 * 0.1 * 0.9 * 0.4 * 0.1$

$= 1.25 * 10^{-18} = \ln(1.25 * 10^{-18}) = \boxed{-41.22}$ — Ans