

$$I = \int_{-1}^0 \ln|x| dx =$$

- (A) -1 (B) 0 (C) 1 (D) -2

Solution

Let $x = -t$

$$\text{So, } I = \int_1^0 \ln|-t|(-dt) = \int_0^1 \ln|t| dt$$

Since t is non-negative, we have $I = \int_0^1 \ln t dt$

$$\text{Now, } I = \ln t \cdot t \Big|_0^1 - \int_0^1 \frac{1}{t} \cdot t dt$$

$$\therefore I = \left(0 - \lim_{t \rightarrow 0^+} t \ln t \right) - 1$$

$$\therefore I = - \lim_{t \rightarrow 0^+} t \ln t - 1 = \lim_{t \rightarrow 0^+} \frac{\ln t}{-1/t} - 1$$

L. H. Rule is applicable for $\lim_{t \rightarrow 0^+} \frac{\ln t}{-1/t}$

$$\therefore I = \lim_{t \rightarrow 0^+} \frac{1/t}{1/t^2} - 1 = 0 - 1 = -1$$

Hence, (A)