All x satisfying the inequality $(\cot^{-1}x)^2 - 7(\cot^{-1}x) + 10 > 0$, lie in the interval :

(1) $(-\infty, \cot 5) \cup (\cot 2, \infty)$

(2) $(-\infty, \cot 5) \cup (\cot 4, \cot 2)$

(3) $(\cot 5, \cot 4)$

(4) $(\cot 2, \infty)$

The correct option is **B** $(\cot 2, \infty)$

$(\cot^{-1}x)^2 - 7(\cot^{-1}x) + 10 > 0$
$\Rightarrow (\cot^{-1}x)^2 - 5(\cot^{-1}x) - 2(\cot^{-1}x) + 10 > 0$
$\Rightarrow (\cot^{-1}x)^2[(\cot^{-1}x)^2 - 5] - 2[(\cot^{-1}x)^2 - 5] > 0$
$\Rightarrow (\cot^{-1}x - 2)(\cot^{-1}x - 5) > 0$
$\Rightarrow \cot^{-1}x \in (-\infty, 2) \cup (5, \infty) \quad \cdots (1)$

We know that $\cot^{-1}x \in (0, \pi) \quad \cdots (2)$
So, from (1) and (2)
$0 < \cot^{-1}x < 2$
As, $\cot^{-1}x$ is decreasing function,
$\Rightarrow x \in (\cot 2, \infty)$