Q2. If the line, $2x - y + 3 = 0$ is at a distance $\dfrac{1}{\sqrt{5}}$ and $\dfrac{2}{\sqrt{5}}$ from the lines $4x - 2y + \alpha = 0$ and $6x - 3y + \beta = 0$, respectively, then the sum of all possible value of α and β is _____.

[Main Sep. 05, 2020 (I)]

Sol 2.

$L_1 : 2x - y + 3 = 0$

$L_1 : 4x - 2y + \alpha = 0 \Rightarrow 2x - y + \dfrac{\alpha}{2} = 0$

$L_1 : 6x - 3y + \beta = 0 \Rightarrow 2x - y + \dfrac{\beta}{3} = 0$

Distance between L_1 and L_2;

$\left| \dfrac{\alpha - 6}{2\sqrt{5}} \right| = \dfrac{1}{\sqrt{5}} \Rightarrow |\alpha - 6| = 2$

$\Rightarrow \alpha = 4, 8$

Distance between L_1 and L_3:

$\left| \dfrac{\beta - 9}{3\sqrt{5}} \right| = \dfrac{2}{\sqrt{5}} \Rightarrow |\beta - 9| = 6$

$\Rightarrow \beta = 15, 3$

Sum of all values $= 4 + 8 + 15 + 3 = 30$.