Two resistors $R_1 = (4 \pm 0.8)\ \Omega$ and $R_2 = (4 \pm 0.4)\ \Omega$ are connected in parallel. The equivalent resistance of their parallel combination will be : **[Sep. 1, 2021 (II)]**

(a) $(4 \pm 0.4)\ \Omega$

(b) $(2 \pm 0.4)\ \Omega$

(c) $(2 \pm 0.3)\ \Omega$

(d) $(4 \pm 0.3)\ \Omega$

(c) The equivalent resistance in parallel combination,

$$\frac{1}{R_{eq}}=\frac{1}{R_1}+\frac{1}{R_2}=\frac{1}{4}+\frac{1}{4}=\frac{1}{2}$$

$$\therefore R_{eq}=2\Omega.$$

Fractional error

$$\text{Also } \frac{\Delta R_{eq}}{R_{eq}^2}=\frac{\Delta R_1}{R_1^2}+\frac{\Delta R_2}{R_2^2}$$

$$\Rightarrow \frac{\Delta R_{eq}}{4}=\frac{0.8}{16}+\frac{0.4}{16}=\frac{1.2}{16}\Rightarrow \Delta R_{eq}=\frac{4.8}{16}=0.3$$

$$\therefore R_{eq}=(2\pm 0.3)\Omega$$