A physical quantity P is described by the relation

$P = a^{1/2} b^2 c^3 d^{-4}$

If the relative errors in the measurement of a, b, c and d respectively, are 2%, 1%, 3% and 5%, then the relative error in P will be : **[Main Online April 9, 2017]**

(a) 8% (b) 12% (c) 32% (d) 25%

23. **(c)** Given, $P = a^{1/2} b^2 c^2 d^{-4}$,

Maximum relative error,

$$\frac{\Delta P}{P} = \frac{1}{2}\frac{\Delta a}{a} + 2\frac{\Delta b}{b} + 3\frac{\Delta c}{c} + 4\frac{\Delta d}{d}$$

$$= \frac{1}{2} \times 2 + 2 \times 1 + 3 \times 3 + 4 \times 5 = 32\%$$