

In the density measurement of a cube, the mass and edge length are measured as  $(10.00 \pm 0.10)$  kg and  $(0.10 \pm 0.01)$  m, respectively. The error in the measurement of density is -

- (1)  $.31 \text{ kg/m}^3$
- (2)  $0.10 \text{ kg/m}^3$
- (3)  $0.01 \text{ kg/m}^3$
- (4)  $0.07 \text{ kg/m}$

$$M = 10 \pm .10$$

$$\ell = .10 \pm .01$$

$$\rho = \frac{M}{\ell^3} = \frac{10}{(.1)^3} = 10^4$$

$$\frac{\Delta\rho}{\rho} = \frac{\Delta M}{M} + \frac{3\Delta\ell}{\ell}$$

$$= \frac{.10}{10} + \frac{3 \times .01}{.10}$$

$$= \frac{1}{100} + \frac{3}{10}$$

$$\frac{\Delta\rho}{\rho} = \frac{31}{100}$$

$$\frac{\Delta\rho}{\rho} = .31$$