

7. A steel wire having a radius of 2.0 mm, carrying a load of 4kg, is hanging from a ceiling. Given that $g = 3.1 \text{ \AA ms}^{-2}$, what will be the tensile stress that would be developed in the wire? **[8 April 2019 I]**

(a) $6.2 \times 10^6 \text{ Nm}^{-2}$

(b) $5.2 \times 10^6 \text{ Nm}^{-2}$

(c) $3.1 \times 10^6 \text{ Nm}^{-2}$

(d) $4.8 \times 10^6 \text{ Nm}^{-2}$

7. (c) Given,

Radius of wire, $r = 2 \text{ mm}$

Mass of the load $m = 4 \text{ kg}$

$$\text{Stress} = \frac{F}{A} = \frac{mg}{\pi(r)^2} = \frac{4 \times 3.1\pi}{\pi \times (2 \times 10^{-3})^2} = 3.1 \times 10^6 \text{ N/m}^2$$