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 MODULE CODE : MLX02192
 MODULE DES : ENGINEERING SCIENCE

4) $B = 65 \text{ mm} \div 1000 = .065 \text{ m}$

$D = 110 \text{ mm} \div 1000 = .11 \text{ m}$

$b = 40 \text{ mm} = .04 \text{ m}$

$d = 80 \text{ mm} = .08 \text{ m}$

$M = 6200 \text{ Nm}$

$E = 210 \text{ GN/m}^2 = 210 \times 10^9 \text{ N/m}^2$

$\sigma = ?$

$R = ?$

$I = 5.5 \times 10^{-6} \text{ m}^4$

$y = \frac{D}{2} \text{ so } \frac{.11}{2} = .055 \text{ m}$

$y = .055 \text{ m}$

$I = \frac{BD^3}{12} - \frac{bd^3}{12}$

$\left(\frac{(.065)(.11)^3}{12} \right) - \left(\frac{(.04)(.08)^3}{12} \right) =$

$I = 5.5 \times 10^{-6} \text{ m}^4$

$\frac{M'}{I'} = \frac{\sigma}{y} = \frac{E'}{R}$

STRESS (σ) $\frac{M}{I} = \frac{\sigma}{y} \text{ so } \frac{My}{I} = \sigma \text{ so } \frac{(6200)(.055)}{(5.5 \times 10^{-6})} = 62 \times 10^6 \text{ N/m}^2$

RADIUS OF CURVATURE (R) $\frac{M}{I} = \frac{E}{R} \text{ so } R = \frac{EI}{M} \text{ so } \frac{(210 \times 10^9)(5.5 \times 10^{-6})}{6200} = 186.29 \text{ m}$