

3D4 Structural Analysis and Stability – Examination 2006

Numerical answers

1. (a) $\bar{x} = 400$ mm, $\bar{y} = 600$ mm $I_{yy} = 58.60 \cdot 10^6$ mm⁴, $I_{xx} = 148.6 \cdot 10^6$ mm⁴,
 $I_{xy} = 78.40 \cdot 10^6$ mm⁴ (b) $194.0 \cdot 10^6$ mm⁴, $13.21 \cdot 10^6$ mm⁴ (c) $356 \times 171 \times 67$ UB

2. (a)(i) 1000 kNm (sagging); 7.50 mm (ii) 571 kNm (hogging)
(iii) ± 2000 kNm at B (b) 0.321 mm

3. (b)(i) $P(y) = \frac{Eb^2}{2L^2}(y^2 - H^2)$; $V(y) = \frac{Eb^2}{L^3}(H^2y - y^3)$; $\frac{Eb^2H^2}{2L^2}$; $\frac{2Eb^2H^3}{3\sqrt{3}L^3}$

(ii) $\frac{H}{b} = \frac{\pi}{2}$

4. (b)(i) 2.86; 2.1

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