

**3D3 Structural Materials and Design 2021-2022 – List of numerical answers**

- 1) b) i) 13.9 mm  
ii) 17.0 mm
- 2) a) i) approximately 290 mm  
ii) 12 mm bars @200 mm c/c or similar  
iii) no reinforcement required  
b) walls are adequate
- 3) a) i) section not adequate for bending  
ii) section adequate for shear  
b) i) 10.6 kN
- 4) a) 286 kN  
b) 529 kNm  
c) no shear stiffening required