

Answers (4D7 - 2009/2010)

- Q2 (b) (i)  $f_{yd} = 400 \text{ MPa}$ ,  $P_f = 3 \times 10^{-3}$   
(ii)  $\beta = 4.67$ ,  $P_f = 1.51 \times 10^{-6}$   
(iii) yes ( $f_{yk} = 462 \text{ MPa} > 460 \text{ MPa}$ ),  $\beta = 4.0$ ,  $P_f = 3.2 \times 10^{-5}$   
(iv)  $S_k = 75 \text{ kN}$ ,  $S_d = 105 \text{ kN}$ ,  $P_f = 2.3 \times 10^{-4}$
- Q3 (b) (i)  $M_{ult} = 237.5 \text{ kNm}$
- Q4 (a) (i)  $\Sigma A_l = 1689 \text{ mm}^2$   
(ii)  $f_{cd} = 23.6 \text{ MPa}$   
(iii) area of longitudinal reinforcement required decreases to  $430/500 \times 1689 \text{ mm}^2 = 1453 \text{ mm}^2$  but the concrete strut angle and the required design concrete strength are unchanged