

## Module 3C4

## Machine Design – Transmissions

1. (b) (ii)  $\left(\frac{36}{5}\right)^2 \frac{L\omega^2}{\pi^2}$
2. (a) (i)  $\frac{T_A}{T_S} = \frac{A}{S} = R$   
 (iii)  $\frac{T_A\omega_A}{T_S\omega_S} = \frac{2R}{1-R}$
3. (a) fraction lost = 1/2  
 (b) (ii)  $J\omega_1^2 \left( \frac{1}{G_1^2} - \frac{1}{G_1G_2} + \frac{1}{2G_2^2} \right)$   
 (iii) fraction lost = 1/3
4. (b) peak power =  $\Omega^2 c$   
 (c) (i) max power in =  $\frac{\Omega^2 c}{3}$ , max power out =  $\frac{2\Omega^2 c}{3}$   
 (ii) initial energy required =  $\frac{2}{9\sqrt{3}} \Omega^2 c \tau$   
 (iii) maximum energy stored =  $\frac{4}{9\sqrt{3}} \Omega^2 c \tau$   
 (d) increase in mean power =  $\frac{4}{9\sqrt{3}} \Omega^2 c \tau (1 - \eta)$ , assuming small  $(1 - \eta)$