ANSWERS

1

(c) Coefficient of friction = 0.0034

(d) (i) The minimum film thickness increases by a factor of 1.39

(ii) The coefficient of friction increases by a factor of 1.56

2

(a) (i) φ = 99.6°

(ii) The follower acceleration is $\frac{36}{\sqrt{35}} r\dot{\varphi}^2$ downwards at maximum lift and zero during the period of minimum lift.

(b) (ii) $y = r(4\sec\theta - \tan\theta)$

3

(a) (i) 26.5 kW

(ii) Energy consumed in: Acceleration phase = 52.4 kJ, Cruise phase = 14.6 kJ, Deceleration phase = -48.8 kJ, Stopped phase = 0 J

(iii) 914 W

(iv) 54.3 kJ

(v) 59.4 s

(b) 0.174 kg