

Short Answers  
Paper 1, IA EGT - 2009

- 1) (a) (i) 6.264 m/s, (ii) 4.905 kPa  
(b) -0.06%
- 2) (a) Frictionless flow  
(b) 6.37 mm  
(c) 200 N  
(d) 50 N
- 3) (a) 10.313 kg  
(b) 20.98 bar, 708.86 K  
(c) 642.95 K, 1.36 m<sup>3</sup>  
(d) No, entropy cannot remain constant
- 4) (a) 88.03 m/s  
(b) 433.2 K, 0.00382 m<sup>2</sup>  
(c) from B to A
- 5) (a) 1.01 m/s, 2.22 m/s  
(b) 4.16 m/s  
(c) linear  
(d) -2085.73 N
- 6)
- 7) (a)  $4/5$  m/s,  $-66/125$  m/s<sup>2</sup>,  $3/25$  rad/s,  $76/625$  rad/s<sup>2</sup>
- 8) (a)  $mu / (m + M)$   
(b)  $mu / \sqrt{k(m + M)}$   
(c) No change
- 9) (b)  $\left[ \frac{a^2 + b^2}{3} \right] m$
- 10)  $A = \lambda/3k$ ,  $B = 2k/3$ ,  $C = 2\lambda/3$
- 11) (a) (i)  $90\sqrt{3}$  mm/s, (ii) 0.3 rad/s  
(b)  $50/\sqrt{3}$  N  
(c) 450 N
- 12) (a)  $\begin{bmatrix} k & -k \\ -k & 2k \end{bmatrix}$   
(c)  $\begin{bmatrix} 1 \\ -3.56 \end{bmatrix}$   
(d)  $\frac{2k - \omega^2 m}{(k - 2\omega^2 m)(2k - \omega^2 m) - k^2}$