PART IA

2011 Paper 1, Section A, numerical answers

1. -., -., 5m/s

2. 20mm, 40m/s, 5.15N, 19.20N, 19.88N, 75°

3. -

4. 193.4 m/s; 0.9039 MPa; 25.4 J/(kgK).

5. 0.604ρgL²w, (0.427 ρgL²w, 0.427 ρgL²w); $\frac{5}{4}\frac{\dot{Q}}{w\sqrt{gl(\frac{1}{2}+\sqrt{2})}}$; 0.51 ρgL²w; -.,

6. 20.3 MW; 26.2 MW; 4.93 bar; 525m/s; -.

IA P1 (2010-2011) Section B Answers

7. (a) $\frac{\rho\pi hv}{64}\left(v^2+h^2\right)$; (b) $\frac{\rho\pi hv}{64}\left(v^2+5h^2\right)$; (c) $\frac{8hg}{v^2+5h^2}$.

8. (a) $\frac{\omega\sqrt{3}}{2}$ counter-clockwise; (b) $4L$; (c) Towards.

9. (a) $\frac{3\omega l}{4}$ at 60° above the horizontal; $\frac{\omega}{4}$ clockwise; (b) $\frac{3\sqrt{3}}{8}Fl+\frac{5}{4}M$.

10. (b) 66mm; 4° lag; (c) hint: $\left|\frac{Y}{X}\right|=5$; 90° lag.

11. (a) $10/3$ ms^{-1} in the same direction; (d) $10/3$ ms^{-1} ; $5/3$ ms^{-1}; (e) $16\,2/3$ ms^{-2} normal to the velocity vector; $1/6$ m.

12. (a) $|Y_1|=|X|$; 90° lag; (c) 2.98mm.