

### Physics 2314, Midterm III: solutions

Answers to multiple choice questions: 1: A; 2: (a) B, (b) C; 3: B; 4: B.

$$\text{P1 } \omega = \sqrt{\frac{8}{3}\alpha\Delta\theta} = 4.09 \text{ rad/s}$$

$$\text{P2 } I = \frac{2}{5}MR^2 + MD^2 = 0.0161 \text{ kg} \cdot \text{m}^2$$

$$\text{P3 } \mathbf{v} = \mathbf{i} + 2t\mathbf{j} \quad \mathbf{L} = \mathbf{r} \times \mathbf{p} = mt^2\mathbf{k} \quad \text{At } t = 1 \text{ s, } L = 0.1 \text{ kg} \cdot \text{m}^2/\text{s}$$

$$\text{P4 } \cos\theta = \frac{g}{\omega^2 l} = 0.5 \quad \theta = 60^\circ \quad L = ml^2\omega \sin^2\theta = 0.0288 \text{ kg} \cdot \text{m}^2/\text{s}$$