

Physics 2314, Midterm I: solutions

Answers to multiple choice questions: 1:A, 2:A, 3:C, 4:A.

P1 (a) $F = m(a + g \sin \theta) = 11.8 \text{ N}$

(b) $F = m(a + g \sin \theta + \mu_k g \cos \theta) = 15.2 \text{ N}$

P2 $\sin 2\alpha = \frac{gR}{v_i^2}$ $\alpha = 15^\circ$ or 75°

P3 $v = \sqrt{r\mu g} = 15.3 \text{ m/s}$

P4 $\mathbf{F}_{net} = (4\mathbf{i} + 5\mathbf{j}) \text{ N}$ $|\mathbf{F}_{net}| = 6.4 \text{ N}$ $\theta = 51.3^\circ$