

- Form A: 2. B 3. C 4. C 5. A 6. B  
 Form B: 2. C 3. C 4. B 5. A 6. B  
 Form C: 2. A 3. B 4. C 5. B 6. C  
 Form D: 2. B 3. C 4. A 5. B 6. C  
 Form E: 2. B 3. C 4. C 5. A 6. B

7, 8 and 9. Translate (8 pts.), Equate (8 pts.), Solve (8 pts.), Significant Digits (1 pt.)

$$7. \quad a_c = \frac{v^2}{R} \quad v = \omega R \quad a_c = \frac{(\omega R)^2}{R} = \omega^2 R \quad \omega = \frac{\Delta\theta}{\Delta t} = \frac{2\pi}{T}$$

$$a_c = \left(\frac{2\pi}{T}\right)^2 R = \frac{4\pi^2 R}{T^2} = \frac{(4\pi)^2 (6.38 \times 10^6)}{(86,400)^2} = \underline{0.0337 \text{ m/s}^2}$$

$$8. \quad a_c = \frac{v^2}{R} = \omega^2 R = (0.05)^2 (200) = 0.500 \text{ m/s}^2$$

$$a_T = \alpha R = (1.5 \times 10^{-3}) (200) = 0.300 \text{ m/s}^2$$

$$a(\text{total}) = \sqrt{a_c^2 + a_T^2} = \underline{0.583 \text{ m/s}^2}$$

$$9. \quad x: 0 = (1)(1250) \cos 45^\circ + -(2)(825) \cos 45^\circ + (3)V_{3x}$$

$$V_{3x} = \frac{1650 \cos 45^\circ - 1250 \cos 45^\circ}{3} = \frac{400 \cos 45^\circ}{3}$$

$$y: 0 = (1)(1250) \sin 45^\circ + (2)(825) \sin 45^\circ - (3)V_{3y}$$

$$V_{3y} = \frac{1250 \sin 45^\circ + 1650 \sin 45^\circ}{3} = \frac{2900 \sin 45^\circ}{3}$$

$$V = \sqrt{V_{3x}^2 + V_{3y}^2} = \frac{\sqrt{2}/2}{3} \sqrt{(400)^2 + (2900)^2} = \underline{690 \text{ m/sec}}$$