

# Quiz 2c

**A 2500 kg roller-coaster completes a loop of radius 16 m in 3.00 s.**

- a. Draw an FBD of the coaster at the top of the loop.**
- b. Determine the speed of the coaster**
- c. Determine  $F_N$ .**



a.)



b.)

$$v = \frac{2\pi r}{T} = \frac{2\pi(16\text{m})}{3\text{s}} = 33.51\text{m/s} = \boxed{34\text{m/s}}$$

c.)

$$F_c = F_g + F_N$$

$$F_N = F_c - F_g$$

$$= \frac{mv^2}{r} - mg = \frac{(2500)(33.51)^2}{16} - (2500)(9.8)$$

$$= \boxed{151000\text{N}}$$