

2 Friction, springs, and circular motion – Part 2 — Answers

Answers

Work through these after you have tried the questions yourself.

2.1 $N = mg = 4.0 \times 9.8 = 39.2 \text{ N}.$

2.2 $f_{s,\max} = \mu_s N = 0.30 \times 39.2 = 11.8 \text{ N}.$

2.3 $k = \frac{F}{x} = \frac{12}{0.040} = 300 \text{ N/m}.$

2.4 its speed is constant but its **direction** keeps changing, so its velocity (a vector) changes; a changing velocity means acceleration.

2.5 $F_c = \frac{mv^2}{r} = \frac{0.30 \times 4.0^2}{0.80} = \frac{4.8}{0.80} = 6.0 \text{ N}.$

2.6 there is no outward force; the real force (friction from the road) points **inward** toward the centre of the turn, and it is what makes the car change direction.