

## CHAPTER 5 FREESTANDING PRACTICE QUESTIONS

- How much work is needed to lift a box of mass 2 kg up a height of 3 m using a pulley system with 75% efficiency?
  - 4 J
  - 8 J
  - 40 J
  - 80 J
- An automobile with a certain shape experiences a drag force due to air resistance that is, in Newtons, equal to one-third the square of the car's speed, in meters per second. How much power would the engine have to supply to the wheels to balance this drag force when the car is moving at a constant speed of 30 m/s?
  - 10 W
  - 300 W
  - 9 kW
  - 27 kW
- A young child is sliding down a hill at an incline of  $30^\circ$  on a sled with total combined mass of 10 kg. If the coefficient of friction between the hill and the sled is 0.3 and the length of the hill is 50 m, how much work has been done by gravity when the child reaches the bottom of the hill?
  - 1000 J
  - 2500 J
  - 3535 J
  - 4330 J
- An experiment is conducted where a cue ball (mass 0.25 kg) moves at 10 m/s towards an adjacent numbered ball (mass 0.25 kg) at rest. In Trial 1, the collision is elastic. In Trial 2, the collision is perfectly inelastic. What is the speed of the cue ball immediately after the collision in Trial 1 and Trial 2 respectively?
  - 0 m/s and 5 m/s
  - 0 m/s and 10 m/s
  - 5 m/s and 0 m/s
  - 5 m/s and 5 m/s
- A 200 kg roller coaster starts from rest 50 m above the ground. It falls toward the ground without any friction, then once it reaches ground level, the brakes are applied over 30 m in order to bring the coaster to a complete stop. How much work is done by the brakes?
  - $10 \times 10^4$  J
  - $10 \times 10^5$  J
  - $-10 \times 10^4$  J
  - $-10 \times 10^5$  J
- A 1000 kg car traveling at 60 km/h hits a stationary truck weighing 20,000 N. If the truck has a velocity of 1 m/s after the crash, what is the velocity of the car after the crash?
  - 14.5 m/s in the same direction it was initially traveling
  - 14.5 m/s in the opposite direction it was initially traveling
  - 19 m/s in the same direction it was initially traveling
  - 19 m/s in the opposite direction it was initially traveling
- A 7 kg ball is dropped from 20 m. If the speed just before it hits the ground is 18 m/s, what is the work done by air resistance?
  - 266 J
  - 13 J
  - 13 J
  - 266 J