Standardized Test Prep

MULTIPLE CHOICE

Use the passage below to answer questions 1–2.

Two blocks of masses m_1 and m_2 are placed in contact with each other on a smooth, horizontal surface. Block m_1 is on the left of block m_2. A constant horizontal force F to the right is applied to m_1.

1. What is the acceleration of the two blocks?

A. $a = \dfrac{F}{m_1}$

B. $a = \dfrac{F}{m_2}$

C. $a = \dfrac{F}{m_1 + m_2}$

D. $a = \dfrac{F}{(m_1)(m_2)}$

2. What is the horizontal force acting on m_2?

F. $m_1 a$

G. $m_2 a$

H. $(m_1 + m_2)a$

J. $m_1 m_2 a$

3. A crate is pulled to the right (positive x-axis) with a force of 82.0 N, to the left with a force of 115 N, upward with a force of 565 N, and downward with a force of 236 N. Find the magnitude and direction of the net force on the crate.

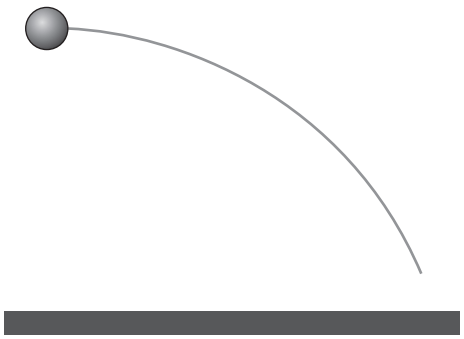
A. 3.30 N at 96° counterclockwise from the positive x-axis

B. 3.30 N at 6° counterclockwise from the positive x-axis

C. 3.30×10^2 N at 96° counterclockwise from the positive x-axis

D. 3.30×10^2 N at 6° counterclockwise from the positive x-axis

4. A ball with a mass of m is thrown into the air, as shown in the figure below. What is the force exerted on Earth by the ball?



F. $m_{ball}g$, directed down

G. $m_{ball}g$, directed up

H. $m_{Earth}g$, directed down

J. $m_{Earth}g$, directed up

5. A freight train has a mass of 1.5×10^7 kg. If the locomotive can exert a constant pull of 7.5×10^5 N, how long would it take to increase the speed of the train from rest to 85 km/h? (Disregard friction.)

A. 4.7×10^2 s

B. 4.7 s

C. 5.0×10^{-2} s

D. 5.0×10^4 s

Use the passage below to answer questions 6–7.

A truck driver slams on the brakes and skids to a stop through a displacement Δx.

6. If the truck's mass doubles, find the truck's skidding distance in terms of Δx. (Hint: Increasing the mass increases the normal force.)

F. $\Delta x/4$

G. Δx

H. $2\Delta x$

J. $4\Delta x$