1. A 20 0. kg box remains at rest on a horizontal surface while a person pushes directly to the right on the box with a force of 60 N . The coefficient of kinetic friction between the box and the surface is µ k = 20.0 . The coefficient of static friction between the box and the surface is µ s = 60.0 . What is the magnitude of the force of friction acting on the box during the push?

(A) 200 N (B) 120 N (C) 60 N (D) 40 N (E) 0 N

2. A car moves to the right along a one-dimensional track for total time T in two parts.

• Part One: The car maintains constant non-zero speed V for the first ¾ of the total time.

• Part Two: The car accelerates uniformly to rest during the last ¼ of the total time.

What is the ratio of the distance traveled during Part One of the trip to the distance traveled during Part Two of the trip?

(A) 1:6 (D) 3:4

(B) :3 2 (E) 3:8

(C) The values of V and T are required to answer the question.

3. By computing the area under the acceleration vs. time graph for a fixed time interval of an object’s motion, what quantity has been determined for that object?

(A) The average velocity during the time interval

(B) The velocity at the end of the time interval

(C) The average speed during the time interval

(D) The change in velocity during the time interval

(E) The velocity at the time midway through the time interval

4. Two point objects are launched straight upward with identical linear momentum. Object 1 has mass M and reaches a maximum height H above the launch point. If object 2 has mass 2M , what is its maximum attained height above the launch point in terms of H ?

(A) 4 H

(B) 2 H

(C) H

(D) 2H

(E) 4H

5. A ball initially at rest falls without air resistance from a height h above the ground. If the ball falls the first distance h/2 in a time t, how much time is required to fall the remaining distance of h/2 ?

(A) 0.25t

(B) 0.41t

(C) 0.50t

(D) 0.71t

(E) 1.00t