

Physics 2204
Assignment 4– Kinematics
2011-2012
Outcomes: 325-2

Name: _____

Multiple Choice. Circle the correct answer. SHOW ALL WORKINGS!

1. In an emergency braking exercise, a student driver stops a car travelling at 83 km/h [W] in a time of 4.0 s. What is the car's acceleration during this time?
A) -5.8 m/s^2 [E]
B) 5.8 m/s^2 [E]
C) 21 m/s^2 [E]
D) 5.8 m/s^2 [W]
E) 21 m/s^2 [W]
2. How long does it take a car to slow down from a speed of 54 km/h to 32 km/h over a distance of 65 m? Answer in seconds.
A) 1.5 s
B) 2.7 s
C) 5.4 s
D) 5.9 s
E) 21 s
3. A jogger is running at 4.2 m/s when she begins to accelerate uniformly. If she runs a distance of 14 m in the next 3.0 s, what is her new speed?
A) 4.9 m/s
B) 5.1 m/s
C) 7.7 m/s
D) 14 m/s
E) 17 m/s
4. A bullet accelerates uniformly along a barrel, exiting the gun in 24 ms with a speed of 196 m/s. What is the acceleration of the bullet?
A) $3.6 \times 10^2 \text{ m/s}^2$
B) $1.7 \times 10^3 \text{ m/s}^2$
C) $8.2 \times 10^3 \text{ m/s}^2$
D) $1.8 \times 10^4 \text{ m/s}^2$
E) $1.7 \times 10^5 \text{ m/s}^2$
5. A car accelerates at 2.7 m/s^2 for 5.4 s, reaching a speed of 18 m/s. During the period of acceleration, what distance did the car travel?
A) 18 m
B) 58 m
C) $9.0 \times 10^1 \text{ m}$
D) $1.4 \times 10^2 \text{ m}$
E) $1.8 \times 10^2 \text{ m}$
6. A toy car is moving at 13 cm/s when it begins accelerating at 1.4 cm/s^2 . If the acceleration is uniform, what is the speed of the car after it has travelled a distance of 27 cm?
A) $1.0 \times 10^1 \text{ cm/s}$
B) 16 cm/s
C) 62 cm/s
D) 93 cm/s
E) $2.4 \times 10^2 \text{ cm/s}$
7. A car is driving along the highway behind a slower vehicle when it pulls out to pass. If the car's acceleration is uniform at 2.0 m/s^2 for 4.0 s and it reaches a speed of 28 m/s, what was its speed when it first pulled out to pass the slower vehicle?
A) 18 m/s
B) 20 m/s
C) 22 m/s
D) 24 m/s
E) 26 m/s

Constructed Response. Answer all questions and show all workings.

1. A car is travelling at 20.0 m/s when it pulls out to pass a truck. The car accelerates at 2.0m/s^2 for 4.0 s and then maintains this new velocity.
 - (a) What distance does the car travel during the period of acceleration?

 - (b) What is the car's speed at the end of the period of acceleration?

2. A box accidentally falls from the back of a truck and hits the ground with a speed of 15 m/s. It slides along the ground for a distance of 45 m before coming to rest. Determine
 - (a) the length of time the box slides before stopping

 - (b) the average acceleration of the box while it's sliding

 - (c) the time it takes to slide the last 10.0 m. (Be careful! You need to write what you are given for the last 10.0 m.)

2. A cyclist is travelling with a speed of 12.0 m/s when she applies the brakes. After slowing for 3.0 s , her speed has been reduced to 4.0 m/s .

(a) What distance does she travel during this time?

(b) What is her acceleration?

(c) If she continues braking, how much longer will it take her to stop?

(d) If she continues to travel with her new speed, how far will she travel during the next 3.0 s ?

6. A sprinter runs a 100.0 m dash. During the first 2.04 s of the race, he accelerates from rest to a velocity of 7.95 m/s [S] . For the rest of the race, he continues at his top speed of 7.95 m/s . What time does the sprinter achieve for the race?