**Physics, Unit 2, Kinematics (Free Fall / Non Free Fall Acceleration - 1 D) Math / Concepts Quiz (A) (key)**

 **Non Free Fall (a ≠ g) Free Fall (a = g = – 9.8 m/s2)**

**a. d = vit + ½ a t2 d. d = vit + ½ g t2**

**b. vf = vi + a t e. vf = vi + g t**

**c. vf2 = vi2 + 2 a d**  **ab.** **vf2 = vi2 + 2 g d**

1.A Nissan Sentra that’s traveling at 20 m/s is **decreasing its speed** at the rate of 1.2 m/s each second. To find the

 distance covered in 6 sec, which equation would you use? Use the choices above and circle your answer below.

 **a** b c d e f g

2. From question 1, what’s the distance covered in 6 sec? a. 120.6 m **b. 98.4 m** c. 21.6 m

 d. Not enough information to determine

3. From question 1, to find the time it would take for the car to stop, which equation would you use? Use the choices

 above and circle your answer below.

 a **b** c d e f g

4. From question 1, how long would it take for the car to stop? **a. 16.7 s** b. 36.7 s c. 20 s d. 4.9 s

5. From question 1, to find the distance the car travels before it comes to a stop, which equation would you use? Use the

 choices above and circle your answer below.

 **a** b **c** d e f g

6. For question 1, what’s the distance covered for the car to come to a stop? a. 400 m b. 233.3 m

 c. 266.7 m **d. 166.7 m**

7. A ball is thrown straight down off of a cliff with an initial downward velocity of 7 m/s. To find the distance covered in

 4 sec, which equation would you use?

 a b c **d** e f g

8. For question 7, what is the distance covered in 4 sec? a. – 78.4 m **b. – 106.4 m** c. – 50.4 m

 d. – 28 m

9. For question 7, to find the ball’s speed after 6 sec, which equation would you use?

 a b c d **e** f g

10. For question 7, what is the ball’s speed after 6 sec? **a. – 65.8 m/s** b. – 58.8 m/s

 c. – 36 m/s d. – 51.8 m/s

11. A car **increases its speed** at the rate of 0.5 m/s2. To find the amount of time required for the speed to increase from

 8 m/s to 12 m/s, which equation would you use?

 a **b** c d e f g

12. For question 11, what is the time required for the speed to increase from 8 m/s to 12 m/s? a. 4 s b. 2 s

 c. 16 s **d. 8 s**

13. For question 11, to find the distance traveled for the car to increase its speed from 8 m/s to 12 m/s, which equation

 would you use?

 **a** b c d e f g

14. For question 11, how far does the car travel in the time it takes for the car to go from 8 m/s to 12 m/s?

 **a. 80 m** b. 64 m c. 16 m d. 108 m

15. A car with a velocity to the northwest and an acceleration to the southeast will always \_\_\_\_. **a. slow down**

 b. speed up c. maintain a constant velocity d. not enough information to determine

16. Can an object be moving when its acceleration is zero? \_\_\_\_. Can an object be accelerating when its speed is zero?

 \_\_\_\_. a. no, yes b. yes, no c. no, no **d. yes, yes**

17. To find the upward speed a ball should be thrown to be caught easily (vf = 0) by a person on a balcony 7.5 m above

 the ground, which equation would you use?

 a b c d e **f** g

18. For question 17, what is the upward speed the ball should be thrown to be caught easily (vf = 0) by a person on a

 balcony 7.5 m above the ground? a. 2.7 m/s **b. 12.1 m/s** c. 4.4 m/s d. 23.5 m/s

19. For question 17, to find the time it would take for the ball to travel to the balcony 7.5 m above the ground, which

 equation would you use?

 a b c d **e** f g

20. For question 17, what is the time it would take for the ball to travel to the balcony 7.5 m above the ground?

 a. 2.6 s b. 0.7 s **c. 1.2 s**  d. 3.1 s

21. The reaction time of the average automobile driver is about 0.8 sec. The reaction time is the interval between the

 perception of a signal to stop and the application of the brakes. If an automobile can decelerate at 4.5 m/s2, what

 would be the total distance covered in coming to a stop (vf = 0) after a signal is observed from an initial velocity of

 20 m/s? a. 44.4 m **b. 60.4 m** c. 16 m d. 124.4 m

22. From question 21, what would be the total distance covered in coming to a stop (vf = 0) after a signal is observed from

 an initial velocity of 25 m/s?

 a. 69.4 m b. 20 m c. 158.8 m **d. 89.4 m**

23. Two football players start from rest, 58 m apart. They run directly toward each other, both players accelerating. Player

 A’s acceleration is 0.45 m/s2. Player B’s acceleration is 0.25 m/s2. How much time passes before they collide?

 a. 165.7 s b. 116 s c. 10.8 s **d. 12.9 s**

24. From question 23, at the instance they collide, how far did player A run?

 **a. 37.4 m** b. 20.6 m c. 58.2 m d. 26.2 m

25. Wasn’t this fun? a. yes b. no c. Can we have a few more word problems on this quiz?

 d. I love physics problems e. Physics is so much fun on a Wednesday afternoon!

 ab. Why did you give us the equations? I had them memorized!

 ac. I’m quite disappointed, Dr. G! This quiz was way too easy!