UCONN Physics / 70

Copy # _____

Unit 2 Pre-test

Directions: Use provided formula and conversion sheets provided. Do NOT write on this Pre-test if you wish to do your best on the actual test. I will not collect this pre-test, but writing on it will put you at a disadvantage for studying. Each question is worth 2 pts. You will have one class period to complete the actual test, therefore time yourself appropriately and don't spend too much time on any one question.

1) Suppose that an object travels from one point in space to another. Make a comparison between the displacement and the distance traveled.
A) The displacement is either greater than or equal to the distance traveled.
B) The displacement is always equal to the distance traveled.
C) The displacement is either less than or equal to the distance traveled.
D) The displacement can be either greater than, smaller than, or equal to the distance traveled.
Answer: C

2) When is the average velocity of an object equal to the instantaneous velocity?
A) always
B) never
C) only when the velocity is constant
D) only when the velocity is increasing at a constant rate
Answer: C

3) An object moving in the +x axis experiences an acceleration of 2.0 m/s^2. This means the object is
A) traveling at 2.0 m in every second.
B) traveling at 2.0 m/s in every second.
C) changing its velocity by 2.0 m/s.
D) increasing its velocity by 2.0 m/s in every second.
Answer: D

4) Suppose that a car traveling to the West (-*x* direction) begins to slow down as it approaches a traffic light. Make a statement concerning its acceleration.
A) The car is decelerating, and its acceleration is positive.
B) The car is decelerating, and its acceleration is negative.
C) The acceleration is zero.
D) A statement cannot be made using the information given.
Answer: A

5) Can an object's velocity change direction when its acceleration is constant? Support your answer with an example.
A) No, this is not possible because it is always speeding up.
B) No, this is not possible because it is always speeding up or always slowing down, but it can never turn around.
C) Yes, this is possible, and a rock thrown straight up is an example.
D) Yes, this is possible, and a car that starts from rest, speeds up, slows to a stop, and then backs up is an example.
Answer: C

6) Can an object have increasing speed while its acceleration is decreasing? Support your answer with an example.
A) No, this is impossible because of the way in which acceleration is defined.
B) No, because if acceleration is decreasing the object will be slowing down.
C) Yes, and an example would be an object falling in the absence of air friction.
D) Yes, and an example would be an object released from rest in the presence of air friction.
Answer: D

7) Objects A and B both start at rest. They both accelerate at the same rate. However, object A accelerates for twice the time as object B. What is the final speed of object A compared to that of object B?
A) the same speed
B) twice as fast
C) three times as fast
D) four times as fast
Answer: B

8) Objects A and B both start from rest. They both accelerate at the same rate. However, object A accelerates for twice the time as object B. What is the distance traveled by object A compared to that of object B?
A) the same distance
B) twice as far
C) three times as far
D) four times as far
Answer: D

9) Suppose a ball is thrown straight up. Make a statement about the velocity and the acceleration when the ball reaches the highest point.
A) Both its velocity and its acceleration are zero.
B) Its velocity is zero and its acceleration is not zero.
C) Its velocity is not zero and its acceleration is zero.
D) Neither its velocity nor its acceleration is zero.
Answer: B

10) A ball is thrown vertically upward with a speed v. An identical second ball is thrown upward with a speed 2v (twice as fast). What is the ratio of the maximum height of the second ball to that of the first ball? (How many times higher does the second ball go than the first ball?)
A) 4:1
B) 2:1
C) 1.7:1
D) 1.4:1
Answer: A

11) Two objects are thrown from the top of a tall building. One is thrown up, and the other is thrown down, both with the same initial speed. What are their speeds when they hit the street?
A) The one thrown up is traveling faster.
B) The one thrown down is traveling faster.
C) They are traveling at the same speed.
D) It is impossible to tell because the height of the building is not given.
Answer: C

12) A brick is dropped from the top of a building. A second brick is thrown straight down from the same building. They are released at the same time. Neglect air resistance. Compare the accelerations of the two bricks.
A) The first brick accelerates faster.
B) The second brick accelerates faster.
C) The two bricks accelerate at the same rate.
D) It is impossible to determine from the information given.
Answer: C

13) An object is moving with constant non-zero acceleration in the +x axis. The position versus time graph of this object is
A) a horizontal straight line.
B) a vertical straight line.
C) a straight line making an angle with the time axis.
D) a parabolic curve.
Answer: D

14) An object is moving with constant non-zero velocity in the +x axis. The velocity versus time graph of this object is
A) a horizontal straight line.
B) a vertical straight line.
C) a straight line making an angle with the time axis.
D) a parabolic curve.
Answer: A

15) The slope of a position versus time graph gives
A) position.
B) velocity.
C) acceleration.
D) displacement.
Answer: B

16) If the position versus time graph of an object is a horizontal line, the object is
A) moving with constant non-zero speed.
B) moving with constant non-zero acceleration.
C) at rest.
D) moving with infinite speed.
Answer: C

17) A boat can move at 30 km/h in still water. How long will it take to move 12 km upstream in a river flowing 6.0 km/h?
A) 20 min
B) 22 min
C) 24 min
D) 30 min
Answer: D

18) 55 mi/h is how many m/s? (1 mi = 1609 m.)
A) 25 m/s
B) 49 m/s
C) 90 m/s
D) 120 m/s
Answer: A

19) A car travels 90 km/h. How long does it take for it to travel 400 km?
A) 4.1 h
B) 4.2 h
C) 4.3 h
D) 4.4 h
Answer: D

20) If you run a complete loop around an outdoor track (400 m), in 100 s, your average velocity is
A) 0.25 m/s.
B) 4.0 m/s.
C) 40,000 m/s.
D) zero.
Answer: D

21) You are driving home on a weekend from school at 55 mi/h for 110 miles. It then starts to snow and you slow to 35 mi/h. You arrive home after driving 4 hours and 15 minutes. How far is your hometown from school?
A) 180 mi
B) 190 mi
C) 200 mi
D) 210 mi
Answer: B

22) A motorist travels for 3.0 h at 80 km/h and 2.0 h at 100 km/h. What is her average speed for the trip?
A) 85 km/h
B) 88 km/h
C) 90 km/h
D) 92 km/h
Answer: B

23) A car traveling 60 km/h accelerates at the rate of 2.0 m/s^2. How much time is required for the car to reach a speed of 90 km/h?
A) 15 s
B) 30 s
C) 45 s
D) 4.2 s
Answer: D

24) A cart starts from rest and accelerates at 4.0 m/s^2 for 5.0 s, then maintain that velocity for 10 s, and then decelerates at the rate of 2.0 m/s^2 for 4.0 s. What is the final speed of the car?
A) 20 m/s
B) 16 m/s
C) 12 m/s
D) 10 m/s
Answer: C

25) A bullet moving horizontally to the right (+*x* direction) with a speed of 500 m/s strikes a sandbag and penetrates a distance of 10.0 cm. What is the average acceleration, in m/s^2, of the bullet?
A) -1.25×10^6
B) -2.50×10^6
C) -1.25×10^3
D) -2.50×10^3
Answer: A

26) A car goes from 40 m/s to 80 m/s in a distance of 200 m. What is its average acceleration?
A) 8.0 m/s^2
B) 9.6 m/s^2
C) 12 m/s^2
D) 24 m/s^2
Answer: C

27) Suppose a ball is thrown downward in the absence of air resistance. Make a statement concerning its acceleration.
A) Its acceleration is constantly increasing.
B) Its acceleration is constant.
C) Its acceleration is constantly decreasing.
D) Its acceleration is zero.
Answer: B

28) An object is thrown upward with a speed of 12 m/s on the surface of planet X where the acceleration due to gravity is 1.5 m/s^2. How long does it take for the object to reach the maximum height?
A) 8.0 s
B) 11 s
C) 14 s
D) 16 s
Answer: A

29) An object is thrown upward with a speed of 14 m/s on the surface of planet X where the acceleration due to gravity is 3.5 m/s^2. What is the speed of the object after 8.0 s?
A) 7.0 m/s
B) 14 m/s
C) 21 m/s
D) 64 m/s
Answer: B

30) A ball is thrown upward at a velocity of 19.6 m/s. What is its velocity after 3.00 s?
A) 9.8 m/s upward
B) 9.8 m/s downward
C) zero
D) 19.6 downward
Answer: B

31) A bullet shot straight up returns to its starting point in 10 s. What is the initial speed of the bullet?
A) 9.8 m/s
B) 25 m/s
C) 49 m/s
D) 98 m/s
Answer: C

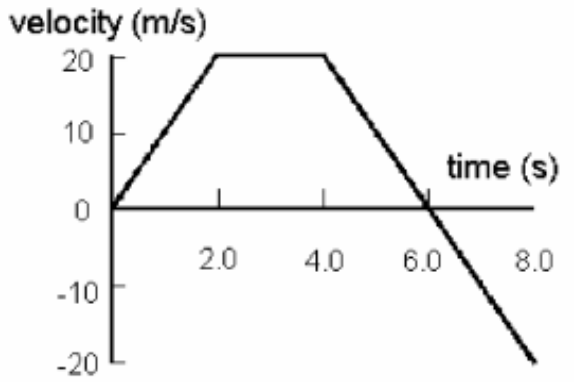

FIGURE 2-2

32) In Fig. 2-2, what is the acceleration at 1.0 s?
A) 0
B) 2.0 m/s^2
C) -2.5 m/s^2
D) 10 m/s^2
Answer: D

33) In Fig. 2-2, what is the acceleration at 3.0 s?
A) 0
B) 2.0 m/s^2
C) -2.5 m/s^2
D) 10 m/s^2
Answer: A

34) In Fig. 2-2, what is the average acceleration from 0 to 5.0 s?
A) 0
B) 2.0 m/s^2
C) -2.5 m/s^2
D) 10 m/s^2
Answer: B

35) In Fig. 2-2, what is the displacement from 0 to 8.0 s?
A) 20 m
B) 40 m
C) 60 m
D) 80 m
Answer: C

Bonus: This will be placed on a separate page for you to take home and complete. It is due the next day in class. If you are absent the day after the test, you must scan and email it to me or have it delivered in a sealed envelope by another person by end our normally scheduled class period. You must show all of your work, and may be asked to explain to the class how you solved the problem (if you get it correct ☺) 10 pts.

Bonus: A car starts from rest and accelerates uniformly at 3.0 m/s^2. A second car starts from rest 6.0 s later at the same point and accelerates uniformly at 5.0 m/s^2. How long does it take the second car to overtake the first car?
Answer: 21 s