Exam 1--PHYS 101--F14--Chapters 1 & 2

Multiple Choice
Identify the choice that best completes the statement or answers the question.

1. The following are not standards for time. However, which one could be an appropriate standard, given the requirements for a good standard (accurate, accessible, and unchanging)?
   I. a fraction of the time for the Sun to complete 1 revolution
   II. the period of a pendulum in France
   III. the time required to travel 1 meter
   IV. the time for light to travel a particular distance
   a. III or IV
   b. IV
   c. III
   d. I or II
   e. none of these would be appropriate

2. Which of these equations is dimensionally correct?
   I. \[ v = v_0 + at \]
   II. \[ \frac{mav}{x} = \frac{mv^3}{x^2} \]
   III. \[ mv = \frac{1}{2} \frac{ma}{x} \]
   a. I
   b. II & III
   c. II
   d. I & II
   e. all of these are correct

3. Consider this expression. How many significant figures should the final answer have?
   \[ \frac{(4.1 + 0.920)^2}{2.54} \]
   a. 1
   b. 2
   c. 3
   d. 4

4. The current standard for a kilogram is a cylinder in France. What is the new proposed standard?
   a. the mass of a particular number of silicon atoms
   b. the mass of a silicon sphere in Australia
   c. the mass of a silicon sphere that will have a period of 1 s on a pendulum
   d. the mass required to construct a silicon sphere 3 cm across

5. How many centimeters are in a kilometer?
   a. 10,000 cm
   b. 100,000 cm
   c. 1,000,000 cm
   d. 1,000,000 cm

6. A pencil is about how many meters long?
   a. 0.02 m
   b. 0.2 m
   c. 2.0 m
   d. 20 m

7. Convert the acceleration 12 m/s^2 to the British system of units (miles/hour^2). (1 mile=1609 m)
   a. 97,000 miles/hour^2
   b. 0.0015 miles/hour^2
   c. 15 miles/hour^2
   d. 27 miles/hour^2
8. Consider this triangle. What is the angle $\theta$?

![Triangle Diagram]

a. 46°  
b. 44°  
c. 55°  
d. 36°

9. For the previous triangle, what is the distance $x$?

a. 2.0 m  
b. 4.9 m  
c. 12 m  
d. 4.0 m

10. Which of the following weighs about a pound?

a. 0.05 kg  
b. 0.5 kg  
c. 5 kg  
d. 50 kg  
e. 500 kg

11. What are the units of this equation? $\frac{mv}{a}$

a. $kg \frac{m^3}{s^3}$  
b. $kg \frac{m^2}{s}$  
c. $kg \frac{m^2}{s^2}$  
d. kg m s

12. You move along this track, measured in meters, from point A to point B. What is your displacement?

![Track Diagram]

a. -3 m  
b. -4 m  
c. 3 m  
d. 4 m  
e. -2 m
13. Consider this position versus time graph. What is the average velocity between t=15 seconds and t=25 seconds?

- a. 0.5 m/s
- b. -1 m/s
- c. -2 m/s
- d. $-\frac{1}{2}$ m/s

14. For the previous plot, what is the instantaneous velocity at t=8.0 seconds?

- a. 0.7 m/s
- b. 1.3 m/s
- c. 3.0 m/s
- d. 0.3 m/s
- e. 0.4 m/s

15. A car is travelling at 20 m/s. It slows down at a rate of 10 m/s$^2$. How far does it travel in 2 seconds?

- a. 20 m
- b. 40 m
- c. 80 m
- d. 60 m
- e. 30 m
16. Consider this position versus time graph. Which of the following best represents the velocity versus time graph for the object described in the position versus time graph?

- a. a
- b. b
- c. c
- d. d

17. You throw a ball up with an initial velocity of 10 m/s. How long does it take to return to you?

- a. 1.0 s
- b. 3.0 s
- c. 2.0 s
- d. 1.4 s

18. For the ball in the previous problem. How high does it travel?

- a. 10. m
- b. 5.0 m
- c. 20. m
- d. 15 m
19. Consider this velocity versus time graph. Estimate the acceleration at t=4 s.

- a. 2.0 m/s²
- b. -1.0 m/s²
- c. 3.0 m/s²
- d. -2.0 m/s²
- e. -5 m/s²

20. Consider the previous graph. What is the total distance traveled between t=2 and t=5 s?

- a. 46 m
- b. 23 m
- c. 35 m
- d. 12 m

21. A truck covers 100 m in 10.0 s while smoothly slowing down to a stop. What was its initial velocity?

- a. 40.0 m/s
- b. 5.00 m/s
- c. 20.0 m/s
- d. 10.0 m/s
22. Your speedometer measures which of these?
   a. speed
   b. velocity
   c. both of these
   d. neither of these

23. When throwing a ball straight up, which of the following is true about its velocity $v$ and its acceleration $a$ at the highest point in its path?
   a. $v=0$ and $a=0$
   b. $v=0$ and $a\neq 0$
   c. $v\neq 0$ and $a\neq 0$
   d. $v\neq 0$ and $a=0$

24. You drop a rock off a bridge. When the rock has fallen 4 m, you drop a second rock. As the two rocks continue to fall, what happens to their velocities?
   a. both increase at the same rate
   b. the velocity of the first rock increases faster than the velocity of the second
   c. both velocities stay constant
   d. the velocity of the second rock increases faster than the velocity of the first

25. You drop a ball from a certain height. Which of these represents the velocity versus time graph for the ball’s motion?

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   a)  b)  c)  d)
     v      v      v      v
     t      t      t      t
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   a. a
   b. b
   c. c
   d. d

26. Consider this position versus time graph. Which of these best describes the acceleration?

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   x
   t
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   a. $a=0$
   b. $a<0$
   c. $a>0$
   d. there is not enough information to determine the sign of $a$

27. An car is initially at rest and accelerates at a constant rate. In the first 10 seconds, it travels 100 meters. How far has the car travelled after 20 seconds (from the beginning)?
   a. 200 m
   b. 400 m
   c. 800 m
   d. 1000 m

28. You are using Version A of this exam. Please bubble “A” for this question.
   a. A
   b. B
   c. C
   d. D
Exam 1--PHYS 101--F14--Chapters 1 & 2
Answer Section

MULTIPLE CHOICE

1. ANS: B  PTS: 1
2. ANS: D  PTS: 1
3. ANS: B  PTS: 1
4. ANS: A  PTS: 1
5. ANS: B  PTS: 1
6. ANS: B  PTS: 1
7. ANS: A  PTS: 1
8. ANS: B  PTS: 1
9. ANS: B  PTS: 1
10. ANS: B  PTS: 1
11. ANS: D  PTS: 1
12. ANS: B  PTS: 1
13. ANS: C  PTS: 1
14. ANS: C  PTS: 1
15. ANS: A  PTS: 1
16. ANS: C  PTS: 1
17. ANS: C  PTS: 1
18. ANS: B  PTS: 1
19. ANS: E  PTS: 1
20. ANS: B  PTS: 1
21. ANS: C  PTS: 1
22. ANS: A  PTS: 1
23. ANS: B  PTS: 1
24. ANS: A  PTS: 1
25. ANS: A  PTS: 1
26. ANS: C  PTS: 1
27. ANS: B  PTS: 1
28. ANS: A  PTS: 1