MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) In Fig. 2–1, what is the velocity at \( t = 1.0 \) s?
   A) \(-40\) m/s  
   B) 0  
   C) 20 m/s  
   D) 10 m/s

2) In Fig. 2–1, what is the velocity at \( t = 4.0 \) s?
   A) 20 m/s  
   B) 0  
   C) \(-40\) m/s  
   D) 10 m/s

3) A net force \( F \) accelerates a mass \( m \) with an acceleration \( a \). If the same net force is applied to mass \( 2m \), then the acceleration will be
   A) \( a/2 \)  
   B) \( a/4 \)  
   C) \( 2a \)  
   D) \( 4a \)

4) An object sits on a frictionless surface. A 16–N force is applied to the object, and it accelerates at 2.0 m/s\(^2\). What is the mass of the object?
   A) 8.0 kg  
   B) 4.0 kg  
   C) 32 kg  
   D) 78 N

5) A polar bear starts at the North Pole. It travels 1.0 km south, then 1.0 km east, then 1.0 km north, then 1.0 km west to return to its starting point. This trip takes 45 min. What was the bear's average velocity?
   A) 0.09 km/h  
   B) 0 km/h  
   C) 5.3 km/h  
   D) 4.5 km/h

6) A student pulls a box of books on a smooth horizontal floor with a force of 100 N in a direction of 37° above the horizontal. If the mass of the box and the books is 40.0 kg, what is the acceleration of the box?
   A) 2.0 m/s\(^2\)  
   B) 1.0 m/s\(^2\)  
   C) 1.5 m/s\(^2\)  
   D) 3.3 m/s\(^2\)
7) In the absence of an external force, a moving object will
   A) slow down and eventually come to a stop.  B) go faster and faster.
   C) stop immediately.  D) move with constant velocity.

8) Two cars collide head-on. At every moment during the collision, the magnitude
   of the force the first car exerts on the second is exactly equal to the magnitude of
   the force the second car exerts on the first. This is an example of
   A) Newton's law of gravitation.  B) Newton's second law.
   C) Newton's third law.  D) Newton's first law.

9) A car travels 90 km/h. How long does it take for it to travel 400 km?
   A) 3.3 h  B) 1.9 h  C) 10.2 h  D) 4.4 h

10) A book contains 382 sheets of paper. The book is 3.00 cm thick. What is the
    average thickness of a sheet of paper in the book, in centimeters?
    A) 200  B) 100  C) 8 × 10⁻³  D) 4 × 10⁻³

11) A ball is thrown downward from the top of a building with an initial speed of 25
    m/s. It strikes the ground after 2.0 s. How high is the building?
    A) 30 m  B) 50 m  C) 70 m  D) 20 m

12) Three vectors, expressed in Cartesian coordinates, are

<table>
<thead>
<tr>
<th>x comp</th>
<th>y comp</th>
</tr>
</thead>
<tbody>
<tr>
<td>⃗S</td>
<td>-3.5</td>
</tr>
<tr>
<td>⃗T</td>
<td>0</td>
</tr>
<tr>
<td>⃗U</td>
<td>+5.5</td>
</tr>
</tbody>
</table>

What is the magnitude of the resultant vector ⃗S + ⃗T + ⃗U?
A) 18  B) 16  C) 24  D) 4.9

13) 100 mL is equivalent to which of the following?
    A) 1 kL  B) 0.01 ML  C) 0.1 L  D) 10⁻⁶ µL
14) Two forces are acting on an object as shown in Fig. 3–1. What is the direction of the resultant force?
   A) $12^\circ$ above $+x$  
   B) $78^\circ$ above $+x$  
   C) $12^\circ$ above $-x$  
   D) $78^\circ$ above $-x$

15) Two forces are acting on an object as shown in Fig. 3–1. What is the magnitude of the resultant force?
   A) 198 N  
   B) 47.5 N  
   C) 185 N  
   D) 200 N

16) The metric prefix for one thousand is
   A) mega.  
   B) kilo.  
   C) milli.  
   D) centi.

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

18) A constant net force acts on an object. Describe the motion of the object.
   A) increasing acceleration  
   B) constant acceleration  
   C) constant speed  
   D) constant velocity

19) If 1 inch = 2.54 cm, how many square centimeters are in 1.00 square in.?
   A) 5.08  
   B) 2.54  
   C) 6.45  
   D) 1.59

20) If you are driving 72 km/h along a straight road and you look to the side for 4.0 s, how far do you travel during this inattentive period?
   A) 18 m  
   B) 80 m  
   C) 40 m  
   D) 20 m

21) Suppose that a car traveling to the East ($+x$ 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 negative.
   B) The acceleration is zero.
   C) The car is decelerating, and its acceleration is positive.
   D) A statement cannot be made using the information given.
22) The number of significant figures in 10001 is
   A) six.  B) five.  C) two.  D) three.

23) A stone is thrown straight up. At the top of its path, the net force acting on it is
   A) equal to its weight.  B) greater than its weight.
   C) instantaneously equal to zero.  D) greater than zero, but less than its weight.

24) A car travels 20 km West, then 20 km South. What is the magnitude of its displacement?
   A) 28 km  B) 20 km  C) 0 km  D) 40 km

25) 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) Neither its velocity nor its acceleration is zero.
   D) Its velocity is not zero and its acceleration is zero.

26) Two displacement vectors have magnitudes of 5.0 m and 7.0 m, respectively. When these two vectors are added, the magnitude of the sum
   A) could be as small as 2.0 m, or as large as 12 m.
   B) is 12 m.
   C) is larger than 12 m.
   D) is 2.0 m.

27) What is the mass of an object that weighs 250 N on the surface of the Earth where the acceleration due to gravity is 9.80 m/s²?
   A) 24.5 kg  B) 25.5 kg  C) 2,450 kg  D) 250 kg

28) Suppose that an object is moving with a constant velocity. Make a statement concerning its acceleration.
   A) The acceleration must be constantly decreasing.
   B) The acceleration must be a constant non-zero value.
   C) The acceleration must be constantly increasing.
   D) The acceleration must be equal to zero.

29) 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) zero.  C) 40,000 m/s.  D) 4.0 m/s.

30) If a ball is thrown with a velocity of 25 m/s at an angle of 37° above the horizontal, what is the vertical component of the velocity?
   A) 15 m/s  B) 25 m/s  C) 19 m/s  D) 12 m/s
31) The number of significant figures in 0.01500 is
   A) five.   B) three.   C) two.   D) four.

32) A soccer ball is kicked with a velocity of 25 m/s at an angle of 45° above the
   horizontal. What is the vertical component of its acceleration as it travels along
   its trajectory?
   A) 9.80 m/s² downward   B) (9.80 m/s²) × sin (45°) downward
   C) (9.80 m/s²) upward   D) (9.80 m/s²) × sin (45°) upward

33) A hot air balloon rises to an altitude of 600 fathoms. What is this height, in feet?
   (1 fathom = 6 ft.)
   A) 600 ft   B) 100 ft   C) 3600 ft   D) 1200 ft

34) Ignoring air resistance, the horizontal component of a projectile's velocity
   A) is zero.   B) continuously decreases.
   C) remains constant.   D) continuously increases.

35) A pilot drops a bomb from a plane flying horizontally at a constant speed.
   Neglecting air resistance, when the bomb hits the ground the horizontal location
   of the plane will
   A) be over the bomb.
   B) be in front of the bomb.
   C) depend on the speed of the plane when the bomb was released.
   D) be behind the bomb.

36) Write out the number 8.42 × 10⁻⁵ in full with a decimal point and correct
    number of zeros.
    A) 0.00842   B) 0.0000842   C) 0.000842   D) 0.00000842

37) A 10-kg box sitting on a horizontal surface is pulled by a 5.0-N force. A 3.0-N
    friction force retards the motion. What is the acceleration of the object?
    A) 0.20 m/s²   B) 0.30 m/s²   C) 5.0 m/s²   D) 0.50 m/s²

38) A golf club hits a golf ball with a force of 2400 N. The golf ball hits the club with
    a force
    A) slightly less than 2400 N.   B) exactly 2400 N.
    C) close to 0 N.   D) slightly more than 2400 N.

39) Which one of the following is an example of a vector quantity?
    A) distance   B) area   C) velocity   D) mass

40) Write the number 13.5 gigameters as full (decimal) numbers with standard
    units.
    A) 135,000,000 m   B) 135,000,000,000 m
    C) 135,000 m   D) 13,500,000,000 m
41) A ball is thrown with a velocity of 20 m/s at an angle of 60° above the horizontal. What is the horizontal component of its instantaneous velocity at the exact top of its trajectory?
   A) 10 m/s  B) 20 m/s  C) 17 m/s  D) zero

42) An object has a mass of 60 kg on the Earth. What is the mass of the object on the surface of the Moon where the acceleration due to gravity is only 1/6 of that on the Earth?
   A) 60 kg  B) 360 kg  C) 10 kg  D) 6.0 kg
Answer Key  
Testname: TEST 1

1) D  
2) B  
3) A  
4) A  
5) B  
6) A  
7) D  
8) C  
9) D  
10) C  
11) C  
12) D  
13) C  
14) B  
15) C  
16) B  
17) D  
18) B  
19) C  
20) B  
21) A  
22) B  
23) A  
24) A  
25) B  
26) A  
27) B  
28) D  
29) B  
30) A  
31) D  
32) A  
33) C  
34) C  
35) A  
36) B  
37) A  
38) B  
39) C  
40) D  
41) A  
42) A