1. The number of significant figures in 0.00150 is:
   (A) 2
   (B) 3
   (C) 4
   (D) 5
   (E) 6

   1 pt.

2. 1 mile is equivalent to 1609 m so 55 mph (miles per hour) is:
   (A) 25 m/s
   (B) 66 m/s
   (C) 88 m/s
   (D) 1500 m/s

   1 pt.

3. A sphere with a radius of 1.7 cm has a surface area of:
   (A) 2.1 \times 10^{-2} \text{ m}^2
   (B) 9.1 \times 10^{-2} \text{ m}^2
   (C) 8.6 \times 10^{-3} \text{ m}^2
   (D) 0.11 \text{ m}^2
   (E) 36 \text{ m}^2

   1 pt.

4. During a short interval of time the speed \( v \) in m/s of an automobile is given by \( v = a t^2 + b t \), where the time \( t \) is in seconds. The units of \( a \) and \( b \) are respectively:
   (A) m/s, m/s
   (B) m/s, s/m
   (C) m/s, m/s
   (D) s/m, m/s
   (E) m/s, m/s

   1 pt.

5. A car moving with an initial velocity of 25 m/s north has a constant acceleration of 3 m/s² south. After 6 seconds its velocity will be:
   (A) 7 m/s north
   (B) 7 m/s south
   (C) 43 m/s north
   (D) 20 m/s north
   (E) 20 m/s south

   1 pt.
9. A body starts from rest at point A and is given a constant acceleration of 4 m/s² in the horizontal direction. After 5 seconds, it reaches point B. What is the final velocity of the body at point B?

\[ v = at = 4 \times 5 = 20 \text{ m/s} \]

10. A stone is dropped from a height of 100 m above the ground. Neglecting air resistance, how long will it take for the stone to reach the ground?

\[ t = \sqrt{\frac{2h}{g}} = \sqrt{\frac{2 \times 100}{9.8}} \approx 4.52 \text{ s} \]

11. A particle is projected at an angle of 30° with the horizontal. If the maximum height reached by the particle is 50 m, what is the initial velocity of the particle?

\[ v_0 = \sqrt{\frac{2gh}{\sin 2\theta}} = \sqrt{\frac{2 \times 9.8 \times 50}{\sin 60°}} \approx 35.36 \text{ m/s} \]
15. A force of 10 N is applied at an angle to an object. The object is in motion with a velocity of 5 m/s. Which of the following statements is/are true regarding work and the object's kinetic energy?

A. The work is done on the object.
B. The work is done against the object's kinetic energy.
C. The work is done on the object and increases its kinetic energy.
D. The work is done on the object and decreases its kinetic energy.
E. None of the above.

16. Which of the following statements is true for the object's motion?

A. Mass, velocity, and speed.
B. Mass and speed.
C. Mass and velocity.
D. Mass and gravitational potential energy.
E. None of the above.

17. A rock is released from a height and falls to the ground. When it has fallen to its lowest point, what is its potential energy?

A. 1800 J
B. 3600 J
C. 1200 J
D. 600 J
E. None of the above.
SOLVING PROBLEMS

Show all the steps. Give right number of significant digits and write units.

1. Given: 19 42. Convert 12 in. into cm.

\[ 12 \text{ in.} \times \frac{1 \text{ ft}}{12 \text{ in.}} \times \frac{1 \text{ yd}}{3 \text{ ft}} \times \frac{1 \text{ in.}}{2.54 \text{ cm}} = 12 \times 10^2 \text{ cm} \]

\[ 1 \text{ in.}^2 = 10^2 \text{ cm}^2 \]

\[ 1 \text{ in.}^2 = (10)^2 \text{ cm}^2 \]

\[ 1 \text{ in.}^2 = 10^3 \text{ cm}^2 \]

\[ 1 \text{ in.}^2 = (2.54)^2 \text{ cm}^2 \]

2. A car accelerates to 5.0 km/h in 22 sec. What is the acceleration? (given)

\[ \frac{\Delta x}{t} = \frac{5.0 \text{ km}}{22 \text{ s}} \]

\[ \Delta x = 0 \text{ km} \]

\[ V = \frac{5.0 \text{ km}}{22 \text{ s}} = \frac{5.0}{22} \text{ m/s} = 0.23 \text{ m/s} \]

\[ a = ? \]

\[ \Delta x = \frac{1}{2} (V + V_0) t \]

\[ = \frac{1}{2} (13.4 + 0) (22) \]

\[ \Delta x = 152.7 \text{ m} \]

\[ = 150 \text{ m} + 2.7 \text{ m} \]

\[ = 1.5 \times 10^2 \text{ m} \]
\[ R = \sqrt{\sum R_x^2 + R_y^2} = \sqrt{(46.9)^2 + (-36.3)^2} = 59.3 \text{ km} \]

\[ \theta = \tan^{-1}\left(-\frac{36.3}{46.9}\right) = -37.7^\circ \]