

Part 1.**(1.0 point each)**

Please circle **O** the correct answer, to the nearest number for quantitative questions, for each of the following:

1. Using the dimensions given for the variables in the table, determine which one of the following expressions is correct.

A) $f = \frac{g}{2\pi l}$

B) $2\pi f = \sqrt{\frac{l}{g}}$

C) $f = 2\pi gl$

D) $f = 2\pi\sqrt{gl}$

E) $2\pi f = \sqrt{\frac{g}{l}}$

variable	dimension
f	$\frac{1}{[T]}$
l	$[L]$
g	$\frac{[L]}{[T]^2}$

2. How many significant figures are in 10,002?

A) 2.

B) 3.

C) 4.

D) 5.

E) Cannot determine.

3. The **Figure** below represents the position of a particle as it travels along the **x-axis**. At what value of **the time (t)** is the speed of the particle equal to **zero**?

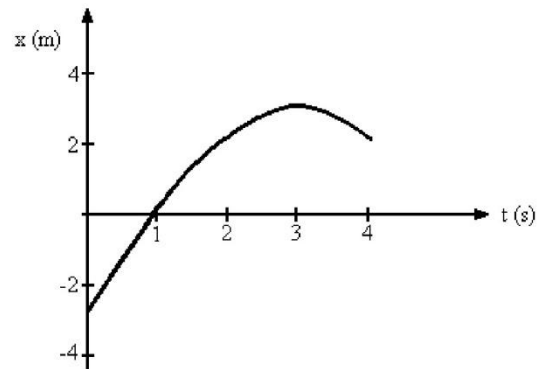
A) 0 s.

B) 1 s .

C) 2 s.

D) 3 s.

E) 4 s.



4. From the **Figure** in **Question 3**, **approximately**, what is the magnitude of the **instantaneous velocity** of the particle when **t = 1 s**?

A) 0 m/s.

B) 1 m/s.

C) 2 m/s.

D) 3 m/s.

E) 4 m/s.

5. From the **Figure** in **Question 3**, what is the average speed of the particle between **t = 1 s** and **t = 4 s**?

A) 1.0 m/s

B) 0.67 m/s

C) 0.50 m/s

D) 1.3 m/s

E) 0.25 m/s

6. A car starts from rest and accelerates at **6.00 m/s²**. How far does it travel in **3.00 s**?

A) 9.00 m

B) 18.0 m

C) 54.0 m

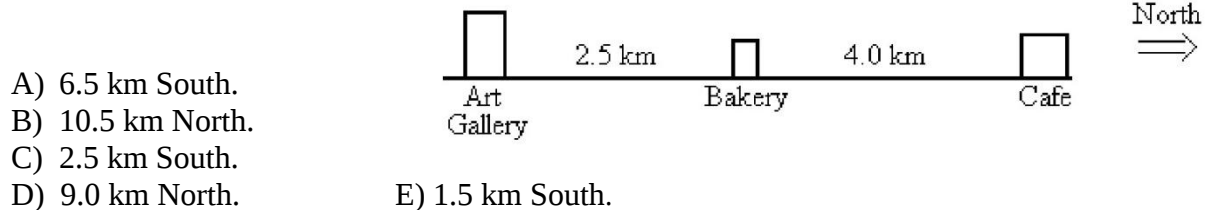
D) 36.0 m

E) 27.0 m

7. A stone is thrown straight up. When it reaches its 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.
- E) needs additional information.

8. Refer to the **Figure below**. If you start from the Bakery, travel to the Cafe, and then to the Art Gallery, what is your displacement?



9. The velocity of a particle as a function of time is given by

$v(t) = (2.3 \text{ m/s}) + (4.1 \text{ m/s}^2)t - (6.2 \text{ m/s}^3)t^2$. What is the average acceleration of the particle between $t = 1.0 \text{ s}$ and $t = 2.0 \text{ s}$?

- A) -15 m/s^2
- B) -13 m/s^2
- C) 13 m/s^2
- D) 15 m/s^2
- E) 0.0 m/s^2

10. A car is moving with a speed of **32.0 m/s**. The driver sees an accident ahead and slams on the brakes, giving the car a deceleration of **3.50 m/s²**. How far does the car travel after the driver put on the brakes before it comes to a stop?

- A) 4.57 m.
- B) 9.14 m.
- C) 112 m.
- D) 146 m.
- E) 292 m.

11. A car is initially traveling at **50.0 km/h**. The brakes are applied and the car stops over a distance of **35 m**. What was magnitude of the car's acceleration while it was braking?

- A) 2.8 m/s^2
- B) 36 m/s^2
- C) 9.8 m/s^2
- D) 5.4 m/s^2
- E) 71 m/s^2

End of Part 1

Some useful constants and formula for Parts 1 & 2:

$$g = 9.81 \text{ m/s}^2 \quad \text{For quadratic equations} \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Part 2:

Please read each of the following questions carefully and show your work in the space provided. Include the appropriate units with your answer. (3 points each)

P1. In a race, runner **A** has a constant velocity of **2.80 m/s**. When runner **A** is **25.0 m** behind runner **B** who is at rest, runner **B** accelerates at **0.0800 m/s²**. How long afterwards will runner **A** catch up with runner **B**?

Answer (with units) _____

P2. An object is thrown upwards with a speed of **13 m/s**. How long does it take to reach a height of **4.0 m** above the **projection point (starting point)** while **descending (going down)**?

Answer (with units) _____