PHY2111

Max Kiene

Spring 2025

Contents

1 Concepts of Motion, Significant Figures, Estimation **2**
1.1 Quiz Work 2
1.1.1 Question 1 2
1.1.2 Question 2 2
1.1.3 Question 3 2
1.1.4 Question 4 2
1.1.5 Question 5 3
1.1.6 Question 6 3
1.1.7 Question 7 3
1.1.8 Question 8 3
1.1.9 Question 9 3
1.1.10 Question 3
1.1.11 Question 11 4
1.1.12 Question 12 4

Chapter 1

Concepts of Motion, Significant Figures, Estimation

1.1 Quiz Work

1.1.1 Question 1

↪ **Solution.** Since there are no velocity vectors, it is impossible to determine whether or not the particle is slowing down or speeding up. □

1.1.2 Question 2

↪ **Solution.** The object is moving downwards, but decreasing in speed. This means that the acceleration vector is opposite of the velocity vector, which (in this case) means that a_y is pointing upwards. □

1.1.3 Question 3

↪ **Solution.** The sign of the position, velocity, and acceleration are all positive, since the object is above the y-axis and is accelerating upwards (increasing in speed) □

1.1.4 Question 4

↪ **Solution.** Since the direction of the particle was not specified, I chose for the velocity vectors to point to the right. The acceleration vectors initially would be opposite of the velocity vectors (since the object was slowing down), but after point 2 the acceleration would be in the same direction as the velocity. □

1.1.5 Question 5

↪ **Solution.** I chose the first motion diagram, since the acceleration vectors and velocity vectors align with the problem most accurately. □

1.1.6 Question 6

↪ **Solution.** I chose option 3, since Eustace would need to drive back in the same direction away from El Dorado. □

1.1.7 Question 7

↪ **Solution.**

A. $8.181 \times 10^{-1} \to 4$ significant figures

B. $95.0 \to 3$ significant figures (trailing zero after decimal is significant)

C. $0.0469 \to 3$ significant figures

D. $0.04 \times 10^{8} \to 1$ significant figure

□

1.1.8 Question 8

↪ **Solution.**

A. $159.31 \cdot 204.6 = 32594.826 \approx 32590$

B. $5.1125 + 0.67 + 3.2 = 8.9825 \approx 9.0$

C. $7.662 - 7.425 = 0.237$

D. $\frac{16.5}{3.45} = 4.7826087 \approx 4.78$

□

1.1.9 Question 9

↪ **Solution.**

A. I chose the fourth motion diagram since the acceleration vectors are pointing in the appropriate direction.

B. I chose the fourth word description because cyclist B would need to be travelling slower in order for them to meet.

C. I chose the first pictoral because it aligns with the problem most accurately (the accelerations are correct)

□

1.1.10 Question

↪ **Solution.**

A. $81\text{in} \cdot 0.0254\text{m/in} = 2.0574\text{m}$

B. $4.45 \cdot 10^6\text{yr} \cdot 3.154 \cdot 10^7\text{s/yr} = 1.404 \cdot 10^{14}\text{s}$

C. $69\text{ft/day} \cdot \frac{0.3048\text{m}}{1\text{ft}} \cdot \frac{1}{86400\text{s/day}} = 2.434 \cdot 10^{-4}\text{m/s}$

D. $3.2 \cdot 10^4\text{mi}^2 \cdot 2.58999 \cdot 10^6\text{m}^2\text{mi}^2 = 8.288 \cdot 10^{10}\text{m}^2$

□

1.1.11 Question 11

↪ **Solution.**

$$\begin{aligned}\text{time} &= \frac{\text{distance}}{\text{speed}} \\ \text{time} &= \frac{0.8\text{m}}{25\text{m/s}} \\ &= 0.032 \text{ seconds} \\ &\approx 30 \text{ ms.}\end{aligned}$$

□

1.1.12 Question 12

↪ **Solution.**

$$\begin{aligned}7.5\text{g/L} &= 7.5 \cdot 0.001\text{kg/L} = 0.0075\text{kg/L} \\ 1\text{L} &= 0.001\text{m}^3 \\ 0.0075\text{kg/L} \cdot \frac{1}{0.001\text{m}^3\text{/L}} &= 7.5\text{kg/m}^3.\end{aligned}$$

□