

Physics 210 Week 1 Multiple Choice Problems

Multiple Choice

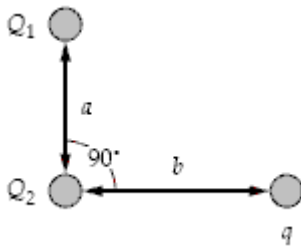
Identify the choice that best completes the statement or answers the question.

- _____ 1. The position of a particle moving along the x axis is given by $x = 6.0t^2 - 1.0t^3$, where x is in meters and t in seconds. What is the position of the particle when it achieves its maximum speed in the positive x direction?
- 24 m
 - 12 m
 - 32 m
 - 16 m
 - 2.0 m
- _____ 2. The position of a particle as it moves along the x axis is given by $x = 15e^{-2t}$ m, where t is in s. What is the acceleration of the particle at $t = 1$ s?
- 22 m/s
 - 60 m/s
 - 8.1 m/s
 - 15 m/s
 - 35 m/s
- _____ 3. Cart A, of mass m , starts from rest and travels in a straight line with acceleration a . It traverses a distance x in time t . Cart B, of mass $4m$, starts from rest and travels in a straight line with acceleration $\frac{a}{2}$. At time t it has traversed the distance
- $\frac{x}{4}$.
 - $\frac{x}{2}$.
 - x .
 - $2x$.
 - $4x$.

Instructions: On occasion, the notation $\vec{A} = [A, \theta]$ will be a shorthand notation for $\vec{A} = A \cos \theta \hat{i} + A \sin \theta \hat{j}$.

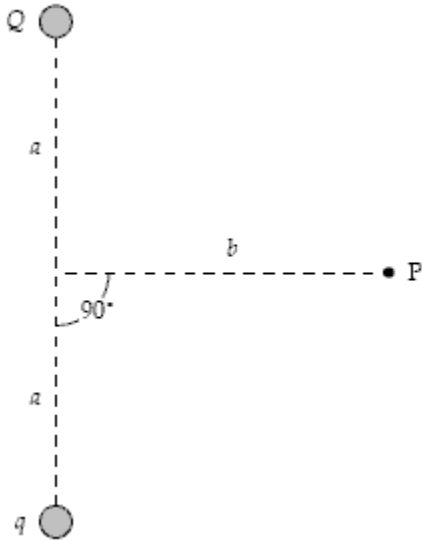
- _____ 4. If $\vec{A} = 12\hat{i} - 16\hat{j}$ and $\vec{B} = -24\hat{i} + 10\hat{j}$, what is the magnitude of the vector $\vec{C} = 2\vec{A} - \vec{B}$?
- 42
 - 22
 - 64
 - 90
 - 13
- _____ 5. A vector, \vec{B} , when added to the vector $\vec{C} = 3\hat{i} + 4\hat{j}$ yields a resultant vector which is in the positive y direction and has a magnitude equal to that of \vec{C} . What is the magnitude of \vec{B} ?
- 3.2
 - 6.3
 - 9.5
 - 18
 - 5

- _____ 6. At $t = 0$, a particle leaves the origin with a velocity of 9.0 m/s in the positive y direction and moves in the xy plane with a constant acceleration of $(2.0\mathbf{i} - 4.0\mathbf{j})\text{m/s}^2$. At the instant the x coordinate of the particle is 15 m , what is the speed of the particle?
- 10 m/s
 - 16 m/s
 - 12 m/s
 - 14 m/s
 - 26 m/s
- _____ 7. A rock is projected from the edge of the top of a building with an initial velocity of 12.2 m/s at an angle of 53° above the horizontal. The rock strikes the ground a horizontal distance of 25 m from the base of the building. Assume that the ground is level and that the side of the building is vertical. How tall is the building?
- 25.3 m
 - 29.6 m
 - 27.4 m
 - 23.6 m
 - 18.9 m
- _____ 8. Each of two small non-conducting spheres is charged positively, the combined charge being $40 \mu\text{C}$. When the two spheres are 50 cm apart, each sphere is repelled from the other by a force of magnitude 2.0 N . Determine the magnitude of the smaller of the two charges.
- $1.4 \mu\text{C}$
 - $1.1 \mu\text{C}$
 - $2.0 \mu\text{C}$
 - $3.3 \mu\text{C}$
 - $17 \mu\text{C}$
- _____ 9. If $a = 3.0 \text{ mm}$, $b = 4.0 \text{ mm}$, $Q_1 = 60 \text{ nC}$, $Q_2 = 80 \text{ nC}$, and $q = 24 \text{ nC}$ in the figure, what is the magnitude of the total electric force on q ?



- 2.7 N
- 1.9 N
- 2.3 N
- 1.5 N
- 0.52 N

10. If $a = 60$ cm, $b = 80$ cm, $Q = -6.0$ nC, and $q = 3.0$ nC in the figure, what is the magnitude of the electric field at point P?



- a. 71 N/C
- b. 56 N/C
- c. 60 N/C
- d. 53 N/C
- e. 67 N/C

Physics 210 Tutorial #1 Practise Problems Answer Section

MULTIPLE CHOICE

- | | |
|------------|--------|
| 1. ANS: D | PTS: 1 |
| 2. ANS: C | PTS: 1 |
| 3. ANS: B | PTS: 1 |
| 4. ANS: C | PTS: 1 |
| 5. ANS: A | PTS: 1 |
| 6. ANS: A | PTS: 1 |
| 7. ANS: D | PTS: 1 |
| 8. ANS: A | PTS: 1 |
| 9. ANS: D | PTS: 1 |
| 10. ANS: D | PTS: 1 |