Mu'tah University - Department of Physics

Medical Physics (100)

First Exam

Sunday 9/11/2014

$\hat{i} = \hat{x}$

$\hat{j} = \hat{y}$

$g = 9.8\ m/s^2$

الاسم : ... رقم الجامعي : ... اسم المدرس ...

1	2	3	4	5	6	7	8	9	10
C	B	C	B	B	B	E	E	B	C

Q1. Consider the following equation: $x = At^4 + (B/A)\,t^2$, where x is the distance, t is the time and v is the speed . The dimensions of B is

A) L^2T^{-4} B) L^2T^{-5} C) L^2T^{-6} D) L^2T^{-8} E) L^2T^{-7}

Q2. The x component of vector $\vec{A}$ is $3.0\ m$ and the Y component is $-4.0\ m$. The magnitude of $\vec{A}$ and the angle that it makes with the positive x-axis is:

A) $10\ m$; $127°$ B) $5.0\ m$; $53.1°$ C) $5.0\ m$; $127°$

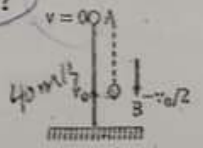
D) $5.0\ m$; $307°$ E) $5.0\ m$; $233°$

Q3. A vector $\vec{A}$ is added to the sum of two vectors $\vec{B} = 3\hat{i} - 2\hat{j} - 2\hat{k}$ and $\vec{C} = 2\hat{i} - \hat{j} + 3\hat{k}$ such that $\vec{A} + \vec{B} + \vec{C} = -2\,\hat{i}$. The vector $\vec{A}$ is:

A) $-5\hat{i} + 3\hat{j}$ B) $-5\hat{i} + 5\hat{j} - \hat{k}$ C) $-7\hat{i} + 3\hat{j} - \hat{k}$

D) $-4\hat{i} + 4\hat{j} - \hat{k}$ E) $-3\hat{i} + 3\hat{j} - 2\hat{k}$

Q4. A ball is thrown vertically upward with an initial velocity v_0 and reaches its maximum height in 4s. At what time, after it was thrown, will it have velocity $-v_0/2$?



A) 9s B) 6s C) 15s D) 18s E) 12s

Q5. The velocity of a truck moving in a straight line is given by $v(t) = 2 - 4t + 4t^2$ where v in m/s and t is in seconds. Find the velocity (in m/s) of the truck at the instant when its acceleration is $20\ m/s^2$.

A) 10 B) 26 C) 0 D) 4.5 E) 16

Mu'tah University Department of Physics
First exam in physics 101
Tuesday, 11/11/2014

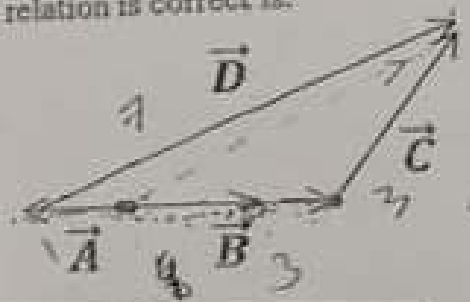
1	2	3	4	5	6	7	8	9	10
B	A	C	D	H	D	E	D	B	B

use $g = 10 m/s^2$

1. velocity of a particle is given by the equation $v(t) = At + Bt^2 + Ct^3$. If this equation is ensionally correct, where v is the velocity, t is the time, , B and C are constants. The SI t of the constant B is?

A. $1/s^2$ B. m/s^3 C. m/s^2 D. m^2/s^3 E. m/s^4

2. For the vectors in the figure, which one of the following relation is correct is:



A. $\vec{B} - \vec{D} = \vec{A} + \vec{C}$
B. $\vec{C} + \vec{B} - (\vec{A} + \vec{D}) = 0$
C. $\vec{B} - \vec{A} = \vec{D} + \vec{C}$
D. $\vec{A} + \vec{B} + \vec{C} = -\vec{D}$
E. $\vec{B} + \vec{C} = \vec{A} - \vec{D}$

3. If $\vec{A} = -6\,\hat{i} + 3\,\hat{j}$, the magnitude of the vector $\vec{B}$ so that $\vec{B} = -\frac{1}{3}\vec{A}$ is:-

A. $\sqrt{13}$ B. $\sqrt{2}$ C. $\sqrt{5}$ D. $\sqrt{8}$ E. $\sqrt{18}$

4. If the magnitude of $\vec{A}$ and $\vec{B}$ are 4 units and 3 units respectively and the resultant is 3 units The angle between the vectors $\vec{A}$ and $\vec{B}$ in degrees is:

A. 90 B. 120 C. 68 D. 48 E. 29

The head of vector $\vec{B}$ on the tail of vector $\vec{A}$

5. An object moves from point A to point B with a speed of 5m/s and comeback from B to A with speed of 3m/s. The average speed of the object is :-

A. 4.44 m/s B. 5.45m/s C. 2.40m/s D. 5.33m/s E. 3.75m/s

الاسم: ...... الرقم المتسلسل: ...... مدرس المادة: ......

1	2	3	4	5	6	7	8	9	10
b	b	d	a	b	c	a	d	b	c

18/25

- Acceleration due to gravity = g = 9.8 m/s²

Q1: The equation for the change of position of a train starting at x = 0 m is given by $x = \frac{1}{2}at^2 + bt^3$. The dimensions of b are:

a) LT^{-2} b) T^{-3} c) LT^{2} d) LT^{-1}

Q2: A car moving in a straight road with constant acceleration of 8 m/s² covers a distance between two points A and B, 100 m a part, in 10 seconds. Find the final velocity (in m/s) at point B.

a) 25 b) 50 c) 110 d) 36

Q3: Of the following situations, which one is **impossible**?

a) A body having velocity east and acceleration east.

b) A body having velocity east and acceleration west.

c) A body having variable velocity and constant acceleration.

d) A body having constant velocity and variable acceleration.

Q4: An object moves along the x-coordinate according to the equation $x=(4t^2-3)$ m. Determi[ne the] average velocity between t = 1 s and t = 2 s.

a) 12 m/s b) 16 m/s c) 10 m/s d) 18 m/s

Q5: A ball thrown **vertically** from ground level is caught 4 s later by a person on balcony 14 m above the ground. The **initial speed** (in m/s) of the ball is:

a) 30.2 b) 23.1 c) 10.2 d) 19.4

Q6: What is the angle between the vectors $\vec{A}=3\hat{i}-\hat{j}$ and $\vec{B}=2\hat{i}-5\hat{j}$?

a) 29.3° b) 49.8° c) 60° d) 40°

Q7: A vector $\vec{A}$ has positive x component 4 units in length and positive y component length. What is the magnitude of the second vector $\vec{B}$ when added to $\vec{A}$ gives vector with no x component and negative y component 4 units in length?

a) 7.2 b) 3.6 c) 5.7 d) 9

Q8: A projectile is fired in such a way that its initial velocity is 56 m/s and strikes a t[arget at a] horizontal distance of 320 m away. The projection angle (in degrees) is:

a) 90 b) 30 c) 60 d) 45

Phys 101
First exam

Mutah University
Dept of Physics

1 hour
14/7/2014

1	2	3	4	5	6	7	8	9	10
C	B	C	D	A	B	A	D	C	A

g=10m/s²

1. Vector D has a magnitude of 3m and makes an angle of −45 with the x-axis, its x-component equals,
(a) −2.1 m (b) −1.2 m (c) +2.1 m (d) +1.2 m

2. The angle between the two vectors A=2i+3j+k and B=−4i+2j−k is,
(a) 50 (b) 100 (c) 120 (d) 60

3. The velocity of a car at any time is given by the equation, v=(60+0.5t²) m/s, the average acceleration of the car between t=1s and t=3s is,
(a) 4m/s² (b) 3 m/s² (c) 2 m/s² (d) 1 m/s²

4. Using the equation of previous problem, the instantaneous acceleration at t=1s equals,
(a) 4m/s² (b) 3 m/s² (c) 2 m/s² (d) 1 m/s²

5. A ball is dropped from a tall building from rest, the position of the ball after 2 s is,
(a) 10 m (b) −10 m (c) 20 m (d) −20m

6. Given A=6i+3j−k and B=4i−5j+8k, the magnitude of 2A − B equals,
(a) 17 (b) 18 (c) 19 (d) 20

7. a car moving with x=(2−0.25 t²)m and y=(t+0.025·t³)m, the distance of the car from the origin at t=2 s is,
(a) 2.1 m (b) 2.2 m (c) 2.3 m (d) 2.4 m

8. A goat jumped off the edge of a cliff with a horizontal velocity equals 9 m/s, the (x,y) components of its position at t=0.5 second is,
(a) (1.2,−4.5)m (b) (−1.2, 4.5)m (c) (4.5,−1.2)m (d) (−4.5,1.2)m

9. A player hits a ball with initial velocity of 37 m/s with an angle 53.1, the maximum height that the ball can reach is,
(a) 34.8 m (b) 84.3 m (c) 43.8 m (d) 48.3 m

10. A long jumper leaves the ground at an angle of 20 above the horizontal at a speed of 11 m/s, his maximum range is,
(a) 9.74 m (b) 7.94 m (c) 4.97 m (d) 9.47 m

$\vec{A}\cdot\vec{B} = |A||B|\cos$

$R = \sqrt{A^2+B^2+2AB\cos\theta}$

$\hat{R} = 28.94$

$R = -2i + 5j$

$|\vec{R}| = \sqrt{29}$

$|\vec{R}| = 5.38$

$R^2 = A^2 + B^2 + 2AB\cos\theta$

$28.91 = 13.98 + 20.97 + 34.25\cos\theta$

$-6.01 = 34.25\cos\theta$

$\cos\theta = .1175$

$\theta = 100$

$|\vec{A}| = \sqrt{4+9+1}$

$\sqrt{14}$

$= 3.74$

$|\vec{B}| = \sqrt{16+4+1}$

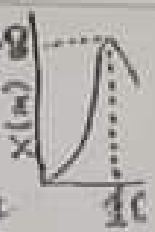
$|\vec{B}| = \sqrt{21}$

$= 4.58$

General Physics 101 | Mu'tah University | First Exam
Spring 2005/2006 | Dept. of Physics | 55 minutes.
Name: ... Section: ... Number: ...

1. Given $\mathbf{A} = 4\mathbf{i} - 2\mathbf{j}$ and, $\mathbf{B} = -\mathbf{i} + 7\mathbf{j}$. The magnitude of $\mathbf{A} + \mathbf{B}$ is,
(a) 7.44 (b) 4.74 (c) 5.83 (d) 4.47

2. In the previous (المسألة السابقة) problem the angle that $\mathbf{A} + \mathbf{B}$ makes with the y-axis is,
(a) 27° (b) 31° (c) 63° (d) 59°

3. The figure shows x(t) graph (المنحنى) for certain particle, the velocity of the particle at 2 s in m/s is,


(a) zero (b) 0.28 (c) 3.5 (d) 7

4. A stone is thrown from the top of a hill with initial velocity of 20 m/s at an angle of 37°. If it reaches the ground after 2 s. The height (الارتفاع) of the hill is,
(a) -80 m (b) 8.1 m (c) 4.5 m (d) 4.5 m.

5. For the previous problem, the magnitude of the stone velocity just before it hits the ground is,
(a) 63.2 m/s (b) 23.6 m/s (c) 66.9 m/s (d) 17.7 m/s.

6. A particle moves along the x-axis according to the equation (حسب المعادلة) $x = -(2t^3 + 3t^2 - 5t)$ m, the acceleration of the particle at t = 2 s is,
(a) -30 m/s^2 (b) 18 m/s^2 (c) 30 m/s^2 (d) -81 m/s^2

7. The volume (حجم) of a sphere (كرة) as a function of time is given by $V = bt^2$. The dimension of b is,
(a) L/T (b) L^3/T^2 (c) T^3/L^3 (d) T / L

8. A bullet (رصاصة) was fired from a horizontal rifle (مسدس) with initial velocity of 500 m/s on a 300 m away target, (هدف) the bullet strikes the target at y equals,,
(a) 0.78 m (b) –0.78 m (c) –1.76 m (d) 1.76 m

9. A jumper leaves the ground at an angle of 20 to the horizontal with a speed of 15 m/s. The time needed for the jumper to reach the maximum height is,
(a) 3.8 s (b) 8.3 s (c) 0.5 s (d) 0.38 s

10. For the jumper in previous problem, the maximum range (المدى) is,
(a) 2.9 m (b) 9.74 m (c) 7.94 m (d) 14 m

1	2	3	4	5	6	7	8	9	10
C	A	B	D	B	A	B	C	C	D

Physics 101

Mu'tah University

First Exam

Q1:- The equation for the change of position of a train starting at $x=0$ m is given by $x=\frac{1}{2}at^2+bt^3$. The dimensions of a are

a. T^{-3} b. LT^3 c. LT^{-2} d. LT^{-1}

Q2:-The coordinate of a particle in meters is given by $x(t)=32t-6t^3$, where the time t is in seconds. The particle is momentarily at rest at t =

a. 0.77 s b. 1.77 s c. 1.3 s d. 7.3 s

Q3:- airplane is in level flight at an altitude of 0.6 km and a speed of 150 km/h. At what distance should it release a heavy bomb to hit the target on the earth?

a. 461m b. 454m c. 420m d. 2550m

Q4:- An object is moving on a circle path of radius $\pi/2$ meters at a constant speed of 4m/s. the time required for one revolution is:

a. $2/\pi^2$ b. $\pi^2/2$ c. $\pi^2/4$ d. $\pi/2$

Q5:-A projectile is thrown from the top of a building with an initial velocity of 40 m/s in the horizontal direction. If the top of the building is 40 m above the ground, how fast will the projectile be moving just before it strikes the ground?

a.35 m/s b.39 m/s c.48 m/s d.41 m/s

Q6: If $\vec{A}=3\hat{i}-4\hat{j}$, $\vec{B}=2\hat{i}+3\hat{j}$, and $\vec{C}=\hat{i}+2\hat{j}$ what is the angle that the vector $-\vec{A}-\vec{B}+\vec{C}$ makes with the positive x-axis?

a. 143° b.37° c. 217 d. 233°

For this part answer Q7 and Q8

A projectile is launched straight up at 60.0 m/s from a height of 80.0 m, at the edge of a sheer cliff. The projectile falls, just missing the cliff and hitting the ground below.

Q7: The maximum height of the projectile above the point of firing is

(a) 184m (b) 222m (c) [illegible] (d) 203m

Q8: The time it takes to hit the ground at the base of the cliff is

(a) 18.3s (b) [illegible] (c) [illegible] (d) 20.3s

1	2	3	4	5	6	7	8	9	10
b	b	d	a	b	c	a	d	b	c

18/25

Acceleration due to gravity = g = 9.8 m/s²

Q1: The equation for the change of position of a train starting at x = 0 m is given by $x = \frac{1}{2}at^2 + bt^3$ the dimensions of b are:

a) LT^{-1} (b) T^{-3} c) LT^{-2} d) LT^{-1}

Q2: A car moving in a straight road with constant acceleration of 8 m/s² covers a distance betwe two points A and B, 100 m a part, in 10 seconds. Find the final velocity (in m/s) at point B.

a) 25 (b) 50 c) 110 d) 36

Q3: Of the following situations, which one is impossible?

a) A body having velocity east and acceleration east

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Q4: An object moves along the x-coordinate according to the equation $x=(4t^2-3)$ m. Determin average velocity between t = 1 s and t = 2 s.

(a) 12 m/s b) 16 m/s c) 10 m/s d) 18 m/s

Q5: A ball thrown vertically from ground level is caught 4 s later by a person on balcony 14 m above the ground. The initial speed (in m/s) of the ball is:

a) 30.2 (b) 23.1 c) 10.2 d) 19.4

Q6: What is the angle between the vectors $\vec{A} = 3\vec{i} - \vec{j}$ and $\vec{B} = 2\vec{i} - 5\vec{j}$?

a) 29.3° (c) 49.8° (e) 60° d) 40°

Q7: A vector $\vec{A}$ has positive x component 4 units in length and positive y component length. What is the magnitude of the second vector $\vec{B}$ when added to $\vec{A}$ gives a vector with no x component and negative y component 4 units in length?

(a) 7.2 b) 3.6 (c) 5.7 d) 9

Q8: A projectile is fired in such a way that its initial velocity is 56 m/s and strikes a targ horizontal distance of 320 m away. The projection angle (in degrees) is:

a) 90 b) 30 c) 60 (d) 45

Physics 101-First Exam

Note: $g = 10\ m/s^2$.

1	2	3	4	5	6	7	8	9	10
B	D	A	A	C	A	A	C	B	d

1. The position of a particle moving along the x-axis is described by the relation: $x(t) = 2 - t^2$. The average acceleration (in m/s^2) of that particle in the time interval $t = 0s$ to $t = 1s$ is

(a) -9 (b) 6 (c) -3 (d) -1

2. If $\vec{A} = 3\hat{i} - 4\hat{j}$, $\vec{B} = 2\hat{i} + 3\hat{j}$, and $\vec{C} = \hat{i} + 2\hat{j}$, the magnitude of $-\vec{A} + \vec{B} + \vec{C}$ is

(a) 6.1 (b) 5 (c) 1 (d) 9

3. What is the value of [10 Kg] ?

(a) 10 (b) L (c) 10L (d) M

4. An object moves along the x axis according to the equation $x(t) = (-t^3 - 3t + 2)$ m. The speed at 3 s ?

(a) 9 (b) 6 (c) 5 (d) -5

5. A ball is thrown directly downward, with an initial speed of 4m/s, from a height of h and takes 2s to reach the ground , what is the height of h ?

(a) 20 (b) 13 (c) 15 (d) 69

6. A points in the xy plane have Cartesian coordinates (5, 20) m . Determine its angle in polar coordinates.

(a) 76^0 (b) 50^0 (c) 63^0 (d) 33^0

7. A particle initially located at the origin has an acceleration of $\vec{a} = 3.0\hat{j}\ m/s^2$ and an initial velocity of $\vec{v}_i = 8.0\hat{i}$ m/s. The vector position (in m) of the particle at $t = 2.0$ s is

(a) $16\hat{i} + 6\hat{j}$ (b) $4\hat{i} + 6\hat{j}$ (c) $4\hat{i} + 3\hat{j}$ (d) $3\hat{i} + 5\hat{j}$

8. A long-jumper leaves the ground at an angle of 40° above the horizontal and at a speed of 11.0 m/s. How far does he jump in the horizontal direction?

(a) 4 (b) 8 (c) 5.2 (d) 12

9. If $\vec{A} = 6\hat{i} - 3\hat{j}$ then $2\vec{A}$ has a magnitude of

(a) 7 (b) 15 (c) 19 (d) 22

10. The direction of displacement depends on

(a) velocity (b) distance (c) force (d) final and initial position

Physics 101-First Exam

الرقم الجامعي:

الاسم: صمام أحمد عبدالله

Note: $g = 10\ m/s^2$.

1	2	3	4	5	6	7	8	9	10
b	a	d	c	g	b	g	a	c	b

1. The position of a particle moving along the x-axis is described by the relation: $x(t) = 2 - t^3$. The average acceleration (in m/s^2) of that particle in the time interval t =0s to t = 2s is

(a) -9 (b)-6 (c)-3 (d)-1

2. If $\vec{A} = 3\hat{i} - 4\hat{j}$, $\vec{B} = 2\hat{i} + 3\hat{j}$, and $\vec{C} = \hat{i} + 2\hat{j}$, the magnitude of $\vec{A} + \vec{B} + \vec{C}$ is

(a) 6 (b) 5 (c) 9 (d) 1

3. What is the value of [10 dyes] ?

(a) 10 (b)L (c) 10L (d)T

4. An object moves along the x axis according to the equation $x(t) = (-t^3 - 3t + 2)$ m. The speed at 2 s ?

(a) 5 (b) 6 (c) 7 (d) -9

5. A ball is thrown directly downward, with an initial speed of 8m/s, from a height of h and takes 2s to reach the ground , what is the height of h ?

(a) 36 (b) 13 (c) 15 (d) 69

6. A points in the xy plane have Cartesian coordinates (10, 12.) m . Determine its angle in polar coordinates.

(a) 76^0 (b) 50^0 (c) 63^0 (d) 33^0

7. A particle initially located at the origin has an acceleration of $\vec{a} = 3.0\hat{j}\ m/s^2$ and an initial velocity of $\vec{v}_i = 4.0\hat{i}$ m/s. The vector position (in m) of the particle at $t = 2.0$ s is

(a) $8\hat{i} + 6\hat{j}$ (b) $4\hat{i} + 6\hat{j}$ (c) $4\hat{i} + 3\hat{j}$ (d) $3\hat{i} + 5\hat{j}$

8 . A long-jumper leaves the ground at an angle of 60° above the horizontal and at a speed of 11.0 m/s. How far does he jump in the horizontal direction?

(a) 4 (b) 10 (c) 5.2 (d) 6

9. If $\vec{A} = 3\hat{i} - 9\hat{j}$ then $2\vec{A}$ has a magnitude of

(a) 7 (b) 15 (c) 19 (d) 22

10. The direction of average velocity depends on

(a) speed (b) displacement (c) force (d) distance