Vector $\overrightarrow{A} = \hat{\imath} - 3\,\hat{\jmath} - 5\,\hat{k}$.

The angle enclosed (المحصورة) between vector $\vec{A}$ and the positive X-axis is:

A. 147.4^0

B. 139.7^0

C. 45.3^0

D. 80.3^0

E. 59.5^0

A

B

$$|\vec{A}| = \sqrt{(1)^2 + (-3)^2 + (-5)^2}$$

$$= 5.9$$

$$\theta = \cos^{-1}\left(\frac{-5}{5.9}\right) = 147^\circ \quad \text{— (A)}$$

Vector $\overrightarrow{A}$ lies in the XY plane and makes an angel θ with the positive X-axis. If the y-component of vector A equals 1/3 of its magnitude then θ is:

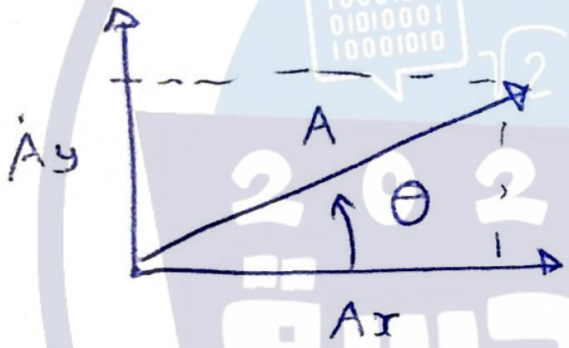
A. 7.1^0

B. 12.2^0

C. 19.5^0

D. 70.5^0

E. 82.9^0



$$Ay = A \sin\theta = \frac{A}{3}$$

$$\sin\theta = \frac{1}{3} \Rightarrow \theta = \sin^{-1}\left(\frac{1}{3}\right)$$

$$= \underline{\underline{19.5}} \quad \text{— (c)}$$

A particle moves with constant acceleration along the X-axis. It takes the particle 2.5 sec to move from $X_i = 2$ m to $X_f = 8$ m. If the magnitude of the particle's velocity at ($X_f = 8$ m) is 2.8 m/s, the magnitude of the particle's acceleration (in m/s^2) is:

A. 0.32

B. 0.96

C. 0.64

D. 0.12

E. 0.25

○ A

○ B

$$\Delta x = 8 - 2 = 6\ m$$

$$\Delta x = v_1 t + \frac{1}{2} a t^2$$

$$6 = 2.5 v_1 + 3.125 a$$

$$\boxed{3.125\ a + 2.5 v_1 = 6} \longrightarrow (1)$$

$$v_2 = v_1 + at$$

$$2.8 = v_1 + 2.5 a$$

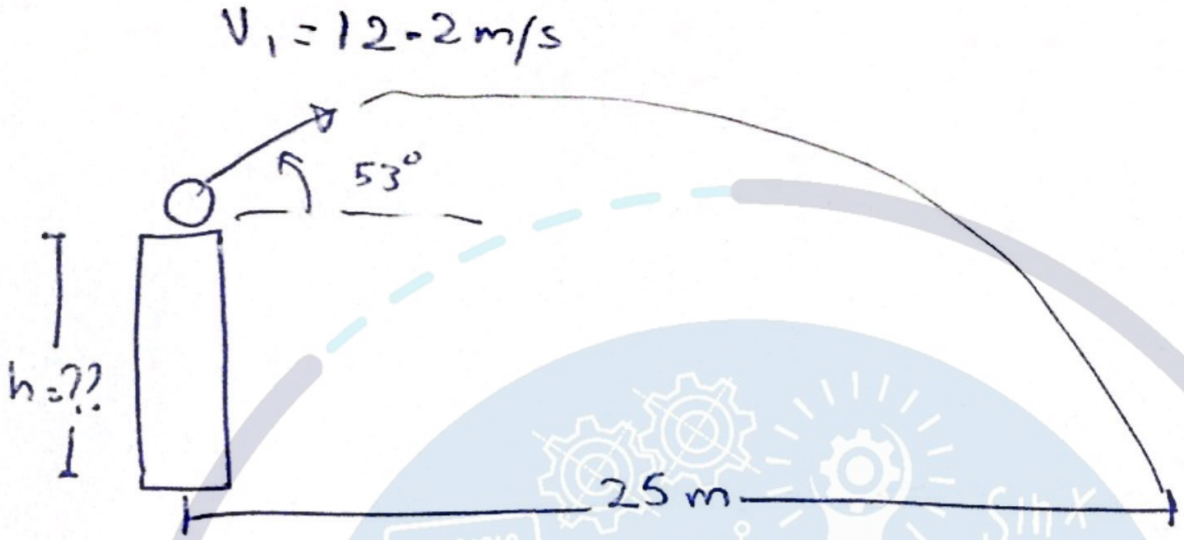
$$\boxed{2.5a + v_1 = 2.8} \longrightarrow (2)$$

$$a = 0.32\ m/s^2$$

$$v_1 = 2\ m/s$$

A ball is fired (أطلقت) 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 ball strikes (تضرب) the ground at a horizontal distance of 25 m from the base of the building. Assume that the ground is level (مستوية) and that the side of the building is vertical. How tall is the building?

A. 18.7 m
B. 15.1 m
C. 77.4 m
D. 50.3 m
E. 23.5 m



$V_{xi} = V_i \cos\theta$
$= 12.2 \cos 53$
$= 7.34\ m/s$

$V_{yi} = V_i \sin\theta$
$= 12.2 \sin 53$
$= 9.74\ m/s$

$\Delta x = V_x t \Rightarrow t = \frac{\Delta x}{V_x} = \frac{25}{7.34}$

$= 3.4\ sec.$

$\Delta y = V_{iy} t + \frac{1}{2} g t^2$

$= 9.74(3.4) + \frac{1}{2}(-9.8)(3.4)^2$

$= -23.5\ m$

$h = 23.5\ m$ ⟶ (E)

At t = 0, a particle leaves the origin with a velocity of 6.3 m/s in the positive y direction and moves in the XY- plane with a constant acceleration of $(2\hat{\imath} - 4\hat{\jmath})$ m/s^2. At the instant the X-coordinate of the particle is 15 m, the speed (magnitude of the velocity) (in m/s) of the particle is:

A. 12

B. 15.3

C. 7.5

D. 23.6

E. 16

○ A

x-axis

$x_1 = 0$

$V_{x_1} = 0$

$a_x = 2\ m/s^2$

$x_2 = 15\ m$

y-axis

$y_1 = 0$

$V_{1y} = 6.3\ m/s$

$a_y = -4\ m/s^2$

$$\Delta x = V_{1x}t + \frac{1}{2}a_x t^2$$

$$15 - 0 = 0 + \frac{1}{2}(2)t^2$$

$$\boxed{t = 3.87\ sec.}$$

$$V_{2x} = V_{1x} + a_x t$$

$$= 0 + 2(3.87) = 7.74\ m/s$$

$$V_{2y} = V_{1y} + a_y t$$

$$= 6.3 + (-4)(3.87)$$

$$= -9.18\ m/s$$

$$S = \sqrt{V_{2x}^2 + V_{2y}^2}$$

$$= \sqrt{(7.74)^2 + (-9.18)^2}$$

$$= 12\ m/s \longrightarrow (A)$$

Given the two vectors: $\vec{A} = (4\hat{\imath} - 2\hat{\jmath})$ and $\vec{B} = (2\,\hat{\imath} + 3\hat{\jmath})$.

The magnitude of their cross product ($|\vec{A}X\vec{B}|$) is:

A. 10

B. 7

C. 16

D. 13

E. Zero

$$\begin{array}{c|ccc} & \hat{i} & \hat{j} & \hat{k} \\ \vec{A} & 4 & -2 & 0 \\ \vec{B} & 2 & 3 & 0 \end{array}$$

$$= (0-0)\hat{i} - (0-0)\hat{j} + (12+4)\hat{k}$$

$$= 16\hat{k}$$

$$|\vec{A} \times \vec{B}| = 16 \longrightarrow (c)$$

A particle moves along the X-axis. Its position changes with time according to: $X(t) = 4t^3 - 2t^2$, where X is in meters and t is in seconds.

The magnitude of the particle's acceleration at t = 3 sec is:

A. 44 m/s^2
B. 20 m/s^2
C. 92 m/s^2
D. 68 m/s^2
E. Zero

$$x(t) = 4t^3 - 2t^2$$

$$v(t) = \frac{dx}{dt} = 12t^2 - 4t$$

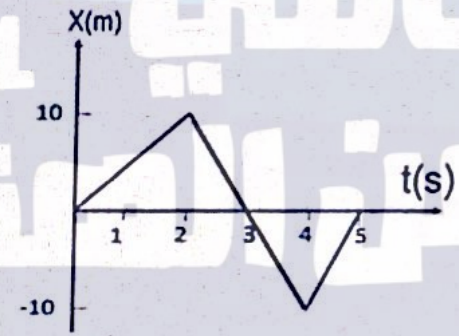
$$a(t) = \frac{dv}{dt} = 24t - 4$$

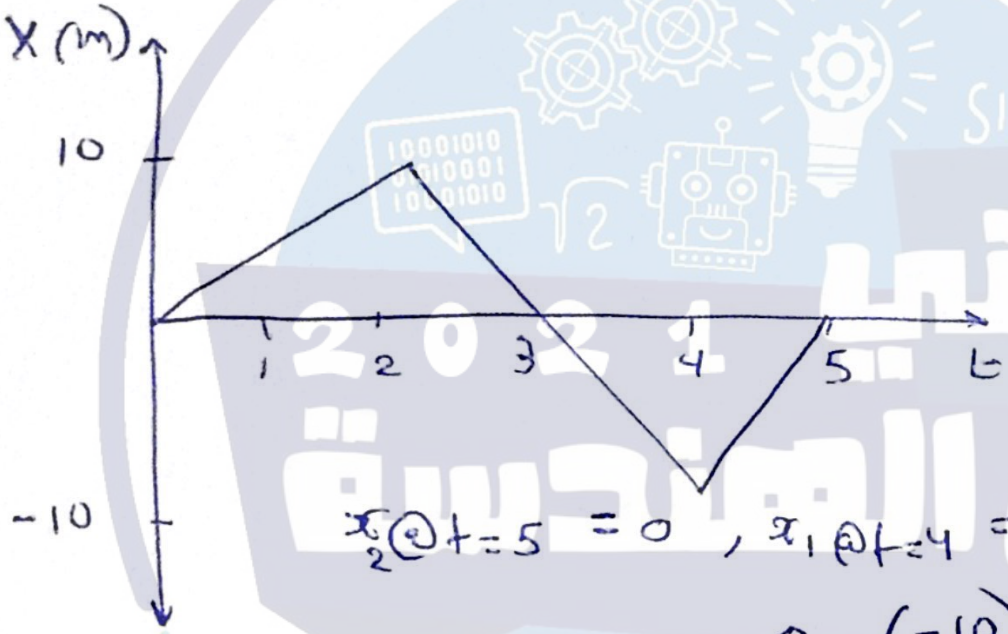
$$a_{@t=3} = 24(3) - 4$$

$$= 68 \longrightarrow \underline{D}$$

The position-time graph for a particle moving along the X-axis is shown below. The average velocity of the particle between t = 4 and t = 5 sec is:

A. +10 m/s
B. +5 m/s
C. -5 m/s
D. -10 m/s
E. Zero





$x_2 @ t=5 = 0$, $x_1 @ t=4 = -10$, $\Delta x = x_2 - x_1$

$$V = \frac{\Delta x}{\Delta t} = \frac{0-(-10)}{5-4} = \underline{\underline{10\ m/s}} \rightarrow (A)$$

The height (in m) from which an object must be released from rest such that it hits the ground at a speed of 10 m/s is:

A. 20.4

B. 45.9

C. 5.1

D. 9.8

E. 81.6

$$a_r = \frac{v^2}{r}$$

$$v_2 = 3v_1$$

$$a_{r_1} = \frac{v_1^2}{r}, \quad a_{r_2} = \frac{v_2^2}{r} = \frac{(3v_1)^2}{r} = \frac{9v_1^2}{r}$$

$$\left(\frac{a_{r_2}}{a_{r_1}}\right) = \left(\frac{9v_1^2/r}{v_1^2/r}\right) = 9 \rightarrow (E)$$

A stone is tied (ربط) to a string (خيط) of length R and whirled (يدور) initially at constant speed such that it makes one revolution (دورة) each second. If the speed of the stone is then tripled (ثلاث اضعاف), the ratio (النسبه) of the final radial acceleration of the stone to the initial one ($a_{(rad)f}/a_{(rad)i}$) is:

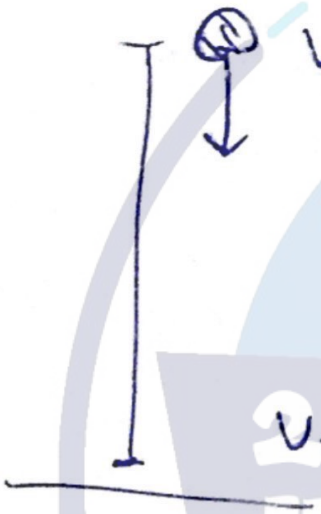
A. 0.25

B. 2

C. 16

D. 4

E. 9



$$V_2^2 = V_1^2 + 2g\Delta y$$

$$(10)^2 = 0 + 2(-9.8)\Delta y$$

$$\Delta y = -5.1 m$$

$$h = 5.1 m \rightarrow (c)$$

GENERAL PHYSICS I\جميع الشعب

Question 4

Not yet answered

Marked out of 2.00

Flag question

A particle moves with constant acceleration along the X-axis. It takes the particle 2.5 sec to move from X_i = 2 m to X_f = 8 m. If the magnitude of the particle's velocity at (X_f = 8 m) is 2.8 m/s, the magnitude of the particle's acceleration (in m/s^2) is:

A. 0.32
B. 0.96
C. 0.64
D. 0.12
E. 0.25

Quiz navigation

1 2 3 4 5 6
7 8 9 10

Finish attempt ...

Time left **0:52:37**

$\Delta x = 8 - 2 = 6\ m$

$\Delta x = u_1 t + \frac{1}{2} a t^2$

$6 = 2.5 u_1 + 3.125 a$

$3.125 a + 2.5 u_1 = 6$ ——→ (1)

$u_2 = u_1 + at$

$2.8 = u_1 + 2.5 a$ ——→ (2)

$2.5 a + u_1 = 2.8$

$a = 0.32\ m/s^2$

$u_1 = 2\ m/s$

General Physics 1- 0302101- Firs

lmsystem.ju.edu.jo/mod/quiz/attempt.php?attempt=126594&cmid=276441&page=5

GENERAL PHYSICS I \ جميع الشعب

Home > My courses > GENERAL PHYSICS I \ جميع الشعب > General > General Physics 1- 0302101- First Exam (20%)

Question 6

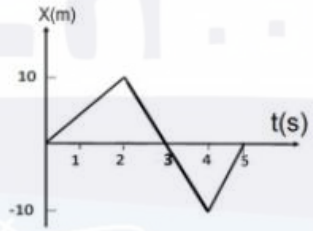
Not yet answered

Marked out of 2.00

Flag question

The position-time graph for a particle moving along the X-axis is shown below. The average velocity of the particle between t = 0 and t = 2 sec is:

A. +10 m/s
B. +5 m/s
C. -5 m/s
D. -10 m/s
E. Zero



Quiz navigation

1 2 3 4 5 6
7 8 9 10

Finish attempt ...

Time left 0:46:19

Type here to search

ENG 08:13 25/11/2020

② at $t = 0$ at $t = 2$

$x_1 = 0$ $x_2 = 10$

$\Delta x = x_2 - x_1 = 10 - 0 = 10$

$U = \frac{\Delta x}{\Delta t} = \frac{10}{2-0} = 5 \text{ m/s}$

General Physics 1- 0302101- Firs

lmsystem.ju.edu.jo/mod/quiz/attempt.php?attempt=126594&cmid=276441&page=6

GENERAL PHYSICS I\جميع الشعب

Home > My courses > GENERAL PHYSICS I\جميع الشعب > General > General Physics 1- 0302101- First Exam (20%)

Question 7

Not yet answered

Marked out of 2.00

Flag question

The height (in m) from which an object must be released from rest such that it hits the ground at a speed of 20 m/s is:

A. 20.4
B. 45.9
C. 5.1
D. 9.8
E. 81.6

Quiz navigation

1 2 3 4 5 6
7 8 9 10

Finish attempt ...

Time left **0:45:13**

Type here to search

ENG 08:14 25/11/2020

$$v_2^2 = v_1^2 + 2g\Delta y$$

$$(20)^2 = 0 + 2(-9.8)\Delta y$$

$$\Delta y = -20.4\ m$$

$$h = 20.4$$

General Physics 1- 0302101- Firs

lmsystem.ju.edu.jo/mod/quiz/attempt.php?attempt=126594&cmid=276441&page=7

GENERAL PHYSICS I\جميع الشعب

Home > My courses > GENERAL PHYSICS I\جميع الشعب > General > General Physics 1- 0302101- First Exam (20%)

Question 8

Not yet answered

Marked out of 2.00

Flag question

A stone is tied (ربط) to a string (خيط) of length R and whirled (يدور) initially at constant speed such that it makes one revolution (دورة) each second. If the speed of the stone is increased to four times its initial value, the ratio (النسبه) of the final radial acceleration of the stone to the initial one $(a_{(rad)f}/a_{(rad)i})$ is:

A. 0.25

B. 2

C. 16

D. 4

E. 5

Quiz navigation

1 2 3 4 5 6

7 8 9 10

Finish attempt ...

Time left **0:42:47**

Type here to search

ENG 08:17 25/11/2020

$$a_r = \frac{v^2}{r}$$

$$v_2 = 4v_1$$

$$a_{r_1} = \frac{v_1^2}{r}, \quad a_{r_2} = \frac{v_2^2}{r} = \frac{(4v_1)^2}{r} = \frac{16v^2}{r}$$

$$\frac{a_{r_2}}{a_{r_1}} = \frac{16v_1^2/r}{v_1^2/r} = 16$$

General Physics 1- 0302101- Firs

lmsystem.ju.edu.jo/mod/quiz/attempt.php?attempt=126594&cmid=276441&page=8

GENERAL PHYSICS I\جميع الشعب

Home > My courses > GENERAL PHYSICS I\جميع الشعب > General > General Physics 1- 0302101- First Exam (20%)

Question 9

Not yet answered

Marked out of 2.00

Flag question

A ball is fired (أطلقت) from the edge of the top of a building with an initial velocity of 12.2 m/s at an angle of 50° above the horizontal. The ball strikes (تضرب) the ground at a horizontal distance of 25 m from the base of the building. Assume that the ground is level (مستوية) and that the side of the building is vertical. How tall is the building?

A. 18.7 m
B. 15.1 m
C. 77.4 m
D. 50.3 m
E. 23.5 m

Quiz navigation

1 2 3 4 5 6
7 8 9 10

Finish attempt ...

Time left 0:37:57

Type here to search

ENG 08:22 25/11/2020

$v = 12.2 \text{ m/s}$

$\theta = 53^\circ$

$\Delta x = 25 \text{ m}$

$v_x = v\cos\theta = 12.2\cos 50$

$v_x = 7.8 \text{ m/s}$

$v_y = v\sin\theta = 12.2\sin 50$

$= 9.3 \text{ m/s}$

$$\Delta x = v_x t \Rightarrow t = \frac{\Delta x}{t}$$

$$= \frac{25}{7.8} = 3.2 \text{ sec}$$

$$\Delta y = v_{iy} t + \frac{1}{2} g t^2$$

$$= 9.3(3.2) + \frac{1}{2}(-9.8)(3.2)^2$$

Final Exam/ General Physics 1 (pa

juexams.com/moodle/mod/quiz/attempt.php?attempt=383263&cmid=280153&page=4

Time left 0:39:32

Question 5

Not yet answered

Marked out of 3.50

Flag question

A ball is fired (أطلقت) with an initial velocity of 30 m/s that makes an angle of 60^0 above the horizontal direction. The speed (in m/s) of the ball after 1.5 sec of its launch is:

A. 16.3
B. 18.8
C. 26.3
D. 22.1
E. Zero

Quiz navigation

1 2 3 4 5 6
7 8 9 10 11 12
13 14

Finish attempt ...

Type here to search

ENG 20:15 11/01/2021

$v_1 = 30\ m/s \ \angle 60^\circ$

$v_{x1} = 30 \cos 60 = 15$

$v_{y1} = 30 \sin 60 = 26$

$t = 1.5\ sec$

$v_2 = ?$

$|v_{x2}| = 15$

$|v_{y2}| \Longrightarrow v_{y_2} = v_{y1} + at = 26 - 9.8(1.5)$

$= 11.3$

$v_2 = \sqrt{(11.3)^2 + (15)^2} = 18.8$ (B)

GENERAL PHYSICS I\جميع الشعب

Question 10

Not yet answered

Marked out of 2.00

Flag question

At t = 0, a particle leaves the origin with a velocity of 7.3 m/s in the positive y direction and moves in the XY- plane with a constant acceleration of $(2\hat{\imath} - 4\hat{\jmath})$ m/s^2. At the instant the X-coordinate of the particle is 15 m, the speed (magnitude of the velocity) (in m/s) of the particle is:

A. 8
B. 11.3
C. 19.6
D. 23.5
E. 16

Quiz navigation

1 2 3 4 5 6
7 8 9 10

Finish attempt ...

Time left 0:21:01

y-axis

$V_{y_1} = 7.3 \text{ m/s}^2$

$a_y = -4 \text{ m/s}^2$

$x_1 = 0$

x-axis

$V_{x_1} = 0$

$a_x = 2 \text{ m/s}^2$

$y_1 = 0$

$$\Delta x = x_2 - x_1 = x_2 - 0 = V_{x_1} t + \frac{1}{2} a_x t^2$$

$$15 - 0 = 0 + \frac{1}{2}(2) t^2$$

$$t = 3.87 \text{ sec.}$$

$$V_{x_2} = V_{x_1} + a_x t$$
$$= 0 + 3.87(2) = 7.74 \text{ m/s}$$

$$V_{y_2} = V_{y_1} + a_y t$$
$$= 7.3 + (-4)(3.87)$$
$$= -8.18 \text{ m/s}$$

$$S = \sqrt{V_{x_2}^2 + V_{y_2}^2} = \sqrt{(7.74)^2 + (-8.18)^2}$$

$$= 11.26 \text{ m/s} \rightarrow (B)$$