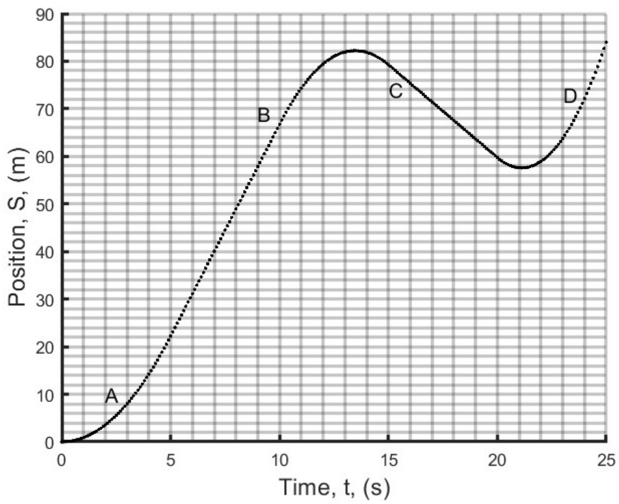
Quiz Average **7.88** **Quiz High Score** **10**

PH 220 **Quiz # 02 (10 pts)** **Name** **Solution**



Looking at the plot of distance versus time shown on the left, in which region of the plot is the object moving with a speed in the negative direction?

A. A **B.** B **C.** **C** **D.** D

Since speed is the slope of distance vs time, the portion of the plot with a negative slope is the correct answer. In this case the slope is negative in region C.

So, the correct answer is C !

A truck is moving with a speed of 7.32 $\mathrm{m}/_\mathrm{s}$ when it begins to uniformly slow down. After a time of 14.3 s, the truck has travelled a distance of 71.3 m. What is the final speed of the truck at this point?

A. 17.3 $\mathrm{m}/_\mathrm{s}$ **B.** 9.97 $\mathrm{m}/_\mathrm{s}$ **C.** 12.3 $\mathrm{m}/_\mathrm{s}$ **D.** $\mathbf{2.65}$ $\mathbf{m}/_\mathbf{s}$

$$\boldsymbol{S = \frac{1}{2}(v_0 + v_f)t}$$

Solve for $\boldsymbol{v_f}$

$$\boldsymbol{v_0 + v_f = \frac{2S}{t}}$$

$$\boldsymbol{v_f = \frac{2S}{t} - v_0 = \frac{2(71.3\ m)}{14.3\ s} - 7.32\ {}^{m}/_{s} = 9.97\ {}^{m}/_{s} - 7.32\ {}^{m}/_{s} = 2.65\ {}^{m}/_{s}}$$

So, the correct answer is D !

A bottle rocket is launched from the ground with an initial speed of 23.7 $^{\mathrm{m}}/_{\mathrm{s}}$ pointed straight up. What is the acceleration of the bottle rocket at a time of 1.71 s after launch? Ignore any effects caused by air resistance.

A.	$\mathbf{9.80\ ^{m}/_{s^2}\ (\widehat{Down})}$	**C.**	$6.94\ ^{\mathrm{m}}/_{\mathrm{s}^2}\ (\widehat{Up})$
B.	$0.00\ ^{\mathrm{m}}/_{\mathrm{s}^2}\ (\widehat{\mathrm{Down}})$	**D.**	$26.2\ ^{\mathrm{m}}/_{\mathrm{s}^2}\ (\widehat{Up})$

Since the only force acting is gravity the object is in free fall so the acceleration is the acceleration due to gravity $\boldsymbol{9.80\ ^{m}/_{s^2}\ (\widehat{Down})}$

So, the correct answer is A !

A hot air balloon with a gondola is rising with a constant speed of 4.35 $^{\mathrm{m}}/_{\mathrm{s}}$. At some point a ballast weight is cut from the balloon gondola. The ballast weight has a mass of 20.0 kg. The weight strikes the ground 4.11 s after it is cut from the balloon gondola. How high above the ground was the weight cut from the balloon gondola? As usual ignore all effects of air resistance.

A. $101.\ \mathrm{m}$ **B.** $\mathbf{64.9\ m}$ **C.** $2.26\ \mathrm{m}$ **D.** $38.0\ \mathrm{m}$

$$\boldsymbol{S = -h = v_0 t - \frac{1}{2} g t^2}$$

Solve for h

$$\boldsymbol{h = \frac{1}{2} g t^2 - v_0 t = \frac{1}{2}\left(9.80\ ^{m}/_{s^2}\right)(4.11\ s)^2 - (4.35\ ^{m}/_{s})(4.11\ s) = 82.77\ m - 17.88\ m}$$

$$\boldsymbol{h = 82.77\ m - 17.88\ m = 64.9\ m}$$

So, the correct answer is B !

A drag racer has reached a speed of $151.\ ^{\mathrm{m}}/_{\mathrm{s}}$ when it begins to apply brakes to stop. If the brakes alone are used and provide a deceleration of 2g or $19.6\ ^{\mathrm{m}}/_{\mathrm{s}^2}$, how far would the drag racer travel before the vehicle stopped?

A.	3.85 m	**C.**	1160. m
B.	59.4 m	**D.**	**582. m**

$$\boldsymbol{v_f^2 = 0 = v_0^2 - 2aS}$$

Solve for $\boldsymbol{S}$

$$\boldsymbol{S = \frac{v_0^2}{2a} = \frac{(151.\ ^{m}/_{s})^2}{2\left(19.6\ ^{m}/_{s^2}\right)} = \frac{2.28\ x\ 10^4\ ^{m^2}/_{s^2}}{39.2\ ^{m}/_{s^2}} = 581.7\ m}$$

Note: The answer indicates why a parachute is added to slow the racecar down.

So, the correct answer is D !

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This page last updated on February 2, 2024