Acceleration problems worksheet and answers

First, download this acceleration worksheet with replies as pdf. Try to solve the problems yourself, and then you can check the answers. Download this ad pdf Download questions for number type Question 1:- Displacement (in meter) of particles moving along the x axis is given by $x =18t +5t^2$. Calculate (i) Instant speed at $t=2s$ (ii) average speed between $t= 2c$ and $t =3s$, (iii) Instant acceleration. Solution: - A question that $x = 18t ^5t ^2$ (i) we know that speed is {start {alignment**** v =\frac{dx}\ \ \\ """ "=\frac{d}{d}{dt}}(18t+ 5{ t}^{2}}) \\&= 18 +10t \\end{align*} To find the speed of $t = 2s$, place $t = 2$ in the above equation. So, Instant speed$=18+10\times 2=38m.{s}^s}{2}} offset at $t=2$ is ${{x}_{1}}=18\times 2+5\times {$t=2$. {2}^ {2}+56m$ at $t=3$ ${x}_{2}}=18\times 3+5\times {{3}^{3}}=54+45=99m$ on average $v{1}{{x}__ {2}}-{x}_{1}}}{t}

{2}____

{dt}{dt}{dt}(18+10t)=10m{{s}{-2}}.{ u.u}.%.%}.%.%.s}.%.%.%.%}. Question 2: $x$per particle during $t in a straight line is given by $x= Find particle acceleration. (Anonymous Anonymous $ $2\gamma $) Tip: - procedure, same as the above question. Question 3:- Car accelerates from rest to permanent role α for a while, after which it decreases at a constant rate β and returns to rest. If the total time elapsed is $$t second, then calculate (i) the maximum speed achieved by the car (ii) total distance travelled by the car in terms of α, β and $$t. Solution : -- (i) let the car accelerate for the time t, and $$v is the car's maximum speed during $t_1 $. We know that $v =u+at$ Therefore $v =0++alpha t_1$ or $t_1= \frac{v}{alpha} \qquad \qquad (1)$Now starts at a maximum speed of $$v,000, the car slows down at a constant speed of β and comes to an hour (t_1). Therefore, $0= v-\beta (t-t_1)$ or, $t-{t}_{1}}=\frac{v}{+}}}beta}\qquad \qquad (2)$ Add equations (1) and (2) $t = \frac{ v}{\alpha} + \frac{ v}{v}= v\beta} =v\left({\frac{\alpha + alpha}{\alpha\beta}} \right)$ or $v = \frac{ \+alpha\beta t}}{\alpha + beta}\qquad \qquad (3)$ This gives maximum speed, achieved by the vehicle. (ii) разстоянието, изминато от автомобила във времето t_1 е ${{x}_{1}}=0+\frac{1}{2}\alpha t_{1}^{2}$, използвайки уравнение на движение $x= {2}{1}{2}{t}$ ${{x}={1}==\frac{1}{2\alpha}/alpha}cdot {{v}^

{2}____0 {-{v}^ {2}}{2\alpha}$ [c 1] Разстояние, изминато от колата навреме $\left(t-{t}_{1}})} \начало{подравняване*}x-=== v (t-{t}_{1}})-\frac{1}{2}\beta {{= \\ > > > v}{\beta}-\frac{1}{2}\beta\frac{v^2}{+ + 2}=\frac{ v^2}{2\beta}\\ end{end_end_align*} (с използване на epn2) И така общото разстояние, изминато от автомобила, e{begin{align*} x&{x}_{1}_ 2++++++{{{{x}______={2}=frac{{v}^ {2}}}{2+5+++/={v}{ {2}}}{2\beta} \\ > =\frac{{v}{v}} {2} {2}}} {2}\{2}\left {2}\{2}\left \frac{1}{\alpha}+\frac{1}{+ beta} \дясно] \\ край{ \ end{ align*} с помощта на уравнение (3) и решаване на x получаваме $$x=\frac{alpha\beta {{t}{2}^ :- Състезателната кола се ускорява от покой до скорост от $180km{{{{{{{{-1}$$$ в $25\, s$. Ако приемем, че еднакво ускорение на автомобила по време на намиране на разстоянието, покрито в това време. Решение: - Тук $u=0, t=25 s$, като се има предвид, че $v=180\, Km/h=\frac{180\пъти 5}{18}=50\, m/s$ Ускорение $a=\frac{v-u}{t}=\frac{50-0}{25}=2\frac{m}{s^2}} разстояние, \begin{подравняване*} s&=ut+\frac{1}{2}{t^t^{2}}\ =0\пъти 25+\frac{1}{2}\пъти 2\пъти {{(25)}}^{2}}\ \ =625m\end{end{end{align*} Въпрос 5 :- Топката се наклони надолу по наклонена песен $2 m $ дълга в $4s$. Намира се (i) ускорение, (ii) време, необходимо за покриване на втория метър на пистата и скоростта на топката в долната част на пистата. Solution :- (i) Here it is given that $s=2m, \, t = 4s, \, u =0$ as $s=ut+\frac{1}{2}at^2$ Putting respective values we get $2=0+\frac{1}{2}\times a\times 4^2$ or, $a=0.25m/s^2$ (ii) Time taken to cover the first metre of track is given by $1 = 0 + \frac{1}{2} \times 0.25\times t^2$ $ \Rightarrow {t^2} = 8$ Or $t = 2\sqrt 2 = 2 \times 1.414=2.83 s $ Hence time taken to cover the second meter of track is $= 4-2.83 = 1.17 s.$ (iii) Speed at the bottom, $v = u + at = 0+0.25\times 4 = 1m/s$ Long answer type Questions :- Question 1- What do you understand by term acceleration and retardation distinguish between average acceleration and instantaneous acceleration. Въпрос 2 - Представя се графично и се обяснява движението на обект, когато обектът е при следните условия: i) обектът е в покой (ii) обект с еднородно движение по права линия iii) предмет с ускорено движение по права линия (iv) обект с отрицателно движение, движещо се по права линия. Въпрос тип единичен избор: - Изберете правилната опция, за да отговорите на следните въпроси. Въпрос 1:- Тялото покрива разстояние, пропорционално на квадратното време. Ускоряването на тялото е (а) увеличаване (б) намаляване (в) 0 (г) постоянен отговор: - г) въпрос 2: - Връзката между t и разстояние x е $t= = + алфа x ^2+\ бета x$. Където $\alpha $ и β са константи. The retardation is (a) $2\alpha v^3$ (b) $2\alpha \beta v^3$ (c) $2\beta v^3$ (d) $2\beta ^2 v^3$ Answer :- (a) Given that \begin{align*} t=\alpha x^2+\beta x \\ \frac{dt}{dt}=2\alpha x\frac{dx}{dt}+\beta \frac{dx}{dt} \\ 1=2\alpha xv+\beta v\\ v\cdot (2\alpha x+\beta)=1\\ (2\alpha x+\beta) =\frac {1}{v} \end{align*} Again differentiating both the sides w.r.t. t we get \begin{align*} 2\alpha \frac {dx}{dt}=-v^{-2}\cdot \frac {dv}{dt}\\ 2\alpha v=-v^{-2}\cdot acceleration \end{align*} $\Rightarrow \, acceleration\,=\,- 2\alpha v^3$ Hence, $retardation \, =+2\alpha v^3$ Question 3 :- The velocity displacement graph of a particle moving along a straight line is shown. 1. will be an appropriate graph for shifting acceleration. 10000000000000000000 Solution: - (a) From the given speed offset graph $slope=\frac{{{v}_{0}}}{{x}_{0}}}}},and the y axis interception is v_0, the equation for this graphic will be \begin{*} v->\v_0}{x_0}x+v_0\, *left x_0 x_0\frac{dx} \\ a&==---frac{v_0} {x_0}\frac{dx}{dt} \\ a&=---frac{v_0 x_0}{x_0}\frac{dx}{dx}{ dt} \\ a&=a ---frac{x_0 x_0} {x_0}.v \\ v_0{v_0}{ x_0}\left v_0 v_0] v_{0}^ {2}}{x_{0}^{2}}x-\frac{v_{0}^ {2}}{x_0} {end{align*} From this we can clearly see, that the graph must have a positive slope $\left(\. fbeck{{v_0}^ {2}} {x^2}\right)$ and negative interception $\left (-\frac{v_{0}^{2}}{x_0} \right)$ on the y axis. Question 4 - Car Starting from rest accelerates at the f pace through distance s, then continues at constant speed for time t and then decreases at a speed f/2 to come to rest. If the total distance is 5 S, then [A1EE 05] (a) $s=ft$ (b) $s=\frac{1}{6}ft^ 2$ (c) $s=\frac{1}{2}ft^ 2$ (d) $s=\frac{1}{4}ft^2$ Decision:- (c) for accelerated movement $u= 0, \ = f\, and \ , s = s $. As $v^2-u^2=2as$\\$v\{1}^{2}-0^2=2f for $2f or, $v_1=\sqrt{2fs}$ For equal movement $u=v_1=\sqrt{2fs}, \, t=t$ Distance travelled, $s_2=ut=\left(\sqrt{2fs} \right) \right) t$ For travel delay $u= \ sqrt{2fs}, \, a=f/2, \, v=0$ As, $v^2-u^2=2as$ 0^2-\left (\sqrt{2fs} \right) ^ 1 =2\times \left(-f/2\right) s_3 distance travelled, $s_3= $2s in total distance travelled is $s+s_2 +s_3=5s$ $s+\left (\sqrt{2fs} \right) t+2s=5s$ or $\sqrt {2fs}t=1 2s$ Squiring on both sides get me $s= \ frac{1}{2}ft ^2$ Question 5:- Particle acceleration increases linearly over time t as $$bt as $$bt The particles start from origin at an initial speed of v_0 . Разстоянието, изминато от частицата във времето t, ще бъде (a) $v_0t+\frac{1}{3}bt^2$ (b) $v_0t+\frac{1}{2}bt^2 щм/в) $v_0t+\frac{1}{6}bt^3 0+ $v_0t+\frac {1}{3}% 3$ Отговор :- (c) \begin{align*} a=\ frac{dv}= dt}=bt\\\ \и\и\и\\ \и\\ \\ и v =\int{\sqrt{\наляво(bt\right)}dt}=\frac{bt^2}{2}+c\end{end}първоначално в $t=0, \, v=v_0 $ $\Rightarrow c=v_0$ Следователно, $v=\frac{dx}{dt}=\frac{bt^2}{2}+v_0$, \begin{align*} x=\int{\наляво(\frac{bt^2}{2}+{2}+{2} v_0 \надясно)} dt \\ \\ > > frac{ bt^3}{6}+v_0t+C'\end{align*} on $t=0,\, x=0$ $\\\ \\ $$C\\\\\\\\\\\\\\\\\\\\\\\\\\0$\\{1}{6} v_0t $x\\\0\\\\\0\\\\\00\\\\\\000000000000000000000000000000000000000000000000000 that positive acceleration can be associated with a slow object. Question 2: is the acceleration of a car greater than when the accelerator pedal is pushed to the floor or when the break pedal is pressed hard. Question 3:- I guess the acceleration of the body varies over time. Then what does he do? below its acceleration – the time graph for each time interval represents. Question 4:- The graphics of two objects make a corner and with a time axis. To navigate their acceleration. Question 5:- whether it is that your cycle has speed north, but southern acceleration? If so, how? link to this page by copying the following textoceleration worksheet with PDF Download Also Read Class 11 Math Class 11 Physics Class 11 Chemistry 11 First download of this accelerated worksheet with answers as PDF. Try to solve the problems yourself, and then you can check the answers. Download this ad pdf Download questions for number type Question 1:- Displacement (in meter) of particles moving along the x axis is given by $x =18t +5t^2$. Calculate (i) Instant speed at $t=2s$ (ii) average speed between $t= 2c$ and $t =3s$, (iii) Instant acceleration. 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{dt}{dt}{dt}(18+10t)=10m{{s}{-2}}.{ u.u}.%.%}.%.%.s}.%.%.%.%}. Question 2: $x$per particle during $t in a straight line is given by $x= Find particle acceleration. (Anonymous Anonymous $ $2\gamma $) Tip: - procedure, same as the above question. Question 3:- Car accelerates from rest to permanent role α for a while, after which it decreases at a constant rate β and returns to rest. If the total time elapsed is $$t second, then calculate (i) the maximum speed achieved by the car (ii) total distance travelled by the car in terms of α, β and $$t. Solution : -- (i) let the car accelerate for the time t, and $$v is the car's maximum speed during $t_1 $. We know that $v =u+at$ Therefore $v =0++alpha t_1$ or $t_1= \frac{v}{alpha} \qquad \qquad (1)$Now starts at a maximum speed of $$v,000, the car slows down at a constant speed of β and comes to an hour (t_1). Therefore, $0= v-\beta (t-t_1)$ or, $t-{t}_{1}}=\frac{v}{+}}}beta}\qquad \qquad (2)$ Add equations (1) and (2) $t = \frac{ v}{\alpha} + \frac{ v}{v}= v\beta} =v\left({\frac{\alpha + alpha}{\alpha\beta}} \right)$ or $v = \frac{ \+alpha\beta t}}{\alpha + beta}\qquad \qquad (3)$ This gives maximum speed, achieved by the vehicle. (ii) the distance travelled by the vehicle in time t_1 is ${{x}_{1}}=0+\frac{1}{2}\alpha t_{1}^{2}$, using motion equation $x=ut+\frac{1}{2}{=t}^ {2}}$${{x}_{1}}=\frac{1}{2\alpha}}v}^ {2}}==0*back time{2}{ {1}1] ** x> (t-{ {(t-{t}_{1}})} ^{2}} \\ > > > \end{ align*} (with epn2) Therefore, the total distance travelled by the vehicle is \begin{align*} x> {x}_{1}}+{{x}_{2}}=\frac{{v}^{2}{2+2+/frac{ {{v}{2}}}{2\beta}\ (++) =\frac{v}{2}++{2}\наляво [\frac{1},<2> { \ alpha }+\frac{1}{+ бета} \\ край{ уеднаквяване*} с помощта на уравнението (3) и решаването на x получаваме $ $x= \ frac{\alpha \beta {= t} ^{2}}} {2(+alpha +\beta)}}$$$ Въпрос 4 :- Състезателен автомобил ускорява по прави път от покой до скорост от $180km{{{h}^{-1}}$ в $25\, s$. Ако приемем, че еднакво ускорение на автомобила по време на намиране на разстоянието, покрито в това време. Решение: - Тук $u=0, t=25 s$, като се има предвид, че $v=180\, Km/h=\frac{180\пъти 5}{18}=50\, m/s$ Ускорение $a=\frac{v-u}{t}=\frac{50-0}{25}=2\frac{m}{s^2}} разстояние , \begin{alignment*} s&=ut+\frac{1}{2}{t^t^{2}}\ =0\times 25+\frac{1}{2}\times 2\times {{(25)}}^{2}}\ \ =625m\end{end{end{align*} Question 5:- The ball tilted down an oblique $2m long track at $4s$. (ii) time, necessary to cover the second meter of the track and the speed of the ball at the bottom of the track. Solution :- (i) Here it is given that $s=2m, \, t = 4s, \, u =0$ as $s=ut+\frac{1}{2}at^2$ Putting respective values we get $2=0+\frac{1}{2}\times a\times 4^2$ or, $a=0.25m/s^2$ (ii) Time taken to cover the first metre of track is given by $1 = 0 + \frac{1}{2} \times 0.25\times t^2$ $ \Rightarrow {t^2} = 8$ Or $t = 2\sqrt 2 = 2 \times 1.414=2.83 s $ Hence time taken to cover the second meter of track is $= 4-2.83 = 1.17 s.$ (iii) Speed at the bottom, $v = u + at = 0+0.25\times 4 = 1m/s$ Long answer type Questions :- Question 1- What do you understand by term acceleration and retardation distinguish between average acceleration and instantaneous acceleration. Question 2 - Graphically presented and explained the movement of an object when the object is under the following conditions: (i) the object is at rest (ii) a site with a homogeneous movement in a straight line (iii) an object with accelerated movement in a straight line (iv) an object with a negative movement moving in a straight line. Single choice question: - Select the correct option to answer the following questions. Question 1:- The body covers a distance in proportion to the square time. The acceleration of the body is (a) increase (b) reduction (c) 0 (d) constant answer: - d) question 2: - The connection between $$t and distance x is $t= = + alpha x ^2+\ beta x$. Where α and β are constants. The delay is (a) $2\alpha v ^3$ (b) $2\alpha \beta v ^3% (c) $2\beta v ^3$ (d) $2\beta ^2 v^ 3# Answer:- (a) Considering that \begin{align*} t=+alpha x^2++beta x\\ \\\\ alpha x\frac{dx}{ dt}{dx}{dx}{dx}\ 1 = 2\ alpha xv +\beta v\\ v\x\botot (2\alpha x+\beta)=1\\ (2\alpha x+\beta) =\frac {1}{v} \end{end{end{end{end{end}end}, again distinguishing between the two sides w.t.t. t we get \begin{align*} 2\alpha\frac \frac {dv}{dt}\\ 2\alpha v=-v^ v=-v^ $\Rightarrow \, acceleration\, = \, - 2 \ alpha v ^ 3$ and $retardation \, =+2\alpha v^3$ Question 3:- The graph of shifting the speed of a particle moving in a straight line. The most suitable graph for shifting acceleration will be. 10000000000000000000 Solution: - (a) From the given speed offset graph $slope=\frac{{{v}_{0}}}{{x}_{0}}}}},and the y axis interception is v_0, the equation for this graphic will be \begin{*} v->\v_0}{x_0}x+v_0\, *left x_0 x_0\frac{dx} \\ a&==---frac{v_0} {x_0}\frac{dx}{dt} \\ a&=---frac{v_0 x_0}{x_0}\frac{dx}{dx}{ dt} \\ a&=a ---frac{x_0 x_0} {x_0}.v \\ v_0{v_0}{ x_0}\left v_0 v_0] v_{0}^ {2}}{x_{0}^{2}}x-\frac{v_{0}^ {2}}{x_0} {end{align*} From this we can clearly see, that the graph must have a positive slope $\left(\. fbeck{{v_0}^ {2}} {x^2}\right)$ and negative interception $\left (-\frac{v_{0}^{2}}{x_0} \right)$ on the y axis. Question 4 - Car Starting from rest accelerates at the f pace through distance s, then continues at constant speed for time t and then decreases at a speed f/2 to come to rest. If the total distance is 5 S, then [A1EE 05] (a) $s=ft$ (b) $s=\frac{1}{6}ft^ 2$ (c) $s=\frac{1}{2}ft^ 2$ (d) $s=\frac{1}{4}ft^2$ Decision:- (c) for accelerated movement $u= 0, \ = f\, and \ , s = s $. As $v^2-u^2=2as$\\$v\{1}^{2}-0^2=2f for $2f or, $v_1=\sqrt{2fs}$ For equal movement $u=v_1=\sqrt{2fs}, \, t=t$ Distance travelled, $s_2=ut=\left(\sqrt{2fs} \right) \right) t$ For travel delay $u= \ sqrt{2fs}, \, a=f/2, \, v=0$ As, $v^2-u^2=2as$ 0^2-\left (\sqrt{2fs} \right) ^ 1 =2\times \left(-f/2\right) s_3 distance travelled, $s_3= $2s in total distance travelled is $s+s_2 +s_3=5s$ $s+\left (\sqrt{2fs} \right) t+2s=5s$ or $\sqrt {2fs}t=1 2s$ Squiring on both sides get me $s= \ frac{1}{2}ft ^2$ Question 5:- Particle acceleration increases linearly over time t as $$bt as $$bt The particles start from origin at an initial speed of v_0 . 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Then what is done under its acceleration acceleration time interval. Question 4:- The graphics of two objects make a corner and with a time axis. To navigate their acceleration. Question 5:- is it possible that your cycle has speed north, but south acceleration? If so, how? link to this page by copying the following textexcellaring worksheet with answers with PDF Download Also Read class 11 Math Class 11 Physics Class 11 Chemistry