PHYSICS

BOOKS - SUNIL BATRA 41 YEARS IITJEE PHYSICS (HINGLISH)

WORK, ENERGY & POWER

Jee Main And Advanced

1. If maching is lubricated with oil

A. the machanical adventage of the maching of the maching increses

B. the machanical efficiency of the maching of the maching increses

C. both its machanical advantage and afficiency increses

D. in efficiency increases but its machanical advantage decreases

Answer: B

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2. Two masses of 1gas and 4 gas are moving with oqualkinetic energy . The ratio of their liner moment is

A. $4:1$

B. $\sqrt{2}:1$

C. $1:2$

D. $1:16$

Answer: C

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3. A particle of mass in is moving in a circular with of constant radius r such that its contripetal accelenation a_c is varying with time t as $a_c = K^2rt^2$ where K` is a constant . The power delivered to the particles by the force action on it is

A. $2\pi mK^2r^2t$

B. mK^2r^2t

C. $\frac{(mK^4r^2t^3)}{3}$

D. $zero$

Answer: B

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4. A spring of Force- constant K is cut into two pieces sach that one piece is double the length of the other . Then the long pieces will have a force - constant of

A. $(2/3)K$

B. $(3/2)K$

C. $3K$

D. $6K$

Answer: B

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5. A wind - powered generator convets and energy into electrical energy . Assume that the generator convents a fixed fraction of the wind energy intercepited by to blades into electrical energy for wind speed V , the electrical power output will be propertional to

A. V

B. V^2

C. V^3

D. V^4

Answer: C

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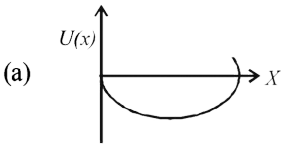
6. A particle which is constant to move along the $x - a\xi s$, is subjected to a force in the same direction which varies with the distance x of the particle from the origin as $F(x) = -Kx + ax^3$. Hero K and a are positive constant . For $x \geq 0$, the fanctional from of the patential every `U(x) of the particle is

A.



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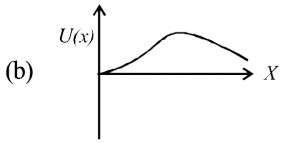
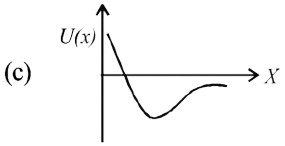


C.



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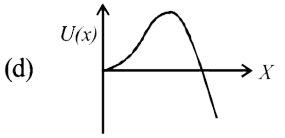

Answer: D

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7. An ideal spring with spring - constant K is bung from the colling and a block of mass M is attached to its lower end the mass is released with the spring initally unstetched . Then the maximum exlemsion in the spring is

A. $\frac{4Mg}{K}$

B. $\frac{2Mg}{K}$

C. $\frac{Mg}{K}$

D. $\frac{Mg}{4K}$

Answer: B

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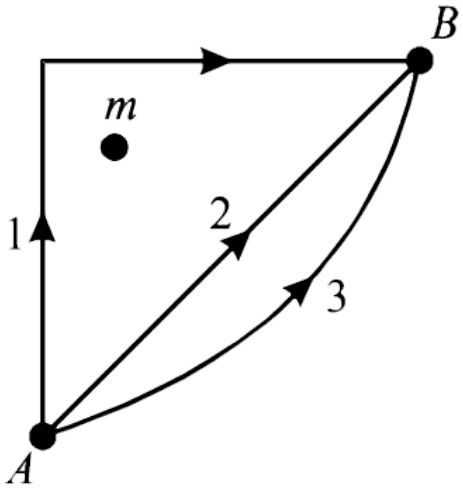
8. If $W_1 W_2$ and W_3 represent the work done in moving a particle from A to B along three different paths 1.2 and3 respectively (as shown) in the

gravitational fieled of a point mass m, find the correct relation between

W_(1) W_(2) and W_(3)`



A. $W_1 > W_2 > W_3$

B. $W_1 = W_2 = W_3$

C. $W_1 < W_2 < W_3$

D. $W_2 > W_1 > W_3$

Answer: B

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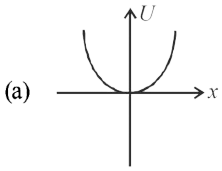
9. A particle is acted by x force $F = Kx$ where K is $a(+Ve)$ constant its potential mwrgy at $x = 0$ is zero . Which curve correctly represent the variation of putential energy of the block with repect to x

A.



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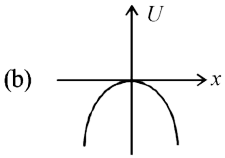
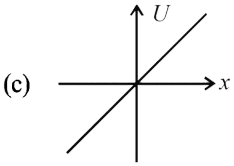
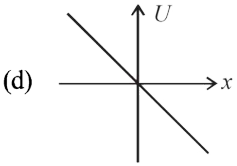


C.



D.



Answer: B

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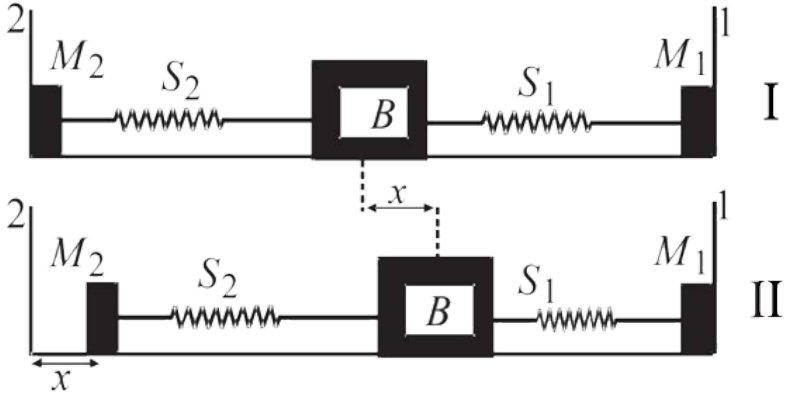
10. A block (B) is attached to two unstriched sprig S_1 and S_(2) with spring constant K and $4K$, respectively (see fig 1) The other ends are atteched in identical support M_1 and M_2 not attached in the walls . The springs and supports have negligible mass . There is no friction anywhere . The block B is displaced toword wall 1 by a small distance z (figure (ii)) and released . THe block return and moves a maximum displacements x and y are musured with reoact to the equalibrum of the block B and the ratio y/x is



A. 4

B. 2

C. $1/2$

D. 1//4`

Answer: C

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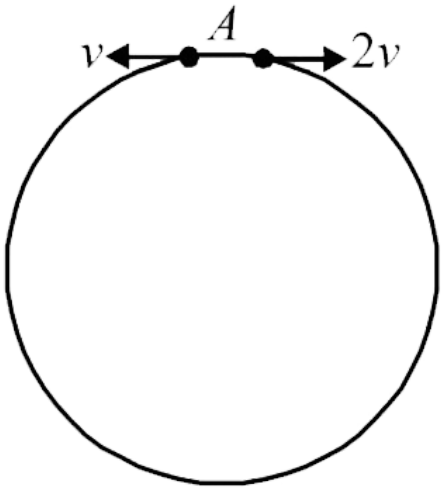
11. Two small particles of equal masses stant moving in opposite direction from a point A in a burtizonetal circule orbic their tangention velocity are V and $2V$, respectively as shown in the figure between collsions , the particals move with constant speed After making how many elastic collition , other the then that at A these two partical will again reach the point A ?



A. 4

B. 3

C. 2

D. 1

Answer: C

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12. A piece of wire is bent in the shape of a parabola $y = Kx^2$ (y - axis vorical) with a bead of mass m on it . The beat can side on the wire without friction , it stays the wire is now accleated parallel to the bead , where the bead can stay at rest with repect to the wire from the y - axis is

A. $\frac{a}{gk}$

B. $\frac{a}{2gk}$

C. $\frac{2a}{gk}$

D. $\frac{a}{4gk}$

Answer: B

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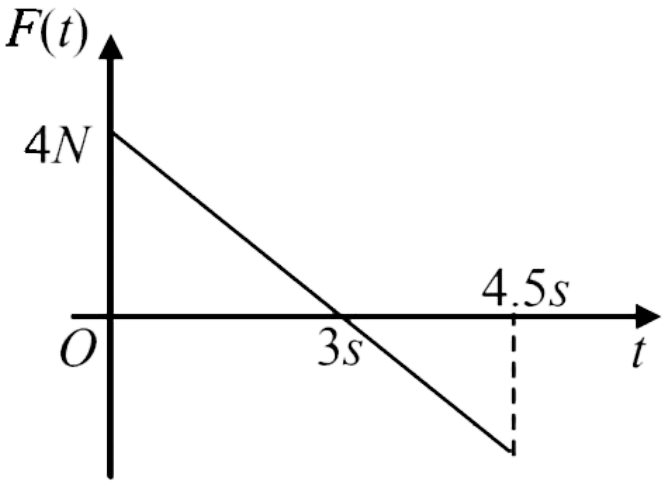
13. A block of mass2 kg is from to move along the x - axis it is at rest and from $1 = 0$ onwards it is subjeted to a time - depended force $F(i)$ in the x diretion . The force $F(1)$ varies with 1 as shown in the figure . The kinetic of the block after 4.5 second is



A. $4.50J$

B. $7.50J$

C. $5.06J$

D. $14.06J$

Answer: C

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14. The work done an a particle of mass m by a force

$K\left[\frac{x}{\left(x^2+y^2\right)^{3/2}}\hat{i}+\frac{y}{\left(x^2+y^{2^{3/2}}\right)\hat{j}}\right](Kbe \in gacons\tan tofap \propto riate$ dir

(a,0) $\rightarrow thep\oint$(0,a)` along a circular path of radius a about the origin in x

- y plane is

A. $\frac{2K\pi}{a}$

B. $\frac{K\pi}{a}$

C. $\frac{K\pi}{2a}$

D. 0

Answer: D

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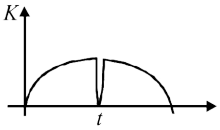
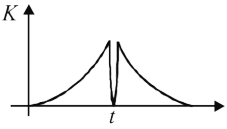
15. A tennis ball dropped on a barizoontal smooth surface , it because back to its original postion after hiting the surface the force on the bell during the collision is propertional to the length of compression of the bell . Which one of the following skethes desches discribe the variation of its kinetic energy K with time 1 mass apporiandly ? The figure as only illistrative and not to the scale .

(a)



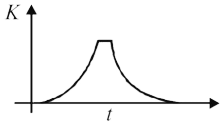
A.

(b)



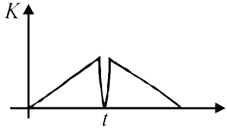
B.

(c)



C.

(d)



D.

Answer: B

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16. A body is moved along a straight line by a machine delivering constant power . The distance moved by the body in time t is proportional to

A. $t^{1/2}$

B. $t^{3/4}$

C. $t^{3/2}$

D. t^2

Answer: C

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17. A uniform chain of length L and mass M is tying on a smoth table and one third of its length is banging vertically down table the edge of the

table if g is acceleration the to gravity , the work required to pull the hanging part on the table is

A. MgL

B. $MgL/3$

C. MgL//9`

D. MgL//18`

Answer: D

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18. A particle is acted upen by the a force of constant magninude which is always perpendicalar to the velocity of the particle . The motion of the particle taken place is a plane it follows that :

A. its velocity is constant

B. its acceleration is constant

C. its Kinectic energy is constant

D. its move is a circular path

Answer: C::D

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19. A force $F = -K\left(y\hat{I} + x\hat{j}\right)(whereK$ $isaposivecons\tan t)actsonapartic \leq mov \in g \in the$xy $pla \neq .Start \in gf$ or $mthe$ or $ig \in al, theparticalistakenalong \in thepo$ xa$\xi s \to thep\oint$(x,0) and $thenpartical \to theya\xi sthep\oint$(x,0) $.The \to talw$ or $kdo \neq bythef$ or ceF` on the particls is

A. $-2Ka^2$

B. $2Ka^2$

C. $-Ka^2$

D. Ka^2

Answer: C

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20. A stone tied to a string of length L is whirled in a vertical circle with the ofter end of the string at the centre . At a certin instant of time , the stone is at its lowest position , and has a speed is , the magintube of the change in its velocity as it reached a positive when the string is horizontal is

A. $\sqrt{u^2 - 2gL}$

B. $\sqrt{2gL}$

C. $\left(u^2 - gL\right)$

D. $\sqrt{2\left(u^2 - 2gL\right)}$

Answer: D

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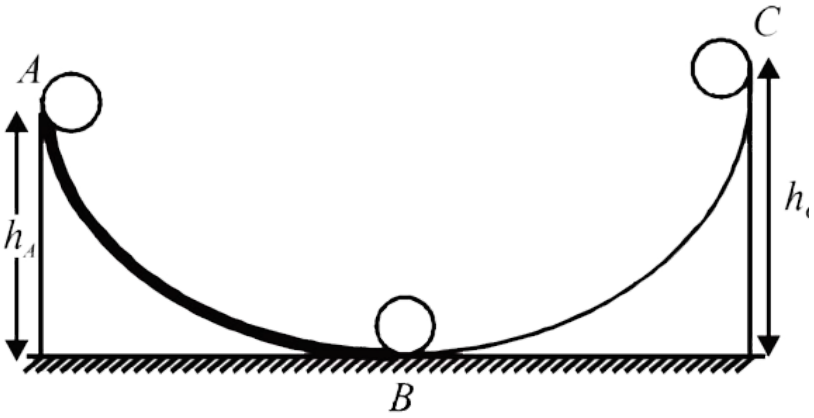
21. A small bell starts moving from A over a fixed track as shown in the figure . Surface AB is friction from A to B the bell roll ralis without

sipping BC is friction , K_AK_B andK_C are kinetic energy of the bell at A, B and C respacecvely.Then



A. $h_A > h_C, K_B > k_c$

B. $h_A > h_C, K_c > k_A$

C. $h_A = h_C, K_B > k_c$

D. $h_A < h_C, K_B > k_c$

Answer: A::B

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22. A bullet is fired fram a riffie . If the rifle recoils freely determine whether the kinetic energy of the rifle is greater then , equal or less then that of the bullet .

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23. A spring of force constant k is cut into there equal part what is force constant of each part ?

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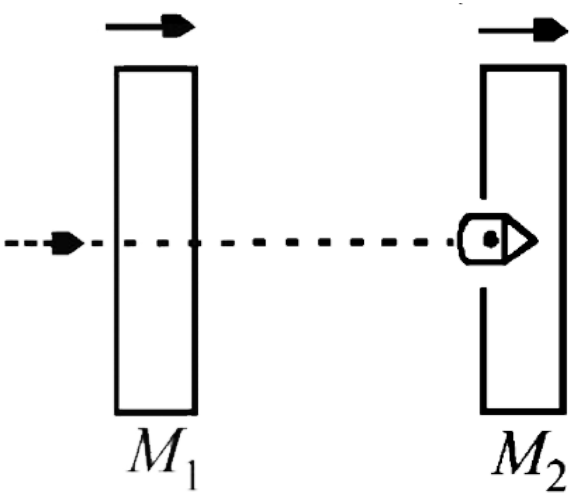
24. A 20 gm bullet pierces through a plate of mass $m_1 = 1$ kg and then comes to rest inside a second plate of mass $M_2 = 2.98$ kg as shown , it is found that the two plates initily atrest , now move with equal velocity . Find the percentage loss in the initial velocity of the bullet when it is between M and M_2 neglet any loss of material of the pletes due to the

action of the bullet



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25. When a ball is thrown up , the magnitude of its momentum decreases end then increase . Does this violate the conervation of momenturn priaciple ?

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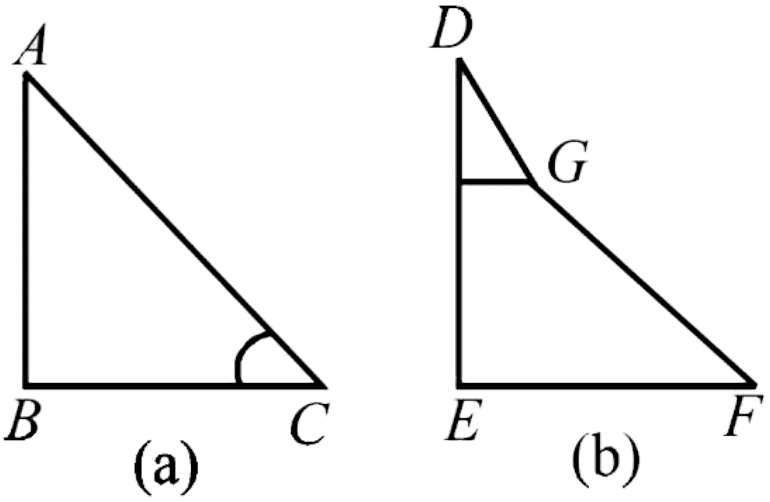

26.

In the figure (a) and (b) AC and GF are fixed inclined planes $BC = EF = x$ and $AB = DE = y$ A small block of mass M is rdeased from the point A it sides down AC and maches C with a speed V_C The same block is relessed from rest from the point D it sides down DGF and reached the point the F with $V_pTHecoefficientsofki \leq ticictionbetweentheblock$ and $thesarface$ AC and DGFaremu$colcate$V_(C) and V(p)`

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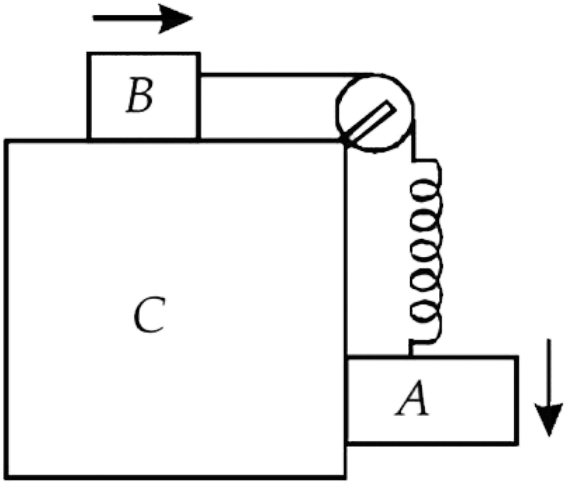
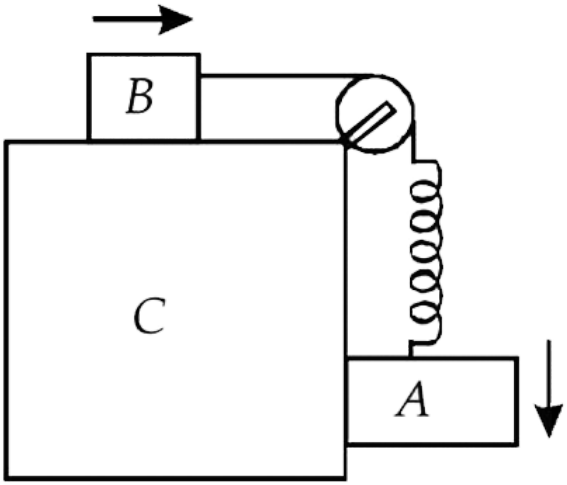
27. Two blocks A and B are connected to each other by a string and a spring , the spring pases and a frictionlesss pulley as down over in the figure . Block B sides over the horizental top surface of a strionry block C both with the verical side of C , both with the same conform speed



The coefficient of friction between the surface the of block is 0.2 force constant of the spring is 1960 newtons , if mass of block A is 2 kg ,

celculate the mass of block F and B and the energy stored is the spring



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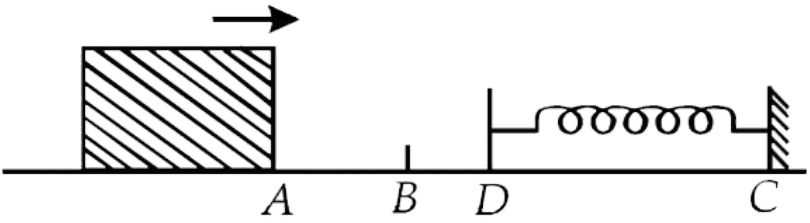
28. A 0.5 kg block sides from the point A (see fig) on a hurizontal track as wil initial speed of 3 m//s toward a weightes horizental spring of length 1 in and force constant 2 newtav in the part AB of the track is frictionless friction and the per BC has the coefficient of the state AB and and BD are 2 m and 2.14 m repectively , find the total distance through which the

block move before if conseto rest completely (Taking $= 10m/s^2$) .



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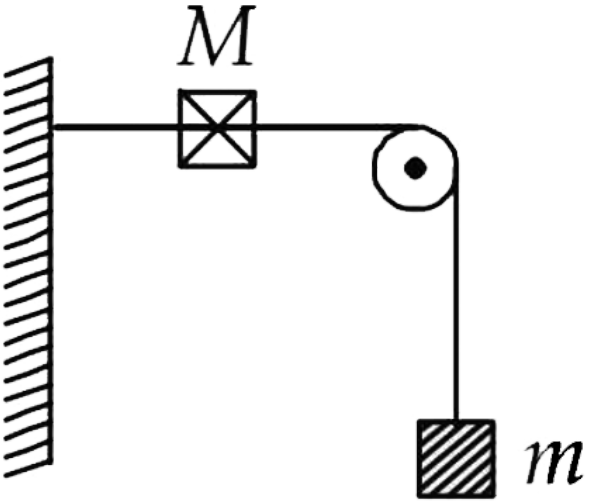
29. A string with one end fixed on a right well , passing over a fixed frictionless pulley at a distance of 2 m from the well , has a point mass $M = 2kg$ attached to the it at a distance of I m from the well . A mass $m = 0.5$ kg attached at the free end is field at rest as this the string is horizontal between the wall and the pulley when will be the speed with which the mass M with hit the well when the mass m is

released ?



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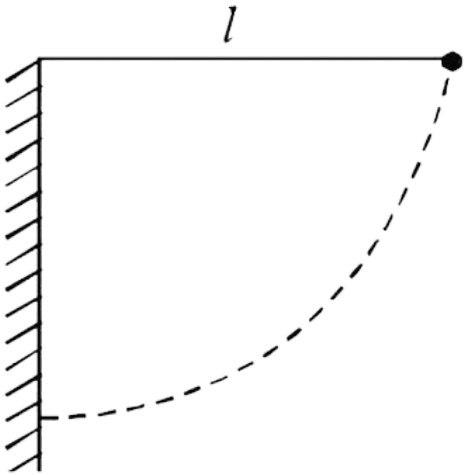
30. A simple pendalum is suspended from a peg on a verticle wall . The pendulum is pulled away from the well is a horizental position (see fig) and released . The bell his the well the coefficient of resitution being $\frac{2}{\sqrt{5}}$



what is the miximum number of colision after which the amplitube of secillections between less that 60 digree ?

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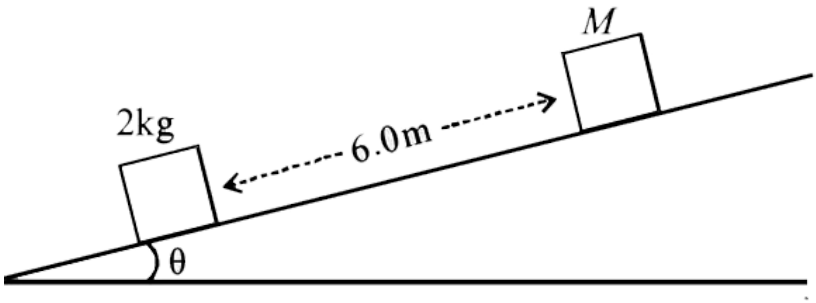
31. Two blocks of mass 2 kg and M are at rest as an inclined plane and are sparated of by a distance of 6.0 m as shown in figure . The coefficient of friction between each of the block and the inclined plane is 0.25 . The 2 kg block is given a velocity of 10.0 m//s up the inclined plate if collied with M comes back and has a velocity of 1.0m//s when if rached its inital position , The ofter block M ofter the collisiin its resitition . THe ofter the colition its 0.5 m up and come to rest caleslate the coefficient of

resttuion between the block and the mass of the block M [Take sin theta +n tan theta = 0.05 and a = 10m//s^(2)]`



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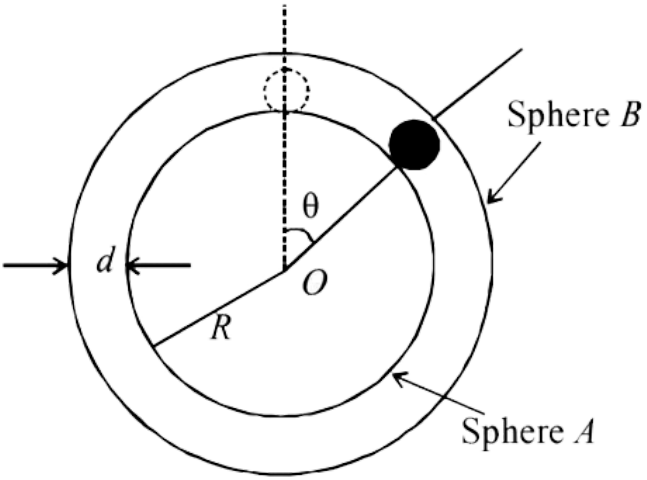
32. A spherical balll of mass m is the highest point in the space between two fixed , concentic sphere A and B the smaller the two sphere A has a radius R and the space between the two spheres has a width d . The bell has a disneter very dightly less then d . All surface are frictionless . The bell is a given a gentle push (owards the right in the figure) The upward vertical is denoted by θ (shown ijn the figure)



(a)Express the total normal reaction force exerted by the sphore on the as a finction of angle θ

(b) Let N_(A) and $N_B$denote in the magnitubes of the normal reaction force on the bell evered by the sphare A and B repectively Skech the variation of N_A and N_(B)$as functions of$cos theta $\in theran \geq 0$ le theta le pi $bydraw \in gtwoseparategraph \in youranswerb\infty ktak \in g$ cos theta `an the horizental axas.

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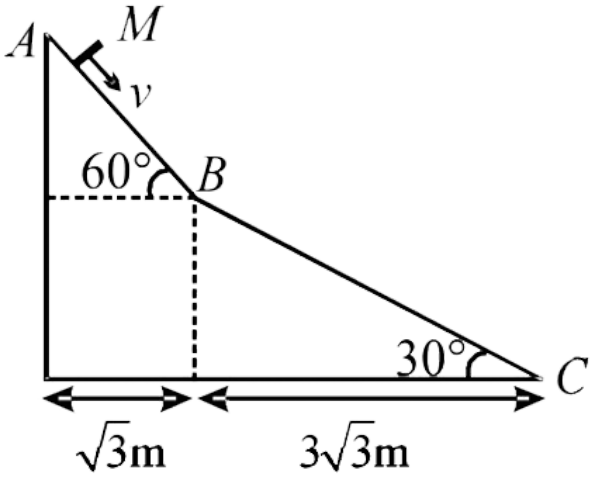
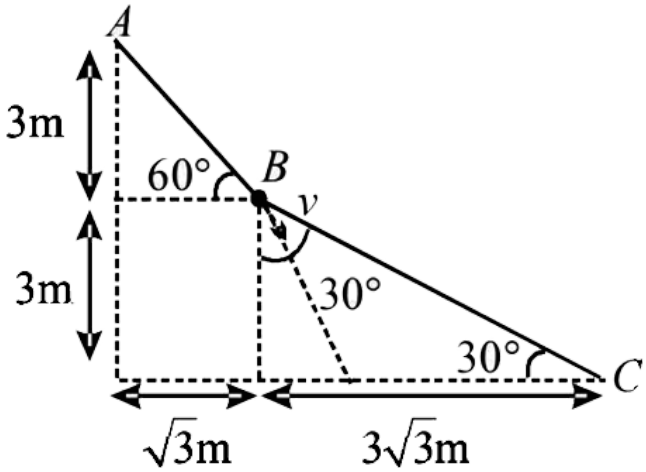
33. A small block of mass M move on a frictionless surface of an inclimed from as down is figure . The engle of the inclime suddenly change from

60° to 30° at point B . The block is initally at rest at A Assume the collsion between the block and the incline are totally inclassic $(g = 10m/s^2)$



The speed of the block at point B immedutaly after it strikes the second inclime is -



A. $\sqrt{60}m/s$

B. $\sqrt{45}m/s$

C. $\sqrt{30}m/s$

D. $\sqrt{15}m/s$

Answer: B

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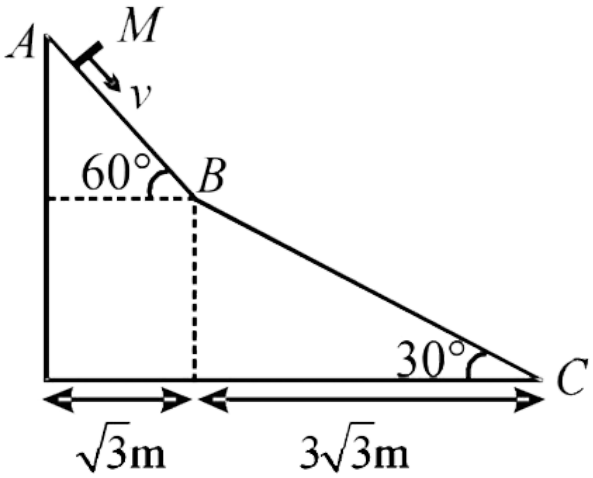
34. A small block of mass M move on a frictionless surface of an inclimed from as down is figure . The engle of the inclime suddenly change from 60° to 30° at point B . The block is initally at rest at A Assume the collsion between the block and the incline are totally inclassic $(g = 10m/s^2)$



The speed of the block at point C immediately before is leaves the second incline is

A. $\sqrt{120}m/s$

B. $\sqrt{105}m/s$

C. $\sqrt{90}m/s$

D. $\sqrt{75}m/s$

Answer: B

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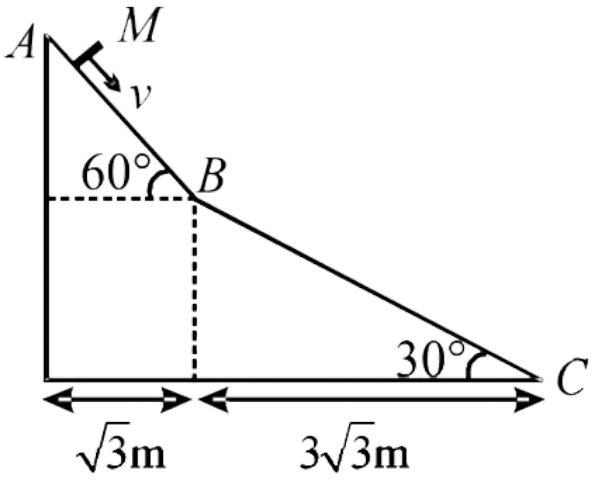
35. A small block of mass M move on a frictionless surface of an inclimed from as down is figure . The engle of the inclime suddenly change from 60° to 30° at point B . The block is initally at rest at A Assume the collsion between the block and the incline are totally inclassic $(g = 10m/s^2)$



If collision between the block and the incline is completely elestic , then the vartical (apward) component of the of the block at point B immediatly after it stricess the scond indine is -

A. $\sqrt{30}m/s$

B. $\sqrt{15}m/s$

C. 0

D. $-\sqrt{15}m/s$

Answer: C

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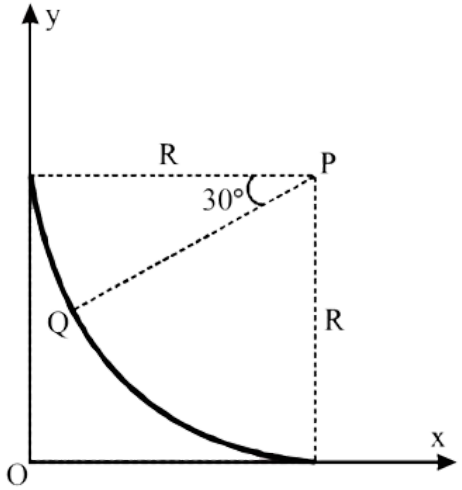
36. A small block of mass 1 kg is a circular are of ratius 40 m . The block sides along the track without topping and a frictionnal force acts on it in the direction opposite in the instrmens velocity . The work done in evercoming the friction up to the point Q as shown is the figure below is $150J$

(Take the acceleration due to gravity $g = 10ms^{-2}$)



The magnitude of the normal reaction that acts on the block at the point Q is

A. $7.5N$

B. $8.6N$

C. 11.5 N`

D. $22.5N$

Answer: A

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37. A small block of mass 1 kg is a circular are of ratius 40 m . The block sides along the track without topping and a frictionnal force acts on it in the direction opposite in the instrmens velocity . The work done in evercoming the friction up to the point Q as shown is the figure below is $150J$

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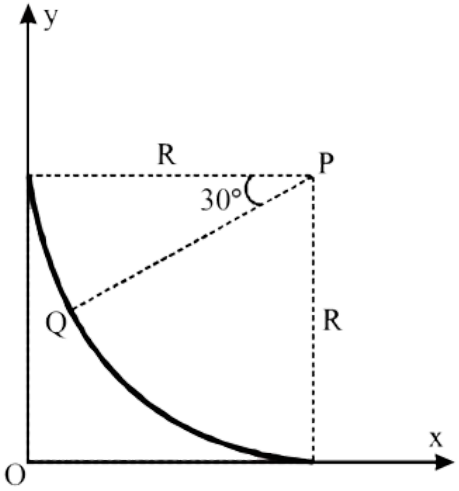

The speed of the block when it reaches the point Q is

A. $5ms^{-1}$

B. $10ms^{-1}$

C. $10\sqrt{3}ms^{-1}$

D. $20ms^{-1}$

Answer: B

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38. Statement - 1 : A block of mass m starts moving an a rough horizental surface with x velocity x it step dus to friction between the block and the surface is now tihed in an angles a cormin distance . The surface is now tilted is an angle on the 30° with the inrizonal and the same block is to go up on the surface with the same inital velocity x .THe decrease in the mechanical energy is the second situation is smailar then the that the first situation

Statment -2 : The coeifficient of friction between the block and the surface dicreases with the increses in the angle of inclimation .

A. Stetment -1 is True , Stetment - 2 is True , Statement - 2 is a correct explenation for Stetment - 1

B. Stetment -1 is True , Stetment - 2 is True , Statement - 2 is NOT a correct explenation for Stetment - 1

C. Stetment -1 is True , Statement - 2 is False

D. Stetment -1 is False , Statement - 2 is true

Answer:

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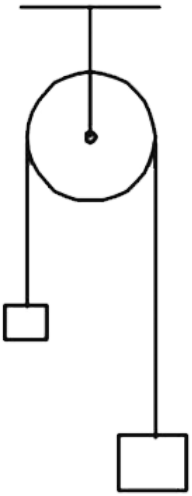
39. A light inextensible string that gas over a smoth fixed polley as shown in the figure connect two blocks of mases it 0.36 kg and 0.72 kg Taking $g = 10ms^{-2}$, find the work done by the string on the block of mass 0.36 kg doring the first second after the system is refosed from rest ,



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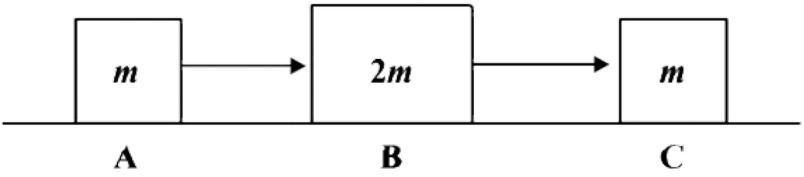
40. There object A, B and C are kept is a straing line a frictionlas horizental surface . These have masses have increase on $2m$ and m

repectively . The object A move toward B with a speed 9 m//s and makes as electic collision with a there after B makes complately inclesis with C . All motion over on the same strangth line . Find the first speed of the object C



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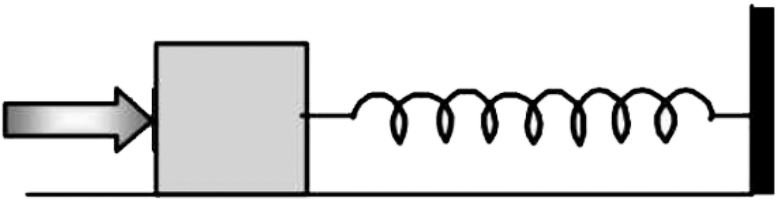
41. A block of mass $0.18kg$ is attached to a spring of force constant $2N/m$ The coefficient of friction between the block and the force is 0.1 insitially its block is at rest and the block as spring is an streched , As impalse is given to the block as shown in the figure . The block sides a distance of 0.06 in and comes to the first time . The initial velocity of the

for blocks is mis $V = N10$ then N is .



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42. A particle of mass 0.2 kg is moving is one dimension under a force that delever is a constant preses $0.5W$ in the particle . If the detail speed $\left(nms^{-1}\right)$ of the particle is zero , the speed $\left(mms^{-1}\right)$ after $5 \times$ is

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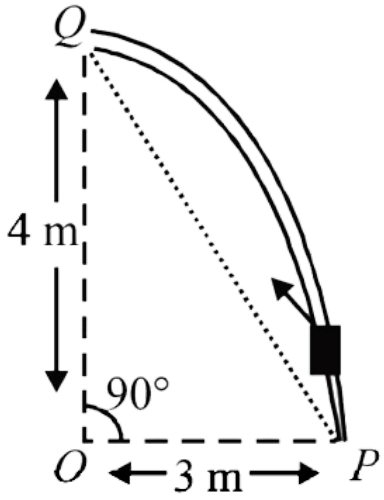
43. Constant as eliptical rail PQ in the varticle plain with $OP = = 3m$ and $OQ = 4m$. A block of mass 1 kg is pailed along the rail from P to Q

with a force of $18N$, which is always parallel to less PQ Assuming are frictionless losess , the kinetic energy the block when 0 reches Q is $(n \times 10)$ pales . THe velie of a (Take acceleration due to gravity) $= 10ms^{-2}$)



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44. Constant the following two statements :

A. Liner momentum of a system of particles is zero

B . Kinetic energy of a system of particls is zero .Then

A. A does not impty B and B does not imply A

B. A implies B and B does not imply A

C. A does not impty B and B implies A

D. A impies B and B implies A

Answer: C

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45. A wire suspended vertically from one of itsends is strached by attached a weight of $200N$ to the lower end . The weight streches the wire by $1mm$. Then the elastic energy stored in the wire is

A. $0.2J$

B. $10J$

C. $20J$

D. $0.1J$

Answer: D

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46. A spring of spring constant 5×10^2Nm is streched initially by $5cm$ from the unstriched position . Then the work required to streach is further by another $5cm$ is

A. $12.50N - m$

B. $18.75N - m$

C. $25.00N - m$

D. $6.25N - m$

Answer: B

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47. A body is moves along a straight line by a machine dellvering a constant power . The distance moved by the body in time t is propertional as

A. $t^{3/4}$

B. $t^{3/2}$

C. $t^{1/4}$

D. $t^{1/2}$

Answer: B

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48. A particle move in a straight line with retardation proportional to its displacement its loss of kinectic energy for any displacement x is proportional to

A. x

B. e^2

C. x^2

D. $\log_e x$

Answer: C

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49. A uniform chain of length $2m$ is kept on a table such that a length of $60cm$ hangas freely from the adge of the table . The table . The total mass of the chain ia $4kg$ What is the work done in pulling the entire the chain the on the table ?

A. $12J$

B. $3.6J$

C. $7.2J$

D. $1200J$

Answer: B

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50. A force $\overline{F} = \left(\bar{5}I + \bar{3}j + 2\bar{k}\right)N$ is applied over a particle which displaces it from its original to the point $\bar{t} = \left(2\bar{i} - \bar{j}\right)m$. The work done the particle in joules is

A. $+10$

B. $+7$

C. -7

D. $+13$

Answer: B

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51. A body of mass m , accelerates uniform from rest to v_1 in time t_1 . The instanencoes power delivered to the body as a finction of t is

A. $\frac{mv_1t^2}{t_1}$

B. $\frac{mv_1^2t}{t_1^2}$

C. $\frac{mv_1t}{t_1}$

D. $\frac{mv_1^2t}{t_1}$

Answer: B

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52. A particle is acted upon by a force of constant magnitude which is always is perpendicular to the velocity of the particle , the motion of the particles takes place is a plane it follow that

A. its kinetic energy is constant

B. its acceleration is constant

C. its velocity is constant

D. its moves in a straight lime

Answer: A

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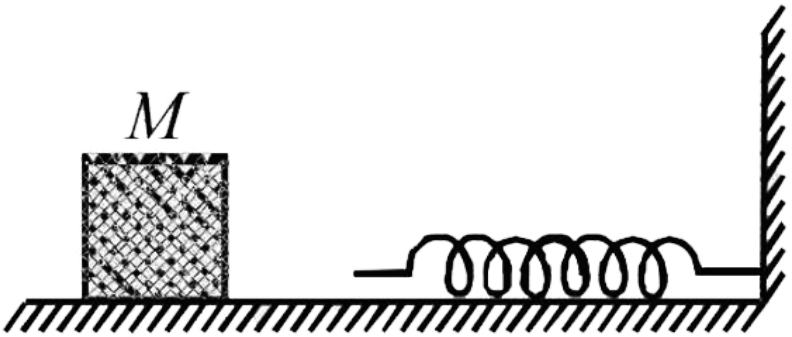
53. The block of mass M moving on the frictionless horizontal surface collides with the spring constant k and compresses it by length L . The maximum momention of the block after collision is



A. $\frac{kL^2}{2M}$

B. $\sqrt{Mk}L(c)$S

C. $\frac{ML^2}{k}$

D. zero

Answer: B

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54. A spherical ball of mass $20kg$ is stationary at the top of a hill of height $100m$, it rolls down a smooth surface to the ground , then climbs up another bill of height of $30m$ and final rolls down to a horizontal base at a height of $20m$ about the ground . The velocity attained by the ball is

A. $20m/s$

B. $40m/s$

C. $10\sqrt{30}m/s$

D. $10m/s$

Answer: B

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55. A body of mass m is acceleratad uniformaly from rest to a speed v in a time T . The instanseous power delivered to the body as a function of time is given by

A. $\frac{mv^2}{T^2}t^2$

B. $\frac{mv^2}{T^2}t(c)$

C. $\frac{1}{2}\frac{mv^2}{T^2}t^2$

D. $\frac{1}{2}\frac{mv^2}{T^2}t^2$

Answer: B

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56. A particle of mass $100g$ is thrown verically upward with a speed of $5m/s$. The work done by the of gravity during the time the particle goes up is

A. $-0.5J$

B. $-1.25J$

C. $1.25J$

D. $0.5J$

Answer: B

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57. The potential energy of a $1kg$ particle free to move along the x- axis is given by $V(x) = \left(\frac{x^4}{4} - \frac{x^2}{2}\right)J$

The total mechainical energy of the particle is $2J$. Then , the maximum speed (in m//s) is

A. $\frac{3}{\sqrt{2}}\Bigg)$

B. $\sqrt{2}$

C. $\frac{1}{\sqrt{2}}$

D. 2

Answer: A

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58. A $2kg$ block slides on a horizontal floor with the a speed of $4m/s$ it strikes a uncompressed spring , and compresses it till the block is motionless . The kinetic friction force is compresses is $15N$ and spring constant is $10000N/m$. The spring by

A. $8.5cm$

B. $5.5cm$

C. $2.5cm$

D. $11.0cm$

Answer: B

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59. As athlete in the olympic ganes cover a distance of $100m$ in $10s$. Hiskinetic energy can be estrimated to be in the range

A. $200J - 500J$

B. $2 \times 10^5 J - 3 \times 10^5 J$

C. $20000J - 50000J$

D. $20000J - 50000J$

Answer: D

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60. A block of mass $0.50kg$ is moving with a speed of $2.00cm^{-1}$ can a smooth surface . It strikes another mass of $1.00kg$ and then they move togather as a single body . The energy less charing the collision is

A. $0.16J$

B. $1.00J$

C. $0.67J$

D. $0.34J$

Answer: C

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61. The potential energy funtions for the force between two along in a distance molecule is approximatily given by $U(x) = \frac{a}{x^{12}} - b\frac{)}{x^6}$ where a and b are constant and x is the distance between the aloms , if the discision energy of the molecale is $D = [U(x = \infty) - U$ atequlibrium] , D is

A. $\frac{b^2}{2a}$

B. $\frac{b^2}{12a}$

C. $\frac{b^2}{4a}$

D. $\frac{b^2}{6a}$

Answer: C

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62. This question has statement 1 and statement 2 . Of the four choice given after the Statement , choose the one that best describe the two Statement .

If the spring $S_1$and S_2 of force constant k_1 and k_2 respectively , are streached by the same force , it is found that more work is done on spring S_1 then on spring S_2

Statement -1: If statement by the same answer work done on S_1 work on S_1 is more then S_2

Statement - 2 : $k_1 < k_2$

A. Statement 1 is false , Statement 2 is true

B. Statement 1 is true , Statement 2 is false

C. Statement 1 is true , Statement 2 is true ,Statement 2 is the correct explantion for Statement 1

D. Statement 1 is true , Statement 2 is true ,Statement 2 is the not the correct explantion for Statement 1

Answer: A

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63. When a rubber bandis streched by a distance x , if exerts resuring foprce of magnitube $F = ax + bx^2$ where$a$ and b are constant . The work in streached the unstreched rubber - band by L is

A. $aL^2 + bL^2$

B. $\frac{1}{2}\left(aL^2 + bL^3\right)$

C. $\frac{aL^2}{2} + \frac{aL^3}{3}$

D. $\frac{1}{2}\frac{9aL^2}{2} + \frac{bL^3}{3}\Big)\Big)$

Answer: C

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64. A person trying to lose weight by burning fat filts a mass of $10kg$ upto a being of $1m1000$ time . Assume that the potential energy lost each time be lower the mass is dissipated . How much far will be use up considering

the work done only when the weight is lifted up ? Far supplies $3.8 \times 10^7 J$ of energy per kg wich is canverted to mechanical energy with $x20\,\%$ efficiency rate Take $= 9.8ms^{-2}$

A. $9.89 \times 10^{-3} kg$

B. $12.89 \times 10^{-3} kg$

C. $2.45 \times 10^{-3} kg$

D. $6.45 \times 10^{-3} kg$

Answer: B

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