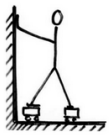
Question 1
Correct
Mark 1.00 out of 1.00
Flag question

Consider the force $F = 2xy^3 i + 3x^2 y^2 j$. The corresponding potential energy U(x, y) is:

- a. None ✔
- b. $-xy^3$
- c. x^2y^3
- d. x^3y
- e. xy^3

The correct answer is:
None

Question 2
Incorrect
Mark 0.00 out of 1.00
Flag question



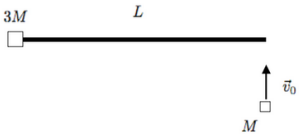
The work done by the contact force of a wall on a person as the person moves is

1. positive.
2. Negative.
3. zero.
4. Impossible to determine from the information given in the question and the figure.

- a. 3
- b. 1
- c. 4
- d. 2 ✖

The correct answer is:
3

Question 3
Correct
Mark 1.00 out of 1.00
Flag question



A block with mass 3M connected to a massless rod of length L lies at rest on a fixed frictionless table. A second block of mass M impinges on the system with speed v_0, strikes the opposite end of the rod at a right angle, and sticks. For this problem, assume that the dimensions of the blocks are much smaller than the length of the rod.
What is the final velocity of the center of mass of the block-rod-block system?

- a. 0.20 v_0
- b. 0.75v_0
- c. 0.50 v_0
- d. 0.33 v_0
- e. None ✔

The correct answer is:
None

Question 4
Incorrect
Mark 0.00 out of 1.00
Flag question

A block with mass *M* and contact area *A* slides down an inclined plane with friction, covering a distance *L* in time *T*. How much time does it take another block with the same mass and composition, but twice the surface area, to slide down the same length?

- a. None
- b. T^2 ✖
- c. 2T
- d. 0.2T
- e. (1/2)T

The correct answer is:
None

Question **5**
Incorrect
Mark 0.00 out of 1.00
Flag question

Compared to the amount of energy required to accelerate a car from rest to 10 miles per hour, the amount of energy required to accelerate the same car from 10 mph to 20 mph is

1. the same
2. twice as much
3. three times as much
4. four times as much
5. unsure.

- a. 4
- b. 2
- c. 3
- d. 1 ✖
- e. 5

The correct answer is:
3

Question **6**
Correct
Mark 1.00 out of 1.00
Flag question

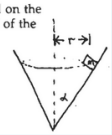
A raindrop of initial mass $< i > M_o$ starts falling from rest under the influence of gravity. Assume that the drop gains mass from the cloud at a rate proportional to the product of its instantaneous mass and its instantaneous velocity: $dM/dt = kMV$, where k is a constant. The terminal speed is:

- a. $2\pi\sqrt{g/k}$
- b. $2\pi\sqrt{g/k}$
- c. None ✔
- d. $\sqrt{k/g}$
- e. $-2\pi\sqrt{g/k}$

The correct answer is:
None

Question **7**
Correct
Mark 1.00 out of 1.00
Flag question

A mass is moving in an horizontal circle of radius r with a constant speed on the inside wall of a cone. Assume the wall of the cone is frictionless. The wall of the cone makes an angle α with the vertical.
How long will the mass take to go around the circle?

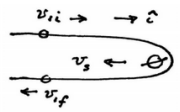


- a. $\frac{r \times \cot \alpha}{g}$
- b. $\sqrt{\frac{r \times \cot \alpha}{g}}$
- c. $\frac{r \times \tan \alpha}{g}$
- d. None ✔
- e. $\sqrt{\frac{r \times \tan \alpha}{g}}$

The correct answer is:
None

Question **8**
Incorrect
Mark 0.00 out of 1.00
Flag question

Question A spacecraft with speed $v_{s,i}$ approaches Saturn which is moving in the opposite direction with a speed v_s. After interacting gravitationally with Saturn, the spacecraft swings around Saturn and heads off in the opposite direction it approached. The final speed of the spacecraft $v_{s,f}$ after it is far enough away from Saturn to be nearly free of Saturn's gravitational pull is



1. $v_{s,i}$
2. v_s
3. $2v_{s,i}$
4. $2v_s$
5. $v_{s,i} + v_s$
6. $v_{s,i} - v_s$
7. $v_{s,i} + 2v_s$

- a. 3
- b. 2
- c. 4
- d. 6
- e. 7
- f. 1
- g. 5 ✖

The correct answer is:
7

Question **9**
Correct
Mark 1.00 out of 1.00
Flag question

A streetcar is freely coasting (no friction) around a large circular track. It is then switched to a small circular track. When coasting on the smaller circle its linear speed is

1. greater
2. less.
3. unchanged.

- a. 1
- b. Not sufficient information to answer the problem
- c. 3 ✔
- d. 2

The correct answer is:
3

Question **10**
Incorrect
Mark 0.00 out of 1.00
Flag question

Compared to the amount of energy required to accelerate a car from rest to 10 miles per hour, the amount of energy required to accelerate the same car from 10 mph to 20 mph is

1. the same
2. twice as much
3. three times as much
4. four times as much
5. unsure.

- a. 3
- b. 1 ✖
- c. 5
- d. 4
- e. 2
- f. None

The correct answer is:
3

Question **11**
Correct
Mark 1.00 out of 1.00
Flag question

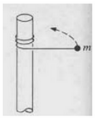
An object 1 is dropped from rest from a building of height H exactly as object 2 is thrown up vertically from the ground. When they collide 1 has twice the speed of 2. If the collision occurs at height h, then h/H is:

- a. 2/5
- b. 5/3
- c. 2/3 ✔
- d. 3/5
- e. None

The correct answers are:
2/3,
None

Question **12**
Incorrect
Mark 0.00 out of 1.00
Flag question

A tetherball of mass m is attached to a post of radius R by a string. Initially it is a distance r_0 from the center of the post and it is moving tangentially with a speed v_0. The string wraps around the outside of the post. Ignore gravity and any dissipative forces. Until the ball hits the post,



1. The kinetic energy of the ball is constant.
2. The kinetic energy of the ball changes.
3. Not enough information is given to determine whether the kinetic energy of the ball changes or not.

- a. 1
- b. 3 ✖
- c. 2

The correct answer is:
1

Question **13**
Correct
Mark 1.00 out of 1.00
Flag question

A body of mass nM moves rightward with speed v toward a mass M that is at rest, where n is a number>0. Then, the speed of the mass nM in the CM frame is:

- a. None
- b. v/3
- c. v/(n+1) ✔
- d. v/n
- e. (n+1)/v

The correct answer is:
v/(n+1)

Question **14**
Correct
Mark 1.00 out of 1.00
Flag question

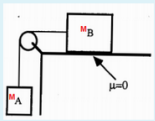
A mass m undergoes circular motion of radius R on a horizontal frictionless table, connected by a massless string through a hole in the table to a second mass M. If M is stationary, then the period of circular motion is:

- a. None ✔
- b. $2\ \Pi\sqrt{\frac{mg}{MR}}$
- c. $\sqrt{\frac{mR}{Mg}}$
- d. $\sqrt{\frac{Mg}{mR}}$
- e. $2\Pi\sqrt{\frac{Mg}{mR}}$

The correct answer is:
None

Question **15**
Correct
Mark 1.00 out of 1.00
Flag question

Figure illustrates the arrangement of two blocks of masses M_A and M_B where M_B placed on a frictionless horizontal surface. They are connected with a light string through frictionless pulley and the arrangement is released from rest. During the subsequent motion, which of the following statement/s is/are true.



- a. The tension in the string is less than g M_A but not zero. ✔
- b. The tension in the string is zero.
- c. The tension in the string is always g M_A
- d. The tension in the string is greater than g M_A

The correct answer is:
The tension in the string is less than g M_A but not zero.

Question **16**
Incorrect
Mark 0.00 out of 1.00
Flag question

A block of mass m is attached to a spring with spring constant k is free to slide along a horizontal frictionless surface. At $t = 0$ the block-spring system is stretched an amount $x_0 > 0$ from the equilibrium position and is released from rest. What is the x -component of the velocity of the block when it first comes back to the equilibrium?

1. $v_x = -x_0\frac{T}{4}$
2. $v_x = x_0\frac{T}{4}$
3. $v_x = -\sqrt{\frac{k}{m}}x_0$
4. $v_x = \sqrt{\frac{k}{m}}x_0$
5. None of the above.

- a. 1
- b. 4
- c. 3
- d. 2
- e. 5 ✖

The correct answer is:
3

Question 17
Correct
Mark 1.00 out of 1.00
Flag question

Consider two carts, of masses m and $2m$, at rest on an air track. If you push first one cart for 3 s and then the other for the same length of time, exerting equal force on each, the kinetic energy of the light cart is

1. larger than
2. equal to
3. smaller than

the kinetic energy of the heavy car.

- a. 1 ✔
- b. 3
- c. 2

The correct answer is:
1

Question 18
Correct
Mark 1.00 out of 1.00
Flag question

Question Consider a person standing in an elevator that is accelerating upward. The upward normal force N exerted by the elevator floor on the person is

1. larger than
2. identical to
3. smaller than

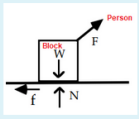
the downward force of gravity on the person.

- a. 1 ✔
- b. 3
- c. None
- d. 2

The correct answer is:
1

Question 19
Incorrect
Mark 0.00 out of 1.00
Flag question

Figure shows the free body diagram of a block on which a person applied force F and the block remains at rest. In this, W, N, f represents weight, normal and frictional forces respectively. It is to be noted that the arrows represents the direction of forces but not their magnitudes. Which of the following relation/s is/are true?



- a. N=W and F=f
- b. F>f and N<W
- c. F>f and N>W
- d. F < f and N = W
- e. None of the given choices ✖

The correct answer is:
F>f and N<W

Question 20
Correct
Mark 1.00 out of 1.00
Flag question

A vehicle traveling at speed s on a frictionless track starts to leak sand. What is the vehicles speed at a later time?

- a. Less than s
- b. Greater than s
- c. The same speed s ✔

The correct answer is:
The same speed s

Question 25
Correct
Mark 1.00 out of 1.00
Flag question

Question Consider two vectors $\vec{\mathbf{A}} = 2\hat{\mathbf{i}} + 3\hat{\mathbf{k}}$ and $\vec{\mathbf{B}} = -6\hat{\mathbf{i}} + 4\hat{\mathbf{k}}$. The two vectors are

1. parallel.
2. perpendicular.
3. neither parallel or perpendicular.

- a. None
- b. 3
- c. 2 ✔
- d. 1

The correct answer is:
2

Question 21
Incorrect
Mark 0.00 out of 1.00
Flag question

Question Two balls that are dropped from a height h_i above the ground, one on top of the other. Ball 1 is on top and has mass m_1, and ball 2 is underneath and has mass m_2 with $m_2 >> m_1$. Ball 2 first collides with the ground and rebounds with speed v_0. Then, as ball 2 starts to move upward, it collides elastically with the ball 1 which is still moving downwards also with speed v_0. The final relative speeds after ball 1 and ball 2 collide is

1. Zero
2. v_0
3. $2v_0$
4. $3v_0$
5. None of the above.

- a. 1
- b. 2
- c. 3
- d. 5 ✖
- e. 4

The correct answer is:
3

Question 22
Correct
Mark 1.00 out of 1.00
Flag question

A 0.3-kg mass is attached to a spring and oscillates at 2 Hz with a *Q-factor* of 60. Find the spring constant in Newton/meter?

- a. None ✔
- b. 4.85
- c. 4.75
- d. 4.45
- e. 4.55

The correct answer is:
None

Question 23
Correct
Mark 1.00 out of 1.00
Flag question

The position of a particle is given by $x(t) = x_0\cos(\omega t + \pi/6)$, where $x_0 = 6$ m and $\omega = 2\ s^{-1}$. The maximum speed the particle achieves is
(a) 3 m/s (b) 6 m/s (c) 12 m/s (d) 24 m/s (e) 36 m/s

- i. (e)
- ii. (a)
- iii. (b)
- iv. (d)
- v. (c) ✔

The correct answer is:
(c)

Question 24
Correct
Mark 1.00 out of 1.00
Flag question

Question The same horizontal force, of magnitude F, is applied to two different blocks, of mass m and $3m$ respectively. The blocks move on a frictionless surface and both blocks begin from rest.

If the force is applied for the same time to each block, which one of the following sentences is true?

(i) The heavier block acquires 9 times as much kinetic energy as the lighter block.

(ii) The heavier block acquires 3 times as much kinetic energy as the lighter block.

(iii) The two blocks acquire the same kinetic energy.

(iv) The lighter block acquires 3 times as much kinetic energy as the heavier block.

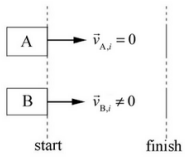
(v) The lighter block acquires 9 times as much kinetic energy as the heavier block.

- a. (i)
- b. (ii)
- c. (iii)
- d. (iv) ✔
- e. (v)

The correct answer is:
(iv)

Question **26**
Correct
Mark 1.00 out of 1.00
Flag question

Identical constant forces push two identical objects A and B continuously from a starting line to a finish line. If A is initially at rest and B is initially moving to the right,



1. Object A has the larger change in momentum.
2. Object B has the larger change in momentum.
3. Both objects have the same change in momentum
4. Not enough information is given to decide.

- a. 4
- b. None
- c. 1 ✔
- d. 2
- e. 3

The correct answer is:
1

Question **27**
Correct
Mark 1.00 out of 1.00
Flag question

An explosion splits an object initially at rest into two pieces of unequal mass. Which piece has the greater kinetic energy?

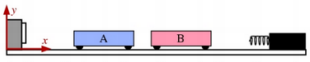
1. The more massive piece.
2. The less massive piece.
3. They both have the same kinetic energy.
4. There is not enough information to tell.

- a. 4
- b. 1
- c. 2 ✔
- d. 3

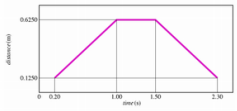
The correct answer is:
2

Question **28**
Incorrect
Mark 0.00 out of 1.00
Flag question

Question The figure below shows an experimental setup to study the collision between two carts.



In the experiment cart A rolls to the right on the level track, away from the motion sensor at the left end of the track. The graph below shows the distance from the motion sensor to cart A as a function of time.



What objects collide when $t = 1.5$ s?

1. Cart B and the spring.
2. Cart B and the motion sensor.
3. Carts A and B.
4. Cart A and the spring.
5. Cart A and the motion sensor.

- a. None
- b. 5
- c. 1 ✖
- d. 3
- e. 2
- f. 4

The correct answer is:
3

Question 30
Incorrect
Mark 0.00 out of 1.00
Flag question

Question A compact car and a large truck collide head on and stick together. Which undergoes the larger momentum change?

1. car
2. truck
3. The momentum change is the same for both vehicles.
4. Can't tell without knowing the final velocity of combined mass.

a. 2
b. 4 ✖
c. 1
d. 3

The correct answer is:
3

Question 31
Incorrect
Mark 0.00 out of 1.00
Flag question

Question Cart A is at rest. An identical cart B, moving to the right, collides inelastically with cart A. They stick together. After the collision, which of the following is true?

1. Carts A and B are both at rest.
2. Carts A and B moves to the right with speed greater than Cart B's original speed.
3. Carts A and B move to the right with a speed less than cart B's original speed.
4. Cart B stops and cart A moves to the right with speed equal to the original speed of cart B.

a. 4
b. 1
c. None ✖
d. 2
e. 3

The correct answer is:
3

Question 32
Incorrect
Mark 0.00 out of 1.00
Flag question

Question When a rocket accelerates in a gravitational field, will it reach a greater final velocity if the fuel burn time is

1. as fast as possible?
2. as slow as possible?
3. The final speed is independent of the fuel burn time?
4. I'm not sure.

a. None ✖
b. 2
c. 4
d. 3
e. 1

The correct answer is:
1

Question 33
Incorrect
Mark 0.00 out of 1.00
Flag question

Question : A constant force is exerted on a cart that is initially at rest on an air track. Friction between the cart and the track is negligible. The force acts for a short time interval and gives the cart a certain final speed.

To reach the same final speed with a force that is only half as big, the force must be exerted on the cart for a time interval

1. four times as long as
2. twice as long as
3. equal to
4. half as long as
5. a quarter of

that for the stronger force.

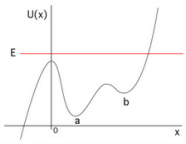
a. 3 ✖
b. 1
c. 5
d. 4
e. 2

The correct answer is:
2

Question **34**
Incorrect
Mark 0.00 out of 1.00
Flag question

A particle with total mechanical energy E has position $x > 0$ at $t = 0$

1. escapes to infinity in the – x-direction
2. approximates simple harmonic motion
3. oscillates around a
4. oscillates around b
5. periodically revisits a and b
6. not enough information
7. two of the above.



- a. 4
- b. 5
- c. 2
- d. 3
- e. 1
- f. 7
- g. 6 ✖

The correct answer is:
1

Question **35**
Incorrect
Mark 0.00 out of 1.00
Flag question

Question Consider two carts, of masses m and $2m$, at rest on an air track. If you push first one cart for 3 s and then the other for the same length of time, exerting equal force on each, the momentum of the light cart is

1. four times
2. twice
3. equal to
4. one-half
5. one-quarter

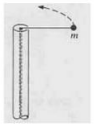
the momentum of the heavy cart.

- a. 2
- b. 5
- c. None
- d. 1 ✖
- e. 3
- f. 4

The correct answer is:
3

Question **36**
Incorrect
Mark 0.00 out of 1.00
Flag question

A tetherball of mass m is attached to a post of radius by a string. Initially it is a distance r_0 from the center of the post and it is moving tangentially with a speed v_0. The string passes through a hole in the center of the post at the top. The string is gradually shortened by drawing it through the hole. Ignore gravity and any dissipative forces. Until the ball hits the post,



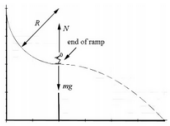
1. The kinetic energy of the ball is constant.
2. The kinetic energy of the ball changes.
3. Not enough information is given to determine whether the kinetic energy of the ball changes or not.

- a. 1
- b. 2
- c. 3 ✖

The correct answer is:
2

Question **37**
Correct
Mark 1.00 out of 1.00
Flag question

A skier of mass M slides down a ramp shaped as a circle of radius R. At the end point of the ramp just before the skier is in the air, the magnitude of the normal force exerted by the ramp on the skier is N. The gravitational constant is g.



1) The magnitude of the normal force N greater than Mg.
2) The magnitude of the normal force N equal to Mg.
3) The magnitude of the normal force N less than Mg.
4) The magnitude of the normal force N can be greater than, equal to, or less than Mg depending on the speed of the skier.

- a. None
- b. 4
- c. 1 ✔
- d. 2
- e. 3

The correct answer is:
1

Question **38**
Incorrect
Mark 0.00 out of 1.00
Flag question

A ball is thrown against a wall; the ball bounces off and returns with speed equal to the speed it had before striking the wall. Which of the following statements is true from before to after the collision between the ball and the wall? Explain your answer.

1) The kinetic energy of the ball is the same.
2) The momentum of the ball is the same.
3) Both the kinetic energy and the momentum of the ball are the same.
4) Neither the kinetic energy nor the momentum of the ball are the same.
5) The collision is inelastic.
6) Two of the above.

- a. 6
- b. 3
- c. 1
- d. 5
- e. 4
- f. 2 ✖

The correct answer is:
1

Question **39**
Incorrect
Mark 0.00 out of 1.00
Flag question

The frequency of small oscillations about equilibrium for 2 identical atoms of mass m bound to each other by the Lennard-Jones interaction $U = \epsilon\left[\left(\frac{r_0}{r}\right)^{12} - 2\left(\frac{r_0}{r}\right)^{6}\right]$ is:

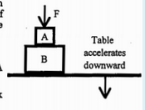
- a. $\omega = 12\sqrt{\frac{\epsilon}{r_0^2}}$
- b. $\omega = 6\sqrt{\frac{\epsilon}{mr_0^2}}$
- c. $\omega = 6\sqrt{\frac{\epsilon}{r_0^2}}$
- d. None ✖
- e. $\omega = 12\sqrt{\frac{\epsilon}{mr_0^2}}$

The correct answer is:
$\omega = 12\sqrt{\frac{\epsilon}{mr_0^2}}$

Question **40**
Correct
Mark 1.00 out of 1.00
Flag question

Block A sits on top of block B which sits on a table. An external force of magnitude F pushes down on the top of block A. If the table is accelerating downward, the magnitude of the Normal force of block B on block A is:

i) Equal to the magnitude of the force of gravity on block A.
ii) Equal to the magnitude of the force of gravity on block A plus the external force F.
iii) Greater than the magnitude of the force of gravity on block A plus the external force F.
iv) None of the above.



- a. (i)
- b. (iv) ✔
- c. (ii)
- d. (iii)

The correct answer is:
(iv)

Question **41**
Incorrect
Mark 0.00 out of 1.00
Flag question

Which of the following forces can never, under *any* circumstances, do work?

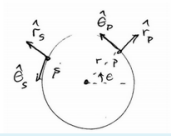
(a) gravity
(b) static friction
(c) kinetic friction
(d) tension
(e) normal force
(f) None of the above; they all can do work.

- i. (b)
- ii. (a)
- iii. (f)
- iv. (c)
- v. (e)
- vi. (d)

The correct answer is:
(f)

Question **42**
Incorrect
Mark 0.00 out of 1.00
Flag question

Question Consider the pair of units vectors $(\hat{\mathbf{r}}_p, \hat{\boldsymbol{\theta}}_p)$ located at the point P, and the pair of units vectors $(\hat{\mathbf{r}}_s, \hat{\boldsymbol{\theta}}_s)$ located at the point S. Which of the following statements is true?



- a. $\hat{r}_s = \hat{r}_p$
- b. $\hat{\theta}_s = \hat{\theta}_p$
- c. None
- d. $\hat{r}_p \neq \hat{r}_s$
- e. $\hat{r}_p = \hat{\theta}_p$
- f. $\hat{\theta}_s = \hat{r}_s$

The correct answer is:
$\hat{r}_p \neq \hat{r}_s$

Question **43**
Correct
Mark 1.00 out of 1.00
Flag question

Consider two carts, of masses m and $2m$, at rest on an air track. If you push first one cart for 3 s and then the other for the same length of time, exerting equal force on each, the kinetic energy of the light cart is

1. larger than
2. equal to
3. smaller than

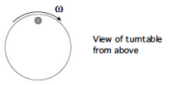
the kinetic energy of the heavy car.

- a. 1
- b. 2
- c. 3
- d. None

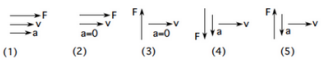
The correct answer is:
1

Question **44**
Incorrect
Mark 0.00 out of 1.00
Flag question

A small cylinder rests on a circular turntable, rotating about a vertical axis at a constant angular speed ω as illustrated in the diagram below.



The cylinder rotates with the turntable; it does not slip. Which of the vectors 1-5 above best describes the velocity, acceleration and net force acting on the cylinder at the point indicated in the diagram?

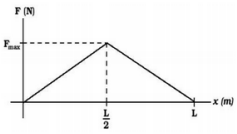


- a. 3
- b. 4
- c. 2
- d. 1
- e. 5 ✖

The correct answer is:
4

Question **45**
Correct
Mark 1.00 out of 1.00
Flag question

A particle starts from rest at $x = 0$ and moves to $x = L$ under the action of a variable force $F(x)$, which is shown in the figure. What is the particle's kinetic energy at $x = L/2$ and at $x = L$?



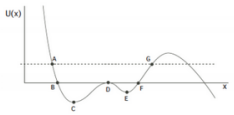
1. $F_{max}L/2, F_{max}L$
2. $F_{max}L/4, 0$
3. $F_{max}L, 0$
4. $F_{max}L/4, F_{max}L/2$
5. $F_{max}L/2, F_{max}L/4$

- a. 2
- b. 4 ✔
- c. 5
- d. 1
- e. 3

The correct answer is:
4

Question **46**
Incorrect
Mark 0.00 out of 1.00
Flag question

The figure below shows a graph of potential energy $U(x)$ verses position x for a particle executing one dimensional motion along the x axis. The total mechanical energy of the system is indicated by the dashed line. At $t = 0$ the particle is somewhere between points A and G. For later times, answer the following questions.



At which point will the magnitude of the force be a maximum? G ✖

At which point will the kinetic energy be a maximum? D ✖

At how many of the labeled points will the velocity be zero? B ✖

The correct answer is:
At which point will the magnitude of the force be a maximum? → A,
At which point will the kinetic energy be a maximum? → C,
At how many of the labeled points will the velocity be zero? → 2

Question **47**
Incorrect
Mark 0.00 out of 1.00
Flag question

In the situation below, a person pulls a string attached to block A, which is in turn attached to another, heavier block B via a second string. Assume the strings are massless and inextensible; and ignore friction. Is the magnitude of the acceleration of block A

a) greater than the magnitude of the acceleration of block B?
b) equal to the magnitude of the acceleration of block B?
c) less than the magnitude of the acceleration of block B?
d) Do not have enough information to decide.

- i. c
- ii. d
- iii. b
- iv. a ✖
- v. None

The correct answer is:
b

Question **48**
Incorrect
Mark 0.00 out of 1.00
Flag question

A particle of effective mass m is acted on by a potential energy given by $u(x) = u_0\left(-ax^2 + bx^4\right)$ where, u_0, a and b are positive constants, then

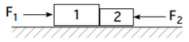
- A. x = 0 and $x = \sqrt{\frac{a}{2b}}$ are points of stable equilibrium
- B. x = 0 is a point of stable equilibrium and $x = -\sqrt{\frac{a}{2b}}$ is a point of unstable equilibrium
- C. $x = \sqrt{\frac{a}{2b}}$ and $x = -\sqrt{\frac{a}{2b}}$ are points of stable equilibrium
- D. there are no points of stable or unstable equilibrium.

- I. A
- II. D ✖
- III. B
- IV. C

The correct answer is:
C

Question **49**
Incorrect
Mark 0.00 out of 1.00
Flag question

Question Two blocks 1 and 2, on a frictionless table, are pushed from the left by a horizontal force $\vec{F}_1$, and on the right by a horizontal force of magnitude $\vec{F}_2$ as shown above. The magnitudes of the pushing forces satisfy the inequality $|\vec{F}_1| > |\vec{F}_2|$.



Which of the following statements is true about the magnitude N of the contact force between the two blocks?

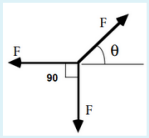
1. $N > |\vec{F}_1| > |\vec{F}_2|$
2. $|\vec{F}_1| > N > |\vec{F}_2|$
3. $|\vec{F}_1| > N = |\vec{F}_2|$
4. $|\vec{F}_1| = N > |\vec{F}_2|$
5. $|\vec{F}_1| > |\vec{F}_2| > N$
6. Cannot be determined from the information given.

- a. 1
- b. 3
- c. 5
- d. 4
- e. 2
- f. 6 ✖

The correct answer is:
2

Question **50**
Incorrect
Mark 0.00 out of 1.00
Flag question

Let us consider an body on which three forces of same magnitude are acting as shown in the figure and no other forces is acting on it. Which of the following statement/s is/are true?



- a. One cannot answer this question without knowing the value of the angle \theta. ✖
- b. None of the given statement
- c. It is possible for this object to remain at rest.
- d. It is not possible for this object to remain at rest
- e. One cannot answer this question without knowing both the value of the angle and the magnitude of the forces F.

The correct answer is:
It is not possible for this object to remain at rest

Question **51**
Incorrect
Mark 0.00 out of 1.00
Flag question

What is the work done by the force $F = 2xy^3 i + 3x^2 y^2 j$ along a path $y = x^{98765432}$ joining (0, 0) to (1, 1)?

- a. 0
- b. -1
- c. 2 ✖
- d. None
- e. 4

The correct answer is:
None

Question **52**
Not answered
Marked out of 1.00
Flag question

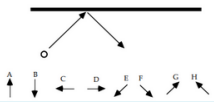
Calculate the curl of $F = -y\hat{i} + x\hat{j}$.

- a. $-2\hat{k}$
- b. None
- c. $2\hat{i}$
- d. $2\hat{j}$
- e. $8\hat{k}$

The correct answer is:
None

Question **53**
Not answered
Marked out of 1.00
Flag question

A ball hits a wall and bounces off as shown. Assume that the collision is elastic. Which vector best represents the direction of the change in momentum of the ball?



- a. G
- b. F
- c. D
- d. B
- e. H
- f. A
- g. E
- h. C

The correct answer is:
B

Question **54**
Not answered
Marked out of 1.00
Flag question

A spring-loaded toy dart gun is used to shoot a dart straight up in the air, and the dart reaches a maximum height h_{max}. The same dart is shot straight up a second time from the same gun, but this time the spring is compressed only half as far before firing. How far up does the dart go this time, neglecting friction and assuming an ideal spring?

a) h_{max}
b) $h_{max}/2$
c) $h_{max}/4$
d) $2h_{max}$
e) $4h_{max}$
f) The dart escapes to infinity.

- i. f
- ii. e
- iii. a
- iv. b
- v. d
- vi. c

The correct answer is:
c