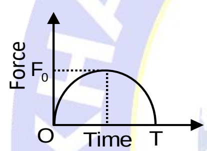
# Chapter 04 Newton's Laws of Motion

## NEET-RANKER'S STUFF

### SINGLE CORRECT QUESTIONS

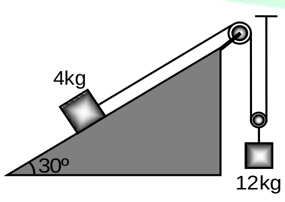
**Q.1** A particle of mass m, initially at rest, is acted upon by a variable force F for a brief interval of time T. It begins to move with a velocity u after the force stops acting. F is shown in the graph as a function of time. The curve is a semicircle.




(1) $u = \frac{\pi F_0^2}{2m}$  (2) $u = \frac{\pi T^2}{8m}$

(3) $u = \frac{\pi F_0 T}{4m}$  (4) $u = \frac{F_0 T}{2m}$

**Q.2** Calculate the acceleration of the mass 12 kg shown in the set up of fig. Also calculate the tension in the string connecting the 12 kg mass. The string are weightless and inextensible, the pulleys are weightless and frictionless-




(1) $\frac{9}{10}, \frac{56g}{5}$N  (2) $\frac{2g}{7}, \frac{60g}{7}$N

(3) $\frac{10}{g}, \frac{5}{56g}$N  (4) $\frac{9}{14}, \frac{5}{56g}$N

**Q.3** A body kept on a smooth inclined plane of inclination 1 in x will remain stationary relative to the inclined plane if the plane is given a horizontal acceleration equal to :-

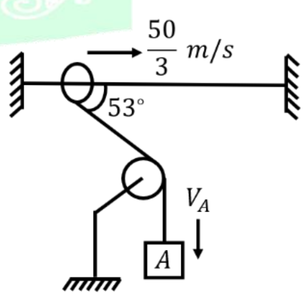
(1) $\sqrt{x^2-1}\,g$  (2) $\frac{\sqrt{x^2-1}}{x}g$

(3) $\frac{gx}{\sqrt{x^2-1}}$  (4) $\frac{g}{\sqrt{x^2-1}}$

**Q.4** A ball of mass m moves with speed v and it strikes normally with a wall and reflected back normally, if its time of contact with wall is t then find force exerted by ball on wall

(1) m  (2) $\frac{2mv}{t}$  (3) $\frac{mv}{t}$  (4) $\frac{mv}{2t}$

**Q.5** What is the velocity of block A ($V_A$) in the figure as shown above.




(1) 10  (2) 5  (3) 6  (4) None

**Q.6** A satellite in force free space sweeps stationary interplanetary dust at a rate $(dM/dt) = +\alpha v$. The acceleration of satellite of mass M is :-

(1) $-4\alpha v^2/M$ (2) $-2\alpha v^2/M$

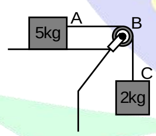
(3) $-\alpha v^2/M$ (4) $-\alpha v^2$

**Q.7** For a Rocket propulsion velocity of exhaust gasses relative to rocket is 2 km/s. If mass of rocket system is 1000 kg, then the rate of fuel consumption for a rocket to rise up with acceleration 4.9 m/s$^2$ will be

(1) 12.25 kg/s (2) 17.5 kg/s

(3) 7.35 kg/s (4) 5.2 kg/s

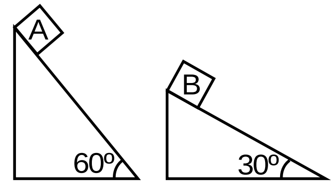
**Q.8** A trolley of mass 5 kg on a horizontal smooth surface is pulled by a load of mass 2 kg by means of uniform rope ABC of length 2 m and mass 1 kg. As the load falls from BC=0 to BC=2m. its acceleration in m/s$^2$ changes–




(1) $\frac{20}{6}$ to $\frac{20}{5}$ (2) $\frac{20}{8}$ to $\frac{30}{8}$

(3) $\frac{20}{5}$ to $\frac{30}{6}$ (4) None of the above

**Q.9** Two fixed frictionless inclined planes making an angle 30° and 60° with the vertical are shown in the figure. Two blocks A and B are placed on the two planes. What is the relative vertical acceleration of A with respect to B?



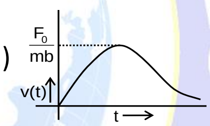

(1) 4.9 ms$^{-2}$ in vertical direction.

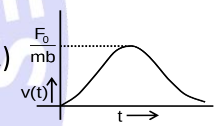
(2) 4.9 ms$^{-2}$ in horizontal direction

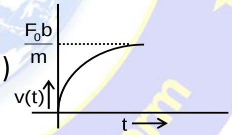
(3) 9.8 ms$^{-2}$ in vertical direction

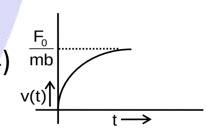
(4) Zero

**Q.10** A particle of mass m is at rest at the origin at time t = 0. It is subjected to a force $F(t) = F_0e^{-bt}$ in the x-direction. Its speed v(t) is depicted by which of the following curves ?

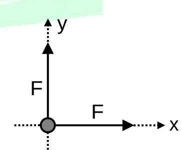
(1) 

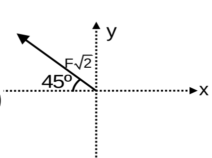

(2) 

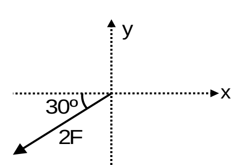

(3) 

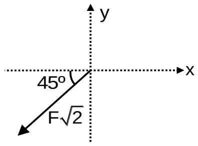

(4) 

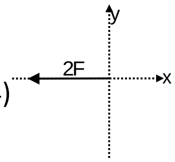

**Q.11** Two forces are simultaneously applied on an object. What third force would make the net force to point to the left (–x direction)?




(1) 


(2) 

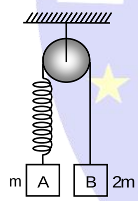
(3) 


(4) 


**Q.12** A block is kept on a smooth inclined plane of angle of inclination $30^0$ that moves with a constant acceleration so that the block does not slide relative to the inclined plane. Let $F_1$ be the contact force between the block and the plane. Now the inclined plane stops and let $F_2$ be the contact force between the two in this case. Then $F_1/F_2$ is

(1) 1 (2) $\frac{4}{3}$ (3) 2 (4) $\frac{3}{2}$

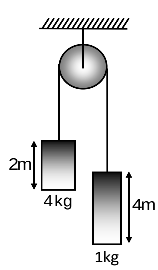
**Q.13** Two blocks A and B of masses m & 2m respectively are held at rest such that the spring is in natural length. What is the acceleration of both the blocks just after release?




(1) $g\downarrow, g\downarrow$ (2) $\frac{g}{3}\downarrow, \frac{g}{3}\uparrow$

(3) 0, 0 (4) $g\downarrow$, 0

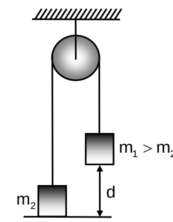
**Q.14** In figure shown, both blocks are released from rest. The time to cross each other is




(1) 2 second (2) 3 second

(3) 1 second (4) 4 second

**Q.15** If masses are released from the position shown in figure then time elapsed before mass $m_1$ collides with the floor will be :



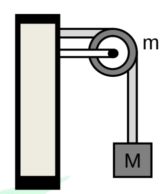

(1) $\sqrt{\frac{2m_1gd}{m_1+m_2}}$

(2) $\sqrt{\frac{2(m_1+m_2)d}{(m_1-m_2)g}}$

(3) $\sqrt{\frac{2(m_1-m_2)d}{(m_1+m_2)g}}$

(4) None of these

**Q.16** A string of negligible mass going over a clamped pulley of mass m supports a block of mass M as shown in the figure. The force on the pulley by the clamp is given by :–




(1) $\sqrt{2}$ Mg

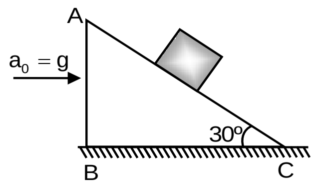
(2) $\sqrt{2}$ mg

(3) $\sqrt{(M+m)^2m^2g}$

(4) $\left(\sqrt{(M+m)^2+M^2}\right)g$

**Q.17** A block is placed on an inclined plane moving towards right horizontally with an acceleration $a_0 = g$. The length of the plane AC = 1m. Friction is absent everywhere. The time taken by the block to reach from C to A is

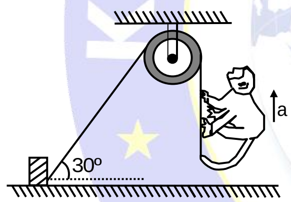
($g = 10\ m/s^2$)




(1) 1.2 s (2) 0.74 s

(3) 2.56 s (4) 0.42 s

**Q.18** A light string fixed at one end to a clamp on ground passes over a fixed pulley and hangs at the other side. It makes an angle of 30° with the ground. A monkey of mass 5 kg climbs up the rope. The clamp can tolerate a vertical force of 40 N only. The maximum acceleration in upward direction with which the monkey can climb safely is (neglect friction and take g = 10 m/s$^2$) :




(1) 2 m/s$^2$ (2) 4 m/s$^2$

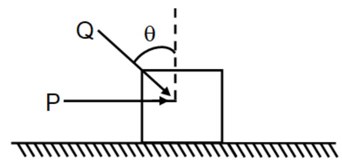
(3) 6 m/s$^2$ (4) 8 m/s$^2$

**Q.19** Two block (A) 2 kg and (B) 5 kg rest one over the other on a smooth horizontal plane. The coefficient of static and dynamic friction between (A) and (B) is the same and equal to 0.60. The maximum horizontal force that can be applied to (B) in order that both (A) and (B) do not have any relative motion :

(1) 42 N (2) 42 kgf

(3) 5.4 kgf (4) 1.2 N

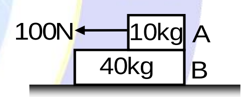
**Q.20** A block of mass m lying on a rough horizontal plane is acted upon by a horizontal force P and another force Q inclined at an angle $\theta$ to the vertical. The block will remain in equilibrium if the coefficient of friction between it and the surface is :-




(1) $\frac{P+Q\sin\theta}{mg+Q\cos\theta}$ (2) $\frac{P\cos\theta+Q}{mg-Q\sin\theta}$

(3) $\frac{P+Q\cos\theta}{mg+Q\sin\theta}$ (4) $\frac{P\sin\theta+Q}{mg-Q\cos\theta}$

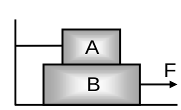
**Q.21** A 40 kg slab rests on a frictionless floor as shown in the figure. A 10 kg block rests on the top of the slab. The static coefficient of friction between the block and slab is 0.60 while the kinetic friction is 0.40. The 10 kg block is acted upon by a horizontal force 100 N. If g = 9.8 m/s$^2$, the resulting acceleration of the slab will be :




(1) 0.98 m/s$^2$ (2) 1.47 m/s$^2$

(3) 1.52 m/s$^2$ (4) 6.1 m/s$^2$

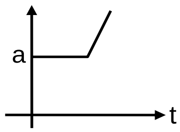
**Q.22** Two block A and B placed on a plane surface as shown in the figure. The mass of block A is 100 kg and that of block B is 200 kg. Block A is tied to a stand and block B is pulled by a force F. If the coefficient of friction between the surfaces of A and B is 0.2 and the coefficient of friction between B and the plane is 0.3 then for the motion of B the minimum value of F will be-

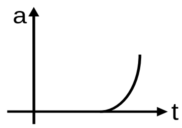


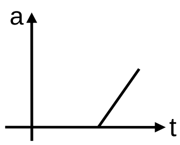

(1) 700 N (2) 1050 N

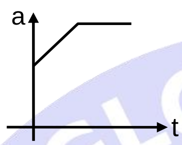
(3) 900 N (4) 1100 N

**Q.23** A block is placed on a rough horizontal plane. A time dependent horizontal force F = kt acts on the block. Here k is a positive constant. Acceleration–time graph of the block is

(1) 


(2) 

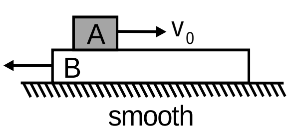

(3) 


(4) 


**Q.24** In the arrangement shown in figure, coefficient of friction between the two blocks is $\mu = \frac{1}{2}$. The force of friction acting between the two blocks is

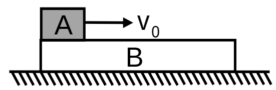

(1) 8 N (2) 10 N (3) 6 N (4) 4 N

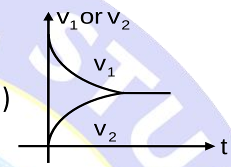
**Q.25** A block A of mass m is placed over a plank B of mass 2m. Plank B is placed over a smooth horizontal surface. The coefficient of friction between A and B is 0.5. Block A is given a velocity $v_0$ towards right. Acceleration of B relative to A is

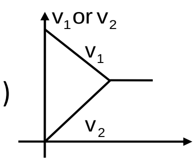


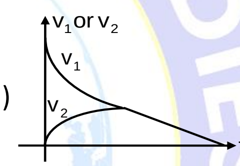

(1) $\frac{g}{2}$ (2) g (3) $\frac{3g}{4}$ (4) zero

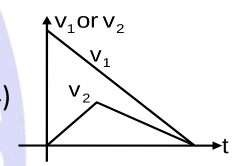
**Q.26** A block A is placed over a long rough plank B of same mass as shown in figure. The plank is placed over a smooth horizontal surface. At time t=0, block A is given a velocity $v_0$ in horizontal direction. Let $v_1$ and $v_2$ be the velocities of A and B at time t. Then choose the correct graph between $v_1$ or $v_2$ and t.



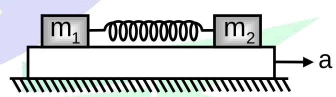

(1) 


(2) 


(3) 


(4) 


**Q.27** Two blocks of masses $m_1$ and $m_2$ are connected with a massless spring and placed over a plank moving with an acceleration 'a' as shown in figure. The coefficient of friction between the blocks and platform is μ.



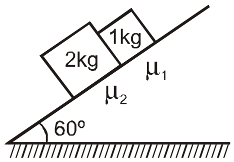

(1) spring will be stretched if a > μg

(2) spring will be compressed if a ≤ μg

(3) spring will neither be compressed nor be stretched for a ≤ μg

(4) spring will be in its natural length under all conditions

**Q.28** In the figure shown if friction coefficient of block 1kg and 2kg with inclined plane is $\mu_1 = 0.5$ and $\mu_2 = 0.4$ respectively, then




(1) both block will move together

(2) both block will move separately

(3) there is a non zero contact force between two blocks

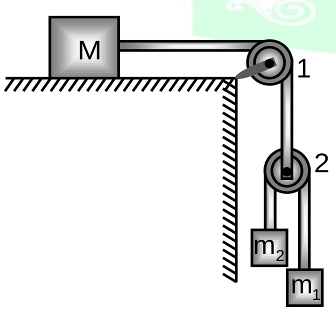
(4) None of these

**Q.29** A smooth block is released at rest on a 45° incline and then slides a distance d. The time taken to slide is n times as much to slide on rough incline than on a smooth incline. The coefficient of friction is-

(1) $\mu_k = 1 - \frac{1}{n^2}$ (2) $\mu_k = \sqrt{1 - \frac{1}{n^2}}$

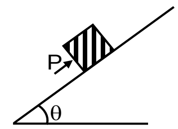
(3) $\mu_s = 1 - \frac{1}{n^2}$ (4) $\mu_s = \sqrt{1 - \frac{1}{n^2}}$

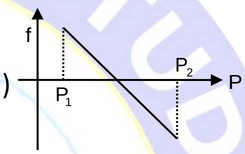
**Q.30** In the arrangement shown in figure $m_1$ = 1kg, $m_2$ = 2kg. Pulleys are massless and strings are light. For what value of M the mass $m_1$ moves with constant velocity (Neglect friction)




(1) 6 kg (2) 4 kg (3) 8 kg (4) 10 kg

**Q.31** A block of mass m is on an inclined plane of angle $\theta$. The coefficient of friction between the block and the plane is $\mu$ and $\tan\theta > \mu$. The block is held stationary by applying a force P parallel to the plane. The direction of force pointing up the plane is taken to be positive. As P is varied from $P_1 = mg(\sin\theta - \mu\cos\theta)$ to $P_2 = mg(\sin\theta + \mu\cos\theta)$, the frictional force f versus P graph will look like




(1)
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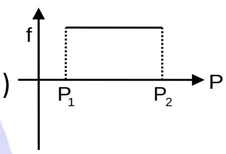


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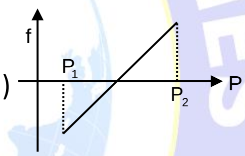


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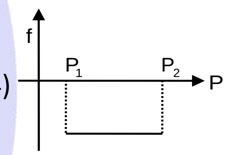
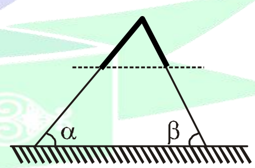


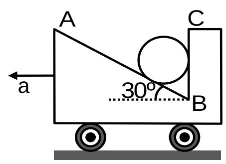

**Q.32** A uniform rope of length L and mass M is placed on a smooth fixed wedge as shown. Both ends of rope are at same horizontal level. The rope is initially released from rest, then the magnitude of initial acceleration of rope is




(1) Zero (2) $M(\cos\alpha - \cos\beta)g$

(3) $M(\tan\alpha - \tan\beta)g$ (4) None of these

**Q.33** A cylinder rests in a supporting carriage as shown. The side AB of carriage makes an angle 30° with the horizontal and side BC is vertical. The carriage lies on a fixed horizontal surface and is being pulled towards left with an horizontal acceleration 'a'. The magnitude of normal reaction exerted by sides AB and BC of carriage on the cylinder be $N_{AB}$ and $N_{BC}$ respectively. Neglect friction everywhere. then as the magnitude of acceleration 'a' of the carriage is increased, pick up the correct statement :




(1) $N_{AB}$ increases and $N_{BC}$ decreases

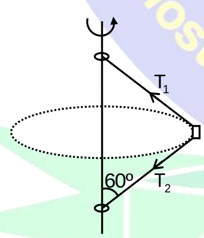
(2) Both $N_{AB}$ and $N_{BC}$ decreases

(3) $N_{AB}$ remains constant and $N_{BC}$ increases

(4) $N_{AB}$ remains and $N_{BC}$ remains constant

**Q.34** A small block is connected to one end of two identical massless strings of length $16\frac{2}{3}$ cm each with their other ends fixed to a vertical rod. If the ratio of tensions $T_1 / T_2$ is 4 : 1, then what will be the angular velocity of the block ?

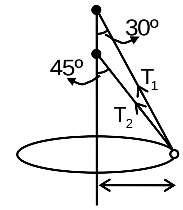
Take $g = 9.8\ m\ s^{-2}$.




(1) 15 rad $s^{-1}$ (2) 12 rad $s^{-1}$

(3) 14 rad $s^{-1}$ (4) 17 rad $s^{-1}$

**Q.35** Two wires AC and BC are tied at C of small sphere of mass 5 kg. Which revolves at a constant speed v in the horizontal circle of radius 1.6 m. Find the maximum value of v ($g = 10\ m/s^2$).




(1) 3.56 m/s (2) 3.96 m/s

(3) 4.2 m/s (4) 5.56 m/s

## MATCH THE COLUMN TYPE QUESTIONS

**Q.36** If the net force acting on a system is represented by $\vec{F}$ and its momentum is $\vec{P}$ , then match the entries of column-I with the entries of column-II

| | **Column-I** | | **Column-II** |
|---|---|---|---|
| (a) | If $\vec{F}$ is constant | (p) | $\vec{P}$ may change its direction |
| (b) | If $\vec{F}$ is changing in magnitude only | (q) | $\vec{P}$ must change its magnitude |
| (c) | If $\vec{F}$ is changing in direction only | (r) | $\vec{P}$ may not change its direction |
| (d) | If $\vec{F}$ is zero | (s) | $\vec{P}$ must not change its direction |

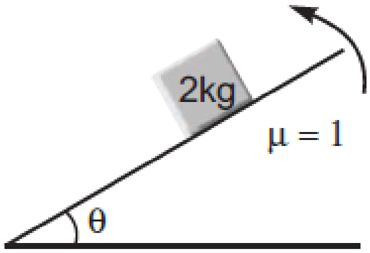
(1) (a)→(p,q,r), (b)→(p,q.r),(c)→(q),(d)→(s)

(2) (a)→(p,q,r), (b)→(q,q.r),(c)→(q),(d)→(s)

(3) (a)→(p,q,s), (b)→(p,q.p),(c)→(q),(d)→(s)

(4) (a)→(p,q,r), (b)→(p,q.s),(c)→(p),(d)→(s)

**Q.37** Angle $\theta$ is gradually increased as shown in figure. For the given situation match the following two columns. ($g = 10\ ms^{-2}$)




| Column-I | | Column-II | |
|---|---|---|---|
| (a) | Force of friction when $\theta$ = 0° | (p) | 10 N |
| (b) | Force of friction when $\theta$ =90° | (q) | $10\sqrt{3}$ N |
| (c) | Force of friction when $\theta$ = 30° | (r) | $\frac{10}{\sqrt{3}}$N |
| (d) | Force of friction when $\theta$ = 60° | (s) | None of these |

(1) (a) $\rightarrow$ (r), (b) $\rightarrow$ (r), (c) $\rightarrow$ (s), (d) $\rightarrow$ (q)

(2) (a) $\rightarrow$ (s), (b) $\rightarrow$ (s), (c) $\rightarrow$ (p), (d) $\rightarrow$ (p)

(3) (a) $\rightarrow$ (s), (b) $\rightarrow$ (s), (c) $\rightarrow$ (q), (d) $\rightarrow$ (q)

(4) (a) $\rightarrow$ (p), (b) $\rightarrow$ (p), (c) $\rightarrow$ (r), (d) $\rightarrow$ (s)

**Q.38** A motorcycle moves around a vertical circle with a constant speed under the influence of the force of gravity $\vec{w}$, friction between wheel and track $\vec{f}$ and normal reaction between wheel and track $\vec{N}$ :

| Column-I | | Column-II | |
|---|---|---|---|
| (a) | Constant magnitude | (p) | $\vec{N}$ |
| (b) | Directed towards or away from centre when value is non zero. | (q) | $\vec{N}+\vec{f}$ |
| (c) | Total reaction force by track | (r) | $\vec{f}+\vec{w}$ |
| (d) | When motion is along vertical the value is zero | (s) | $\vec{N}+\vec{f}+\vec{w}$ |

(1) (a) $\rightarrow$ (s),(b) $\rightarrow$ (p,r.s), (c) $\rightarrow$ (q), (d)$\rightarrow$(r)

(2) (a) $\rightarrow$ (r),(b) $\rightarrow$ (p,q.s), (c) $\rightarrow$ (s), (d)$\rightarrow$(r)

(3) (a) $\rightarrow$ (q),(b) $\rightarrow$ (p,s.s), (c) $\rightarrow$ (q), (d)$\rightarrow$(r)

(4) (a) $\rightarrow$ (q),(b) $\rightarrow$ (p,p.s), (c) $\rightarrow$ (p), (d)$\rightarrow$(r)

**Q.39** Match the following two columns regarding fundamental forces of nature.

| Column-I | | Column-II | |
|---|---|---|---|
| (a) | Force of friction | (p) | Field force |
| (b) | Normal reaction | (q) | Contact force |
| (c) | Force between two neutrons | (r) | Electromagnetic force |
| (d) | Force between two protons | (s) | Nuclear force |

(1) (a)$\rightarrow$(p,r), (b)$\rightarrow$(q,r), (c)$\rightarrow$(s), (d)$\rightarrow$ (p,s)

(2) (a)$\rightarrow$(s,r), (b)$\rightarrow$(p,r), (c)$\rightarrow$(s), (d)$\rightarrow$ (p,q)

(3) (a)$\rightarrow$(q,r), (b)$\rightarrow$(q,r), (c)$\rightarrow$(s), (d)$\rightarrow$ (p,s)

(4) (a)$\rightarrow$(p,r), (b)$\rightarrow$(q,r), (c)$\rightarrow$(s,r), (d)$\rightarrow$ (p,s)

**Q.40** A particle is rotating in a circle of radius $R=\left(\frac{2}{\pi}\right)m$, with constant speed 1 $ms^{-1}$. Match the following two columns for the time interval when it completes $\frac{1}{4}$ th of the circle.

| Column-I | | Column-II | |
|---|---|---|---|
| (a) | Average speed | (p) | $\frac{\sqrt{2}}{\pi}$ |
| (b) | Average velocity | (q) | $2\frac{\sqrt{2}}{\pi}$ |

| | | | |
|---|---|---|---|
| (c) | Average acceleration | (r) | $\sqrt{2}$ |
| (d) | Displacement | (s) | 1 |

(1) (a)→(p), (b)→(q), (c)→(r), (d)→ (s)

(2) (a)→(q), (b)→(q), (c)→(r), (d)→ (p)

(3) (a)→(r), (b)→(q), (c)→(s), (d)→ (p)

(4) (a)→(s), (b)→(q), (c)→(r), (d)→ (q)

## ASSERTION AND REASON TYPE QUESTIONS

**Directions:** Choose the correct option.

(A) If both Assertion and Reason are true and the Reason is correct explanation of the Assertion.

(B) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(C) If Assertion is true, but the Reason is false.

(D) If Assertion is false but the Reason is true.

**Q.41** **Assertion:** Two frames $S_1$ and $S_2$ are non-inertial. Then frame $S_2$ when observed from $S_1$ is inertial.

**Reason:** A frame in motion is not necessarily a non- inertial frame.

(1) A (2) B (3) C (4) D

**Q.42** **Assertion:** If net force on a rigid body in zero, it is either at rest or moving with a constant linear velocity. Nothing else can happen.

**Reason:** Constant velocity means linear acceleration is zero.

(1) A (2) B (3) C (4) D

**Q.43** **Assertion:** Moment of concurrent forces about any point is constant.

**Reason:** If vector sum of all the concurrent forces is zero, then moment of all the forces about any point is also zero.

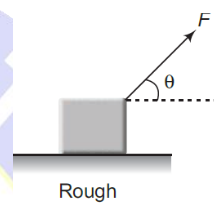
(1) A (2) B (3) C (4) D

**Q.44** **Assertion:** Three concurrent forces are $F_1$, $F_2$ and $F_3$. Angle between $F_1$ and $F_2$ is 30° between $F_1$ and $F_3$ is 120°. Under these conditions, forces cannot remain in equilibrium.

**Reason:** At least one angle should be greater than 180°.

(1) A (2) B (3) C (4) D

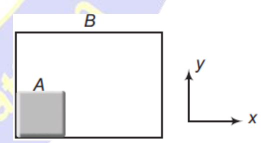
**Q.45** **Assertion:** Minimum force is needed to move a block on rough surface, if θ = angle of friction.
**Reason:** Angle of friction and angle of repose are numerically same.




(1) A (2) B (3) C (4) D

**Q.46** **Assertion:** A block A is just placed inside a smooth box B as shown in figure. Now, the box is given an acceleration $\vec{a} = (3\hat{j} - 2\hat{i})\,ms^{-2}$.

**Reason:** Under this acceleration block A cannot remain in the position shown.



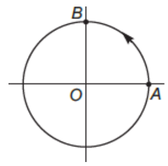

(1) a (2) b (3) c (4) d

**Q.47** **Assertion:** When a person walks on a rough surface, the frictional force exerted by surface on the person is opposite to the direction of his motion.

**Reason:** It is the force exerted by the road on the person that causes the motion.

(1) A (2) B (3) C (4) D

**Q.48** **Assertion:** A particle is rotating in a circle with constant speed as shown. Between points A and B, ratio of average acceleration and average velocity is angular velocity of particle about point O.




**Reason:** Since speed is constant, angular velocity is also constant.

(1) A (2) B (3) C (4) D

**Q.49 Assertion:** A frame moving in a circle with constant speed can never be an inertial frame.

**Reason:** It has a constant acceleration.

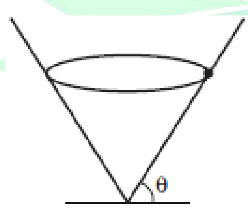
(1) A (2) B (3) C (4) D

**Q.50 Assertion:** In circular motion, dot product of velocity vector (v) and acceleration vector (a) may be positive, negative or zero.

**Reason:** Dot product of angular velocity vector and linear velocity vector is always zero.

(1) A (2) B (3) C (4) D

**Q.51 Assertion:** A particle of mass m takes uniform horizontal circular motion inside a smooth funnel as shown. Normal reaction in this case is not mg cos$\theta$.




**Reason:** Acceleration of particle is not along the surface of funnel.

(1) a (2) b (3) c (4) d

**Q.52 Assertion:** When water in a bucket is whirled fast overhead, the water does not fall out at the top of the circular path.

**Reason:** The centripetal force in this position on water is more than the weight of water.

(1) a (2) b (3) c (4) d

# ANSWER KEY

## NEET-RANKER'S STUFF

| Que. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ans. | 3 | 2 | 4 | 2 | 1 | 3 | 3 | 2 | 1 | 4 | 2 | 3 | 1 | 3 | 2 |
| **Que.** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** | **25** | **26** | **27** | **28** | **29** | **30** |
| Ans. | 4 | 2 | 3 | 1 | 1 | 1 | 4 | 3 | 1 | 3 | 2 | 4 | 2 | 1 | 3 |
| **Que.** | **31** | **32** | **33** | **34** | **35** | **36** | **37** | **38** | **39** | **40** | **41** | **42** | **43** | **44** | **45** |
| Ans. | 1 | 1 | 3 | 3 | 2 | 1 | 2 | 1 | 3 | 4 | 4 | 4 | 4 | 1 | 2 |
| **Que.** | **46** | **47** | **48** | **49** | **50** | **51** | **52** | | | | | | | | |
| Ans. | 2 | 4 | 2 | 3 | 2 | 1 | 1 | | | | | | | | |