1.

When a body of mass m raised by a string with an acceleration a = g in an upward direction, the tension in the string is:

(1) 2mg

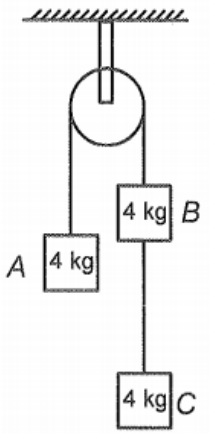
(2) mg

(3) $\frac{mg}{2}$

(4) Zero

2.

Three identical masses each of mass 4 kg are connected by massless inextensible strings. The string joining A and B passes over a massless frictionless pulley as shown in the figure. The tension in the string connecting mass B and C is:



(1) 40 N

(2) 20 N

(3) 26.67 N

(4) 13.33 N

3.

A monkey slides down a rope. The breaking load for the rope is $\frac{5}{6}$th of the weight of the monkey. The minimum acceleration with the monkey should slide so that the rope does not break, is:

(1) $\frac{5g}{6}$

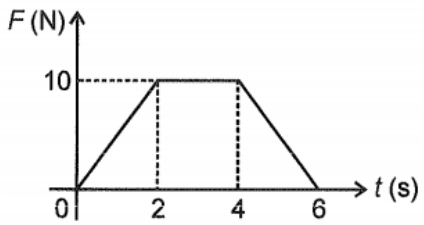
(2) $\frac{g}{2}$

(3) $\frac{g}{6}$

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

4.

The force (F) acting on a particle varies with the time (t) as shown in the figure. The change in momentum during t = 0 to t = 6 s is:



(1) 80 Ns

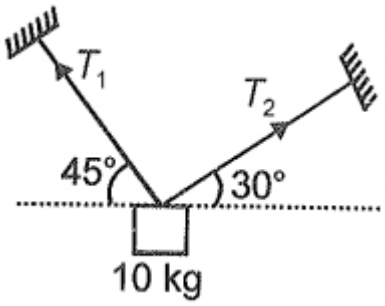
(2) 40 Ns

(3) 20 Ns

(4) Zero

5.

A body of mass 10 kg is suspended by two massless strings making angles 45° and 30° with horizontal as shown in the figure then:



(1) $\sqrt{2}T_1 + 3T_2 = 0$

(2) $2T_1 - \sqrt{3}T_2 = 0$

(3) $\sqrt{2}T_1 - \sqrt{3}T_2 = 0$

(4) $\sqrt{3}T_1 + \sqrt{2}T_2 = 0$

6.

Two masses M and m are connected by a weightless string. They are pulled by a force on a frictionless horizontal surface. The tension in the string will be:

(1) $\frac{F(M+2m)}{m+M}$

(2) $\frac{F}{m+M}$

(3) $\frac{FM}{m}$

(4) $\frac{Fm}{m+M}$

7.

A body of mass m traveling with velocity $\left(\hat{i} + 2\hat{j}\right)$ is given an impulse 6 $m\hat{j}$. The final velocity of the body will become:

(1) $-\hat{i} + 8\hat{j}$

(2) $\hat{i} - 8\hat{j}$

(3) $\hat{i} + 8\hat{j}$

(4) $8\hat{i} - \hat{j}$

8.

According to Newton's second law of motion force acting on the body is: [where symbols have their usual meaning]

(1) $m\vec{a}$

(2) $\vec{v}\frac{dm}{dt}$

(3) $\frac{d\vec{p}}{dt}$

(4) All of these

9.

Which of the following is/are an example/s of impulse?

(1) Hitting off the ball on the ground and bounces back

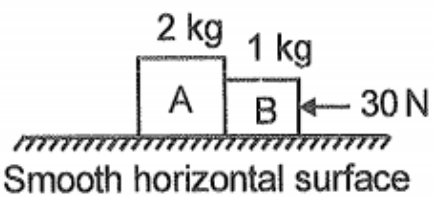
(2) When a batsman hits the ball

(3) When a ball falls into the net

(4) All of these

10.

In the given figure, the acceleration of block A (of mass 2 kg) is:



(1) 2 m/s^2

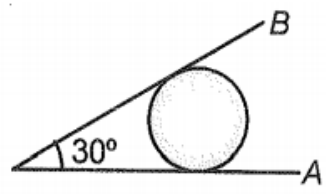
(2) 15 m/s^2

(3) 10 m/s^2

(4) 0.1 m/s^2

11.

A sphere weighs 10 N and rests in a V-shaped trough whose sides form an angle 30^0. Normal reaction exerted by wall B on the sphere is:



(1) 10 N

(2) 53 N

(3) 5 N

(4) Zero

12.

Normal force acting between two surfaces in contact is fundamentally:

(1) Electromagnetic

(2) Gravitational

(3) Weak nuclear force

(4) Strong nuclear force

13.

Choose the incorrect alternative:

(1) Newton's first law is the law of inertia

(2) Newton's first law states if the net force on a system is zero, the acceleration of any particle of the system is zero.

(3) Action and reaction act simultaneously

(4) The area under the force-time graph is equal to the change in momentum

14.

Two forces $(6\hat{i} + 8\hat{j})$ and $(4\hat{i} + 4\hat{j})$ N are acting on a body of mass 2 kg, then acceleration produced in the body in m/s^2 will be:

(1) $(5\hat{i} + 6\hat{j})$

(2) $(10\hat{i} + 12\hat{j})$

(3) $(6\hat{i} + 12\hat{j})$

(4) $(2\hat{i} + 3\hat{j})$

15.

The speed of a 5 kg body is reduced from 65 m/s to 15 m/s in 2 s. The average resisting force acting is:

(1) 125 N

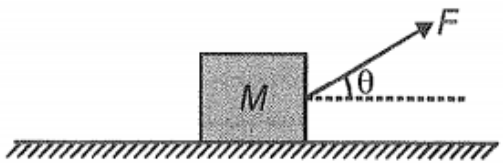
(2) 1250 N

(3) 12.5 N

(4) 200 N

16.

A block of mass M is pulled by a force F making angle θ with horizontal on a smooth horizontal surface as shown. If a is the acceleration of block on the surface, then the contact force between the block and the surface is:



(1) Mg + Ma cosθ

(2) Mg - Ma cosθ

(3) Mg + Ma tanθ

(4) Mg - Ma tanθ

17.

A machine gun fires a bullet of mass 50 g with a velocity of 1000 m/s. The man holding it can exert a maximum force of 160 N on the gun. How many bullets can he fire per second at the most?

(1) 3

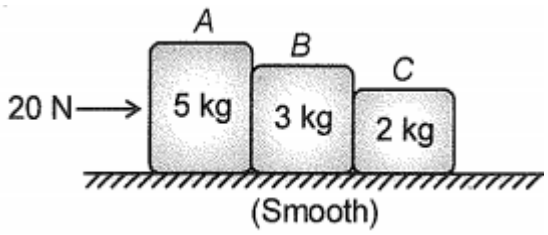
(2) 4

(3) 2

(4) 5

18.

If block A as shown in the figure is pushed horizontally by a horizontal force 20 N, then the force exerted by A on B is:



(1) 4 N

(2) 8 N

(3) 10 N

(4) 20 N

19.

If the force acting on a system is zero, the quantity which remains constant is:

(1) Force

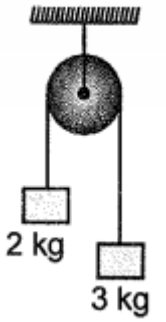
(2) Linear momentum

(3) Speed

(4) Kinetic energy

20.

Pulley and strings shown in the figure are massless. Acceleration of 3 kg block is: [Take g = 10 m/s^2]



(1) 1 m/s^2

(2) 2 m/s^2

(3) 3 m/s^2

(4) 4 m/s^2

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