Yekeen NEET 2.0 (2026)

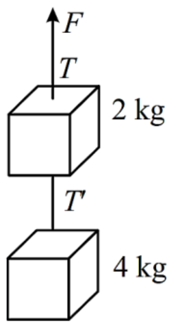
KPP - 23

Physics by Saleem Sir

Newton's Laws of Motion

Time Limit 01 Hour

1. Two blocks are connected by a string as shown in the diagram. The upper block is hung by another string. A force F applied on the upper string produces an acceleration of 2 m/s^2 in the upward direction in both the blocks. If T and T' be the tensions in the two parts of the string, then.



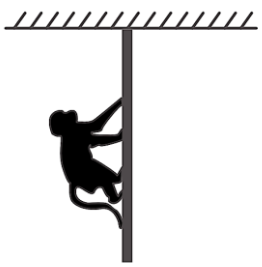
(1) T = 70.8 N and T′= 47.2 N

(2) T = 58.8 N and T′= 47.2 N

(3) T = 70.8 N and T′ = 58.8 N

(4) T = 70.8 N and T′ = 0

2. A monkey of mass 40 kg climbs on a rope which can withstand a maximum tension of 600 N. In which of the following cases will the rope break the monkey.



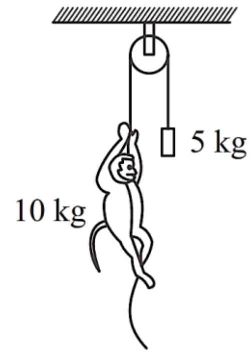
(1) Climbs up with an acceleration of 6 ms^{-2}

(2) Climbs down with an acceleration of 4 ms^{-2}

(3) Climbs up with an uniform speed of 5 ms^{-1}

(4) Falls down the rope nearly freely under gravity

3. In the figure shown acceleration of monkey relative to the rope if it exerts a force of 80 N on string will be:



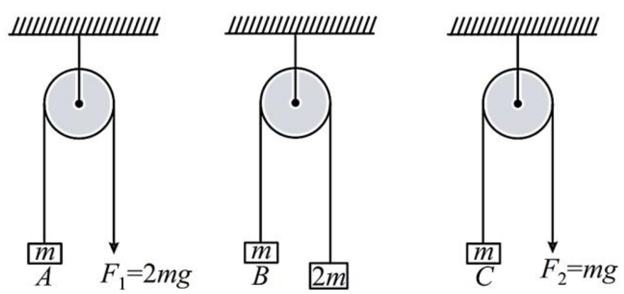
(1) 2 m/s^2 downwards

(2) 4 m/s^2 upwards

(3) 4 m/s^2 downwards

(4) 8 m/s^2 downwards

4. In the figure, the blocks A, B and C of mass m each have acceleration a_1, a_2 and a_3 respectively. F_1 and F_2 are external forces of magnitudes 2 mg and mg respectively.



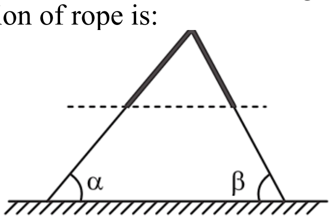
(1) $a_1 = a_2 = a_3$

(2) $a_1 > a_2 > a_3$

(3) $a_1 = a_2$, $a_2 > a_3$

(4) $a_1 > a_2$, $a_2 = a_3$

5. 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:



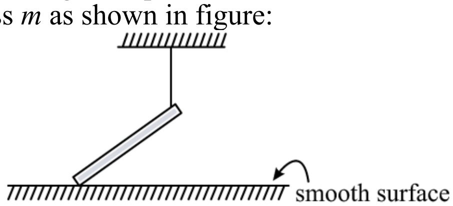
(1) Zero
(2) M(cosα – cos β) g
(3) M(tan α – tan β)g
(4) None of these

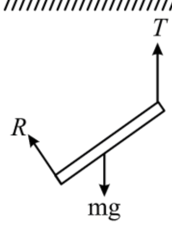
6. A balloon of gross weight w newton is falling vertically downward with a constant acceleration $a(<g)$. The magnitude of the air resistance is: (Neglecting buoyant force).

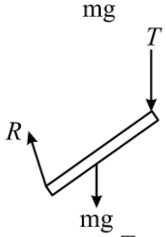
(1) w (2) $w\left(1+\frac{a}{g}\right)$

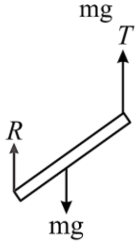
(3) $w\left(1-\frac{a}{g}\right)$ (4) $w\frac{a}{g}$

7. Which figure represents the correct F.B.D. of rod of mass m as shown in figure:



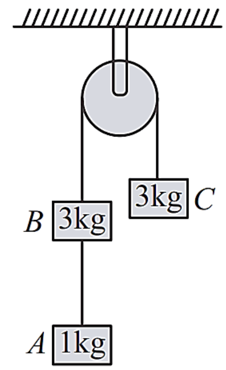
(1)


(2)


(3)


(4) None of these

8. In the system shown in the figure, the acceleration of the 1 kg mass and the tension in the string connecting between A and B is:



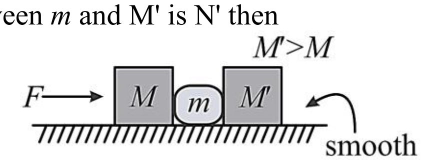
(1) $\frac{g}{4}$ downwards, $\frac{8g}{7}$

(2) $\frac{g}{4}$ upwards, $\frac{g}{7}$

(3) $\frac{g}{7}$ downwards, $\frac{6}{7}g$

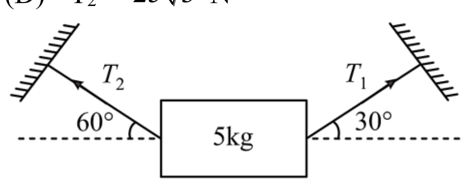
(4) $\frac{g}{2}$ upwards, g

9. A constant force F is applied in horizontal direction as shown. Contact force between M and m is N and between m and M' is N' then



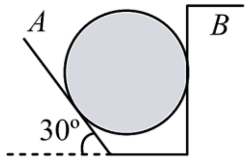
(1) N = N'
(2) N > N'
(3) N' > N
(4) Cannot be determined

10. A body of mass 5 kg is suspended by the strings making angles 60º and 30º with the horizontal
(A) $T_1 = 25$ N
(B) $T_2 = 25$ N
(C) $T_1 = 25\sqrt{3}$ N
(D) $T_2 = 25\sqrt{3}$ N



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

11. The 50 kg homogeneous smooth sphere rests on the 30° incline A and bears against the smooth vertical wall B. Calculate the contact forces at A and B.



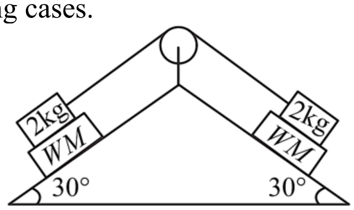
(1) $N_B = \frac{1000}{\sqrt{3}} N, N_A = \frac{500}{\sqrt{3}} N$

(2) $N_A = \frac{1000}{\sqrt{3}} N, N_B = \frac{500}{\sqrt{3}} N$

(3) $N_A = \frac{100}{\sqrt{3}} N, N_B = \frac{500}{\sqrt{3}} N$

(4) $N_A = \frac{1000}{\sqrt{3}} N, N_B = \frac{50}{\sqrt{3}} N$

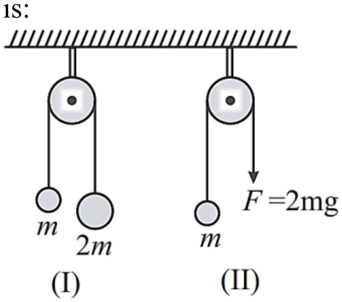
12. Find out the reading of the weighing machine in the following cases.



(1) $10\sqrt{3}$ (2) $10\sqrt{2}$

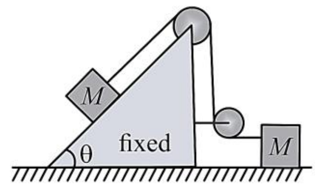
(3) $20\sqrt{3}$ (4) $30\sqrt{3}$

13. The pulley arrangements shown in figure are identical, the mass of the rope being negligible. In case-I, the mass m is lifted by attaching a mass $2m$ to the other end of the rope. In case-II, the mass m is lifted by pulling the other end of the rope with a constant downward force F = $2mg$, where g is acceleration due to gravity. The acceleration of mass in case-I is:



(1) Zero
(2) More than that in case-II
(3) Less than that in case-II
(4) Equal to that in case-II

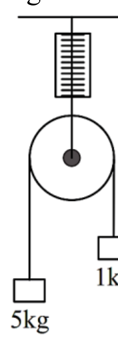
14. Two blocks, each having mass M, rest on frictionless surfaces as shown in the figure. If the pulleys are light and frictionless, and M on the incline is allowed to move down, then the tension in the string will be:



(1) $\frac{2}{3}Mg\sin\theta$ (2) $\frac{3}{2}Mg\sin\theta$

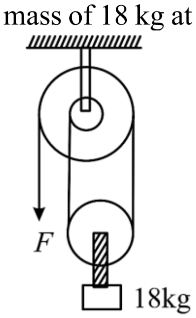
(3) $\frac{Mg\sin\theta}{2}$ (4) $2\,Mg\sin\theta$

15. In the figure a smooth pulley of negligible weight is suspended by a spring balance. Weights of 1 kg and 5 kg are attached to the opposite ends of a string passing over the pulley and move with acceleration because of gravity. During the motion, the spring balance reads a weight of



(1) 6 kg
(2) Less than 6 kg
(3) More than 6 kg
(4) May be more or less than 6 kg

16. In the figure at the free end a force F is applied to keep the suspended mass of 18 kg at rest. The value of F is:



(1) 180 N (2) 90 N

(3) 60 N (4) 30 N

17. A cricket player catches a ball of mass 120 g moving with 25 m/s speed. If the catching process is completed in 0.1 s then the magnitude of force exerted by the ball on the hand of player will be (in SI unit): **[Feb 1, 2024 (II)]**

(1) 30 (2) 24
(3) 12 (4) 25

18. A body of mass 4 kg experiences two forces $\vec{F}_1 = 5\hat{i} + 8\hat{j} + 7\hat{k}$ and $\vec{F}_2 = 3\hat{i} - 4\hat{j} - 3\hat{k}$.

The acceleration acting on the body is:

[01 Feb, 2024 (Shift-II)]

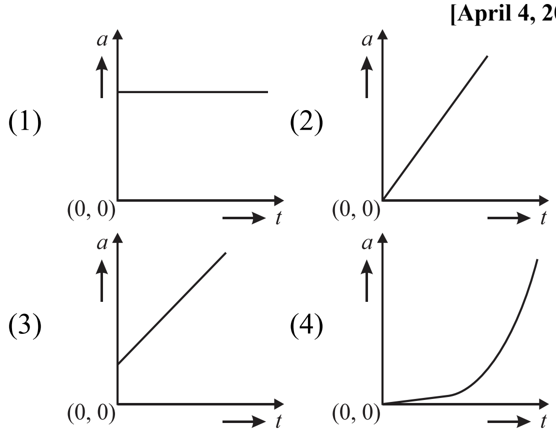
(1) $-2\hat{i} - \hat{j} - \hat{k}$

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

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

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

19. A wooden block, initially at rest on the ground, is pushed by a force which increases linearly with time t. Which of the following curve best describes acceleration of the block with time: **[April 4, 2024 (I)]**



20. A particle moves in $x - y$ plane under the influence of a force $\vec{F}$ such that its linear momentum is $\vec{p}(t) = \hat{\imath}\cos(kt) - \hat{\jmath}\sin(kt)$. If k is constant, the angle between $\vec{F}$ and $\vec{p}$ will be:

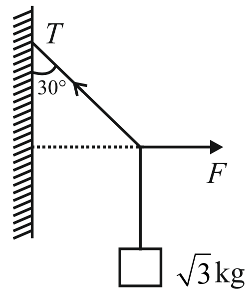
[April 5, 2024 (II)]

(1) $\pi/2$ (2) $\pi/6$
(3) $\pi/4$ (4) $\pi/3$

21. A block of $\sqrt{3}$ kg is attached to a string whose other end is attached to the wall. An unknown force F is applied so that the string makes an angle of 30° with the wall. The tension T is:

(Given $g = 10 \text{ ms}^{-2}$)

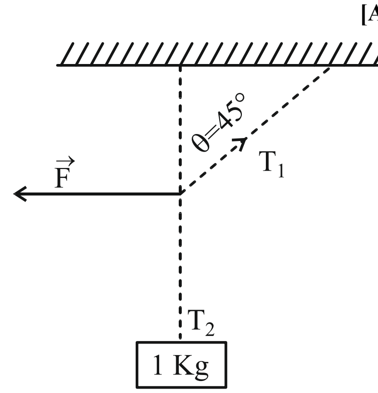
[Jan 30, 2023 (II)]



(1) 20 N (2) 25 N
(3) 10 N (4) 15 N

22. A 1 kg mass is suspended from the ceiling by a rope of length 4m. A horizontal force 'F' is applied at the mid point of the rope so that the rope makes an angle of 45° with respect to the vertical axis as shown in figure. The magnitude of F is:

[April 9, 2024 (II)]



(1) $\dfrac{10}{\sqrt{2}}$ N

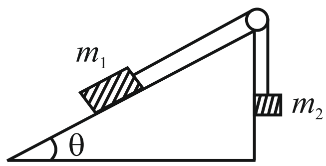
(2) 1 N

(3) $\dfrac{1}{10\times\sqrt{2}}$ N

(4) 10 N

23. Two bodies of masses m_1 = 5 kg and m_2 = 3 kg are connected by a light string going over a smooth light pulley on a smooth inclined plane as shown in the figure. The system is at rest. The force exerted by the inclined plane of the body of mass m_1 will be:
[Take $g = 10\ \text{ms}^{-2}$]

[July 29, 2022 (II)]

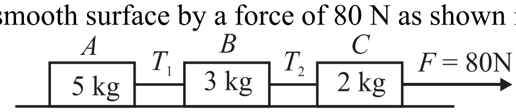


(1) 30 N (2) 40 N
(3) 50 N (4) 60 N

24. A person standing on a balance inside a stationary lift measures 60 kg. The weight of that person if the lift descends with uniform downward acceleration of 1.8 m/s^2 will be ________ N. [$g = 10$ m/s^2]

[26 Feb, 2021 (Shift-I)]

25. Three blocks A, B and C are pulled on a horizontal smooth surface by a force of 80 N as shown in figure



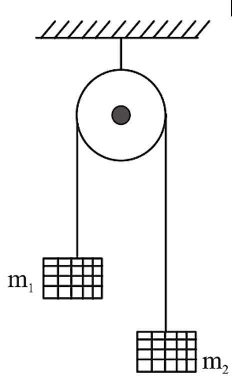
The tensions T_1 and T_2 in the string are respectively

[Jan 30, 2024 (II)]

(1) 40 N, 64 N (2) 60 N, 80 N
(3) 88 N, 96 N (4) 80 N, 100 N

26. A light string passing over a smooth light fixed pulley connects two blocks of masses m_1 and m_2. If the acceleration of the system is g/8, then the ratio of masses is:

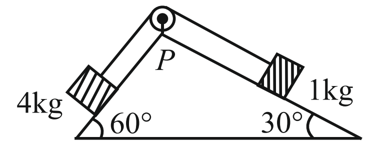
[31 Jan, 2024 (Shift-II)]



(1) 9/7 (2) 8/1
(3) 4/3 (4) 5/3

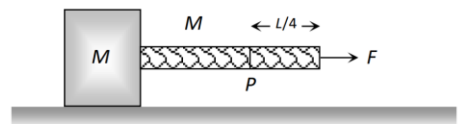
27. As per given figure, a weightless pulley P is attached on a double inclined frictionless surface. The tension in the string (massless) will be (if $g = 10$ m/s^2).

[Jan 24, 2023 (I)]



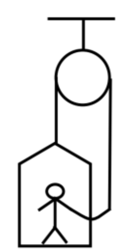
(1) $\left(4\sqrt{3}+1\right)$N (2) $4\left(\sqrt{3}+1\right)$N
(3) $4\left(\sqrt{3}-1\right)$N (4) $\left(4\sqrt{3}-1\right)$N

28. A block of mass M is pulled by a uniform chain of mass M tied to it by applying a force F at the other end of the chain. The tension at a point distant quarter of the length of the chain from free end will be:



(1) $\frac{7F}{8}$ (2) $\frac{4F}{5}$
(3) $\frac{3F}{4}$ (4) $\frac{6F}{7}$

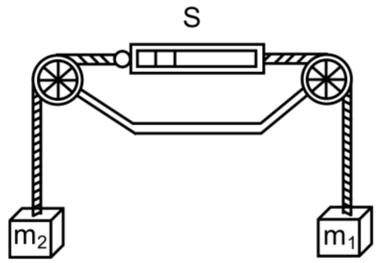
29. A painter is raising himself and the crate on which he stand with an acceleration of 5 m/s^2 by a massless rope and pulley arrangement. Mass of the painter is 100 kg and that of the crate is 50 kg. If $g = 10$ m/s^2, then the



(i) tension in rope is 2250 N
(ii) tension in rope is 1125 N
(iii) force of contact between the painter and the floor is 750 N
(iv) force of contact between the painter and the floor is 375 N

(1) (i), (ii) (2) (ii), (iv)
(3) (i), (iv) (4) (ii), (iii)

30. In the arrangement shown, the pulleys are fixed and ideal, the strings are light, $m_1 > m_2$ and S is a spring balance which is itself massless. The reading of S (in units of mass) is:



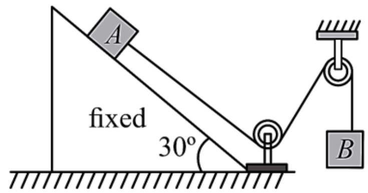
(1) $m_1 - m_2$

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

(3) $\frac{m_1 m_2}{m_1 + m_2}$

(4) $\frac{2m_1 m_2}{m_1 + m_2}$

31. Two blocks A and B of equal mass m are connected through a massless string and arranged as shown in figure. Friction is absent everywhere. When the system is released from rest.



(1) Tension in string is $\frac{mg}{2}$

(2) Tension in string is $\frac{mg}{4}$

(3) Acceleration of A is $\frac{g}{2}$

(4) Acceleration of A is $\frac{3}{4}g$

Answer Key

1. (1)
2. (1)
3. (2)
4. (2)
5. (1)
6. (3)
7. (1)
8. (3)
9. (2)
10. (2)
11. (2)
12. (1)
13. (3)
14. (3)
15. (2)
16. (2)
17. (1)
18. (3)
19. (2)
20. (1)
21. (1)
22. (4)
23. (2)
24. (492)
25. (1)
26. (1)
27. (2)
28. (1)
29. (2)
30. (4)
31. (2, 4)