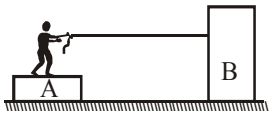
CLASS TEST

PHYSICS CLASS TEST # 18

SECTION-I

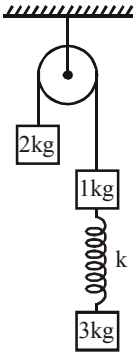
Single Correct Answer Type **10 Q. [Marks 3 (–1)]**

1. Figure shows a boy on a horizontal platform A on a smooth horizontal surface, holding a rope attached to a box B. Boy pulls the rope with a constant force of 50 N. (boy does not slip over the platform). The combined mass of platform A and boy is 250 kg and that of box B is 500 kg. The velocity of A relative to the box B, 5 s after the boy on A begins to pull the rope, will be



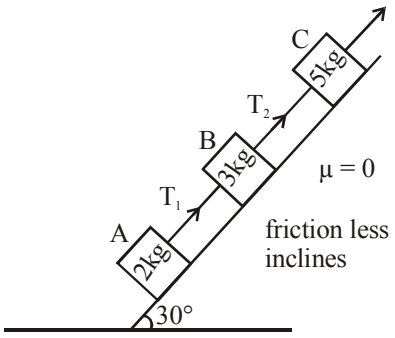
(A) 1 m/s (B) 1.5 m/s (C) 2 m/s (D) 0.5 m/s

2. From the fixed pulley, masses 2kg, 1kg and 3kg are suspended as shown in the figure. Find the extension in the spring if k = 100 N/m. (Neglect oscillations due to spring) :-



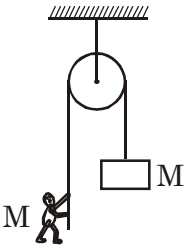
(A) 0.1 m (B) 0.2 m (C) 0.3 m (D) 0

3. Three blocks A, B, C of mass 2kg, 3kg, 5kg are placed on a frictionless inclined as shown in figure. Force F of magnitude 150 N is applied on block 'C' as shown. Find tension in string 1(T_1) :-



(A) 20 N (B) 30 N (C) 10 N (D) 40 N

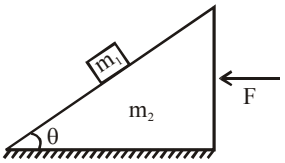
4. A block is hanging at one end of the massless rope passing over a fixed smooth pulley. From the other end of the rope a man of same mass climbs at an acceleration x relative to the rope. Find the value of x if acceleration of rope is 'a' :-



(A) a (B) $\frac{a}{2}$

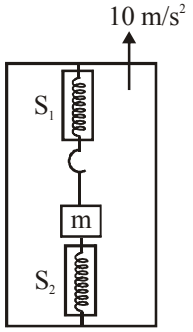
(C) 2a (D) $\frac{5a}{2}$

5. A block of mass m_1 is placed on wedge (mass m_2) shown in fig. Find out magnitude of force 'F' such that block m_1 remain stationary w.r.t wedge. (All surfaces are frictionless.)



(A) $(m_1 + m_2)g \sin\theta$ (B) $(m_1)g \tan\theta$
(C) $(m_2)g \tan\theta$ (D) $(m_1 + m_2)g \tan\theta$

6. Reading shown in two spring balances, S_1 and S_2 is 60 kg and 30 kg respectively. Spring S_1 is in elongated state & spring S_2 is in compressed state. Lift is accelerating upward with acceleration 10 m/s^2. The mass is stationary with respect to lift. Then the mass of the block will be :-

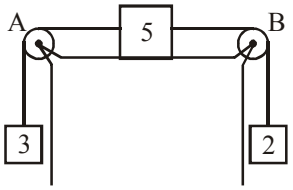


(A) 45 kg (B) 30 kg (C) 60 kg (D) 15 kg

7. A weighing machine is kept upside down on head of a man of mass 50 kg, mass of weighing machine is 3 kg. What will be reading of weighing machine ?

(A) 0 kg (B) 50 kg (C) 3 kg (D) 53 kg

8. Three blocks are arranged by the two string as shown in the diagram. Then the force exerted by the pullyon the clamp is

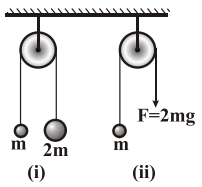


(A) $22\sqrt{2}$ (B) $27\sqrt{2}$ (C) $20\sqrt{2}$ (D) Zero

9. The rear side of a truck is open and smooth. A box of mass 20 kg is placed on the truck 4 m away from the open end, and g = 10 m/s^2. The truck starts from rest with an acceleration of 2m/s^2 on a straight road. The distance moved by the truck when box falls from the truck is:-

(A) 4 m (B) 8 m (C) 16 m (D) 32 m

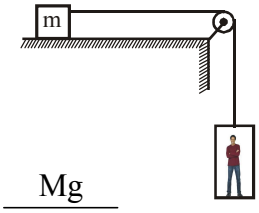
10. The pulley arrangements shown in figure are identical, the mass of the rope being negligible. In case I, the mass m is lifted by attaching a mass 2 m to the other end of the rope. In case II, the mass m is lifted by pulling the other end of the rope with a constant downward force F = 2mg, where g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



(A) zero (B) more than that in case II
(C) less than that in case II (D) equal to that in case II

Multiple Correct Answer Type 3 Q. [4 M (–2)]

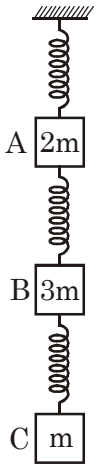
11. In the figure, a man of true mass M is standing on a weighing machine placed in a cabin. The cabin is joined by a string with a body of mass m. Assuming no friction, and negligible mass of cabin and weighing machine, then choose the correct statement(s) (normal force between the man and the machine is proportional to the mass) :-



(A) Measured mass of man is $\frac{Mm}{(M+m)}$ (B) Acceleration of man is $\frac{Mg}{(M+m)}$

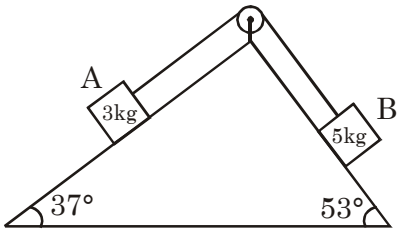
(C) Acceleration of man is $\frac{mg}{(M+m)}$ (D) Measured mass of man is M.

12. Initially system is in equilibrium. If the spring between A & B is cut then just after cutting. (Assume all springs are massless and identical)



(A) Acceleration of block A is 2g upwards (B) Acceleration of block A is 4g upwards
(C) Acceleration of block B is 4g/3 downwards (D) Acceleration of block B is 4g downwards

13. A system of two block A & B having mass 3kg and 5kg. If system is released from rest as shown in figure. If surface between inclined & both blocks is smooth than choose **INCORRECT** statement (pulley & string are ideal) :-



(A) Magnitude of acceleration of 3kg block along the inclined plane is $\frac{3}{2}\text{m/sec}^2$.

(B) Acceleration of both blocks along the inclined plane will be same.

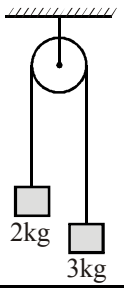
(C) Tension in string is $\frac{105}{4}\text{N}$.

(D) Acceleration of B w.r.t. A is $\frac{11}{2}\text{N}$

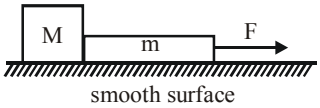
SECTION-III

Numerical Grid Type (Ranging from 0 to 9) 4 Q. [4 M (0)]

1. The atwood machine system shown in the figure is released from rest. At what time (in sec) will the speed of the block of mass 3 kg be 6 m/s ?

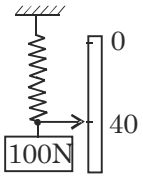


2. A block of mass M is pulled along horizontal frictionless surface by a rope of mass m. If tension at the middle point of rope & force applied by string on the block is in ratio 3 : 2 then find the value of M/m.



3. A vertical rod of mass 4 kg is hanging on a rope and 3kg cat is grasping the bottom end of the rod. The rope is cut off and the frightened cat beings to run up on the rod. While the rod is falling vertically, the cat remains at the same height, with respect to the ground. If the acceleration of the rod is ng/4 m/s^2 then what is value of n.

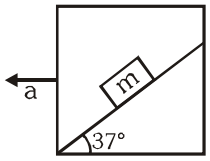
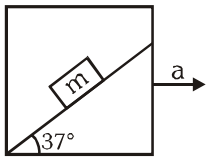
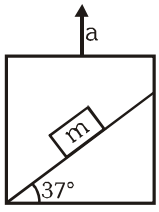
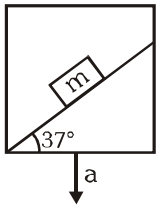
4. An ideal spring, with a pointer attached to its end, hangs next to a scale. With a 100 N weight attached and at rest, the pointer indicates '40' cm on the scale as shown. Using a 200 N weight instead results in 60 cm on the scale. Using an unknown weight 'X' instead results in '30' cm on the scale. Fill value of $\frac{X}{10}$ (in newton).



SECTION-IV

Matrix Match Type (4 × 5) **1 Q. [8 M (for each entry +2(0)]**

1. A block of mass m=1kg, is placed on a wedge. The wedge can be accelerated with acceleration (a =g) in four manners as shown. The normal reaction between block and incline is N.

Column I	**Column II (Normal reaction and acceleration of block w.r.t. incline)**
(A) 	(P) $\frac{7g}{5}$
(B) 	(Q) $\frac{g}{5}$
(C) 	(R) $\frac{8g}{5}$
(D) 	(S) Zero
	(T) $\frac{6g}{5}$

CLASS TEST # 18 (TNPS)			ANSWER KEY
SECTION-I			
Single Correct Answer Type			**10 Q. [Marks 3 (–1)]**
1. Ans. (B)	**2. Ans. (B)**	**3. Ans. (B)**	**4. Ans. (C)**
5. Ans. (D)	**6. Ans. (A)**	**7. Ans. (C)**	**8. Ans. (D)**
9. Ans. (A)	**10. Ans. (C)**		
Multiple Correct Answer Type			**3 Q. [4 M (–2)]**
11. Ans. (A, B)	**12. Ans. (A, C)**	**13. Ans. (A, B, D)**	
SECTION-III			
Numerical Grid Type (Ranging from 0 to 9)			**4 Q. [4 M (0)]**
1. Ans. 3	**2. Ans. 1**	**3. Ans. 7**	**4. Ans. 5**
SECTION-IV			
Matrix Match Type (4 × 5)			**1 Q. [8 M (for each entry +2(0)]**
1. Ans. (A) → (P,Q) ; (B) → (P,Q) ; (C) → (R,T) ;(D) → (S)			