CLASS - IX (1)

EXPERIMENT NO. 9

To establish relationship between weight of a rectangular block lying on a horizontal surface and minimum force required to just move it using a spring balance.

1. Range of a spring balance used for measuring the minimum force required to just slide a block is 0–500 g wt. And it has a total of 20 divisions between 0–100 g wt marks. Its least count is

   (*a*) 5 g wt (*b*) 20 g wt

   (*c*) 0.4 g wt (*d*) 0.2 g wt

2. Four spring balances are provided to find the minimum force required to move a rectangular wooden block lying on a wooden table. Range and least count of four spring balances are given below. Which of the following spring balance will you select:

   (*a*) Range 0–100 g wt and least count of 10 g wt

   (*b*) Range 0–10 g wt and least count of 1 g wt

   (*c*) Range 0–10 g wt and least count of 2 g wt

   (*d*) Range 0–100 g wt and least count of 1 g wt

3. A student has to perform the experiment "To establish relationship between weight of a rectangular wooden block lying on a horizontal surface and minimum force required to just move it using a spring balance". If the weight of the given wooden block is nearly 200 g wt and three known weight of 100 g wt each are to be successively placed on the wooden block to take three more readings, then which one of the following spring balances available in the laboratory would you select for the best results in the experiment? It is known that a force of 90 g wt is required to just move the block on the surface.

   (*a*) Range 0–100 g wt, Least count 1.0 g wt

   (*b*) Range 0–200 g wt, Least count 2.0 g wt

   (*c*) Range 0–250 g wt, Least count 2.0 g wt

   (*d*) Range 0–500 g wt, Least count 5.0 g wt

4. The spring balance used to measure minimum force required to just slide a wooden block is of range 0–50 g wt and has 100 divisions on its scale. A block just starts sliding when its pointer is at 42nd division. The minimum force thus measured should be

   (*a*) 210 g wt (*b*) 42 g wt

   (*c*) 21 g wt (*d*) 84 g wt

5. In an experiment to establish the relationship between weight of a rectangular wooden block lying on a horizontal table and the minimum force required to just move it using a spring balance, which type of string should be used?

   (*a*) Very high elasticity

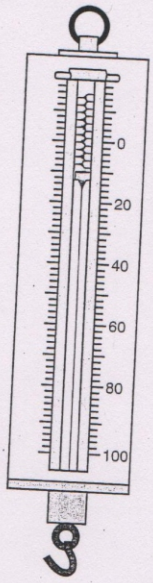
   (*b*) Less elasticity

   (*c*) Moderate elasticity

   (*d*) Anyone can be used

6. In an experiment to establish relationship between weight of a rectangular block lying on a horizontal wooden table and a minimum force required to move it, a spring balance is provided. The least count of the given spring balance is

PRACTICE MCQ PAPERS



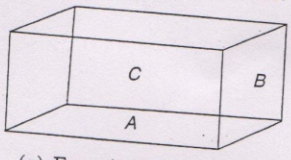
(a) 1 g wt (b) 2 g wt
(c) 5 g wt (d) 3 g wt

7. While doing an experiment to find the relationship between the weight of a rectangular wooden block lying on a horizontal table and the minimum force required to just move it using a spring balance it is observed that:
(a) more inertia, more force
(b) more inertia, less force
(c) less inertia, more force
(d) no relationship between inertia and force

8. To establish relationship between the weight of a wooden block and the force required to make it just move, a student first measured the force required for a block of weight W to move. He then repeated the experiment after placing a weight $W/2$ and then $2W$ on the block. Which of the following statement is likely to agree with the conclusion of the student?
(a) The force required by a block to just move does not depend on its weight
(b) The ratio of force required for making the block just move and its weight is a constant
(c) The ratio of force required for making the block just move and its weight is less than one
(d) The ratio of force required for making the block just move and its weight is more than one

9. While performing the experiment, to establish relationship between weight of a rectangular wooden block lying on a horizontal table and the minimum force required to just move it using a spring balance. A student 'A' placed the block on its surface of maximum area and noted the value of minimum force required as 'F_1' while student 'B' placed the block on its surface of minimum area and noted the value of minimum force as F_2. Relationship between F_1 and F_2 is
(a) $F_1 = F_2$ (b) $F_1 > F_2$
(c) $F_1 < F_2$ (d) $F_1 = \frac{1}{F_2}$

10. In an experiment to establish the relationship between weight of a wooden cuboid lying on the horizontal surface and the minimum force required to move it, which of the following faces of cuboid should be in contact with the surface?



(a) Face A with area 30×20 m^2
(b) Face B with area 20×10 m^2
(c) Face C with area 30×10 m^2
(d) any of the face A, B or C

11. To calculate the force of friction between a wooden block and the horizontal table, two students use identical blocks and spring balances but different surface below the wooden block. One of them uses a rough surface and other one puts some oil on the surface. The observed readings of spring balance are F_1 and F_2 respectively.

(a) $F_1 > F_2$ (b) $F_1 < F_2$
(c) $F_1 = F_2$ (d) None of these

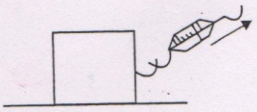
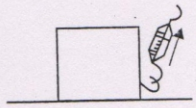
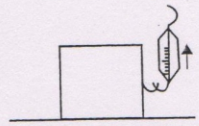
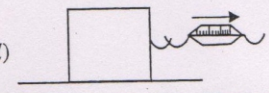
12. While doing an experiment to establish relationship between weight of a rectangular wooden block lying on a horizontal table and the minimum force required to just move it. Student A performed the experiment on wooden table and calculated force as F_A, student B on the table covered with sand calculated force as F_B, student B on the table covered with oil poured on it calculated force as F_C. Then
(a) $F_A < F_B < F_C$ (b) $F_A < F_B > F_C$
(c) $F_A = F_B = F_C$ (d) $F_A > F_B > F_C$

13. While performing an experiment to establish relationship between weight of a rectangular wooden block lying on a horizontal table and the minimum force required to just move it using a spring balance, a student calculated the minimum force required as 180 g wt to move the wooden block of 40 g wt. If he places another block of mass 100 g wt over it, then the force required will
(a) remain same
(b) decrease
(c) increase
(d) may decrease or increase

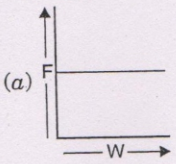
14. A rectangular wooden box open from one side is lying on a horizontal table. Different weights are kept in the box one by one. To establish relationship between weight of a box with minimum force required to just move it using a spring balance, it is observed that the force required to just move the rectangular box is maximum when we put a weight of
(a) 40 g wt (b) 45 g wt
(c) 30 g wt (d) 35 g wt

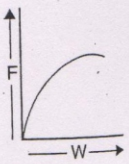
15. The minimum force required to just slide a wooden block of 100 g wt is 70 g wt. This infers that the force of friction between the block and the surface on which it is placed is
(a) greater than 170 g wt
(b) less than 170 g wt but more than 70 g wt
(c) equal to 70 g wt
(d) equal to 170 g wt

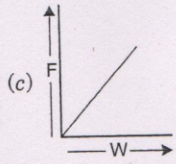
16. The correct way to pull to measure the minimum force required to just slide a wooden block on a surface is shown by the figure

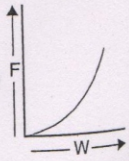
(a) 
(b) 
(c) 
(d) 

17. Weight of a wooden block to be pulled by spring balance is gradually increased and graph is plotted between total weight of block (W) and reading of spring balance (F) to pull it. The shape of graph is

(a) 

(b) 

(c) 

(d) 

18. A student applied force on a wooden block placed on a horizontal surface. He gradually increased the force on the block till it just starts sliding gently on

the surface. He then measured the force as F_1. The same process was repeated with the same set of apparatus by his two classmates but they applied force in some other directions to slide the block and recorded the applied force as F_2 and F_3. On analysing these forces it was found that

(a) $F_1 > F_2 > F_3$ (b) $F_1 < F_2 < F_3$
(c) $F_1 < F_2 > F_3$ (d) $F_1 = F_2 = F_3$

ANSWERS/HINTS

1. (a) Least count = $\frac{100 \text{ g wt}}{20} = 5 \text{ g wt.}$
2. (d) It has sufficient range and lowest least count.
3. (c) Same reason as above.
4. (a) Minimum force measured
   $= \frac{500}{100} \times 42 = 210 \text{ g wt.}$
5. (b) Least elastic string is preferred.
6. (b) Least count = $\frac{20 \text{ g wt}}{10} = 2 \text{ g wt.}$
7. (a) More is the inertia offered by the block, more is the force required to move it.
8. (b) This ratio is constant for a given pair of surfaces.
9. (a) The required minimum force does not depend on the area of contact.
10. (d) Same reason as above.
11. (a) Less force is required to move the block an oily surface.
12. (b) Minimum force is required on oily surface and maximum force is required on surface covered with sand.
13. (c) Required force increases with the increase in weight of the block.
14. (b) Same reason as above.
15. (c) Minimum force required = Force of friction.
16. (d) The applied force is most effective when it is parallel to the surface of contact.
17. (c) The applied force increases proportionally with the increase in weight of the block.
18. (d) $F_1 = F_2 = F_3$.

❑❑❑