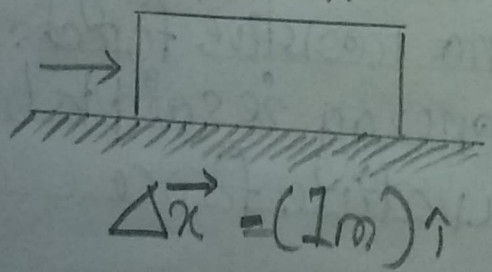
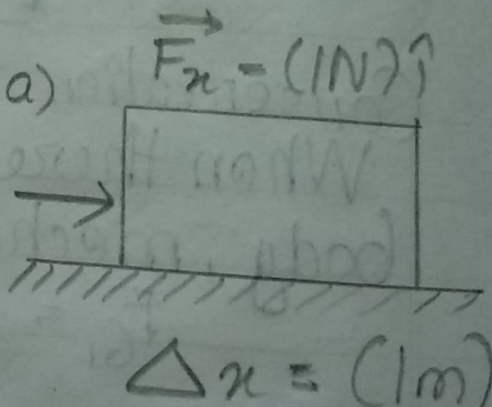
Home Assignment

1. The figure shows four situations in which a force acts on a box while the box either slides to the right with a displacement or doesn't budge as indicated. The force on each box is shown. Rank the situations according to the amount of work done by the force on the box during its displacement from greatest to least.

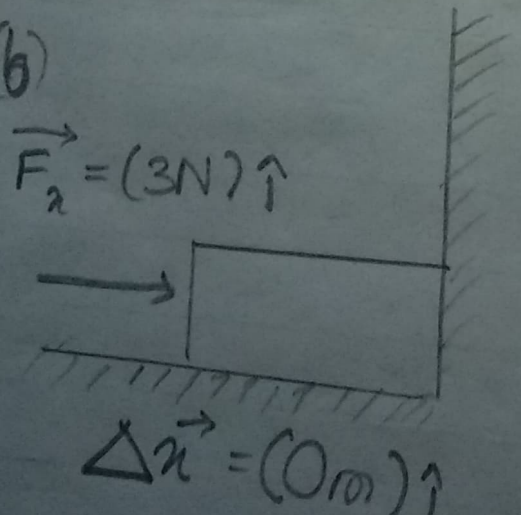
(c)



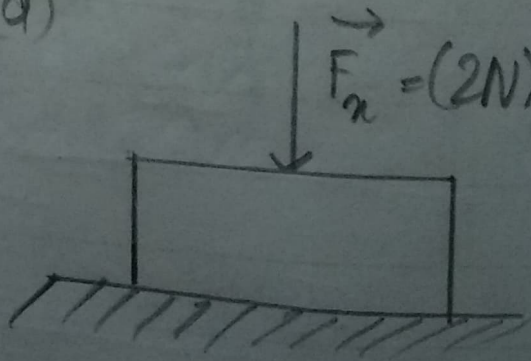
(a)



(b)



(d)



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2. A body of mass 1 kg has kinetic energy 1J when its speed is :-

$\frac{1}{2}mv^2$

$\Rightarrow \frac{1}{2} \times 1 \times v^2 = 1$

$\Rightarrow v^2 = 2$

$\Rightarrow v = \sqrt{2} = 1.4$

3. The Kinetic energy of a body will become eight times it-

Kinetic energy is directly proportional to mass & velocity. Mass is directly proportional to K.E and K.E is directly proportional to the square of velocity. If both the mass & velocity are doubled then Kinetic energy of a body will become eight times.

4. A uniform force of 4N acts on a body of mass 8kg for distance of 2.0 m. The Kinetic Energy acquired by the body is

Work = Kinetic Energy Acquired

Force = 4N

Distance = 20m

Work = Force × Distance

$= 4 \times 2$

$= 8J$

5. The Kinetic energy of body becomes twice its initial value. The momentum of the body will be.

$$2KE = \frac{1}{2}MV^2$$

$$V^2 = 2x$$

$$V = \sqrt{2}x$$

Ans = $\sqrt{2}x$

6. The Kinetic energy acquired by a body of mass 'm' after travelling a fixed distance from rest under the action of a constant force is -

Directly proportional to mass m

7. A car weighing 500 kg, working against a resistance of 500N, accelerates from rest to 20m/s in 100m. ($g = 10 m/s^2$). The work done by the engine of car is:

$u = 0$, $v = 20 m/s$, $s = 100m$

$v^2 - u^2 = 2as$

$\Rightarrow (20)^2 = 2 \times a \times 100$

$\Rightarrow 400 = 200a$

$\Rightarrow a = 2 m/s$

Work = Force x Distance

= Mass x Acceleration x Displacement

$= 500 \times 2 \times 100 = 100000$

$= 1.0 \times 10^5$