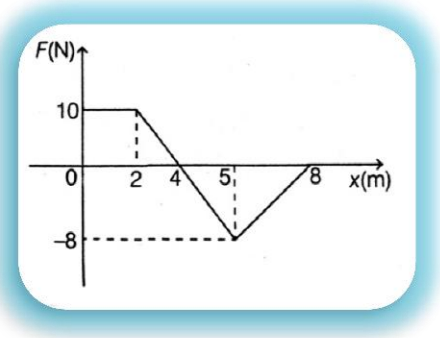
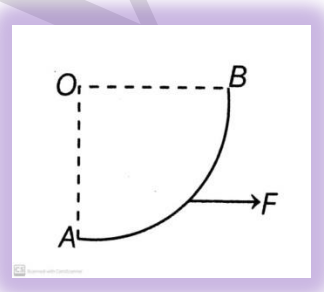
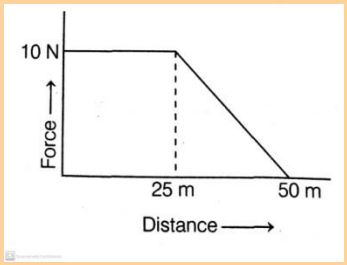
1. An object is displaced from point A (2m, 3m, 4m) to point B (1m, 2m, 3m) under a constant force F = $(2\hat{\imath} + 3\hat{\jmath} + 4\hat{k})$N. Find the work done by this force in this process.
2. A particle moves along the X-axis from x = 0 to x = 5 m under the influence of a force F (in newton) given by F = $3x^2 - 2x + 7$. Calculate the work done by this force.
3. An object is displaced from position vector $r_1 = (2\hat{\imath} + 3\hat{\jmath})$ m to $r_2 = (4\hat{\imath} + 6\hat{\jmath})$ m under the action of a force F = $(3x^2\hat{\imath} + 2y\hat{\jmath})$N. Find the work done by this force.
4. A 5.0 kg block moves in a straight line on a horizontal frictionless surface under the influence of a force that varies with position as shown in the figure. How much work is done by the force as the block moves from the origin to x = 8 m?



5. A chain of length L and mass M slowly pulled at constant speed up over the edge of a table by a force parallel to the surface of the table. Assuming that, there is no friction between the table and chain, calculate the work done by force till the chain reaches to the horizontal surface of the table.
6. The figure shows a smooth circular path of radius R in the vertical plane which subtends an angle $\left(\frac{\pi}{2}\right)$ at O. A block of mass m is taken from position A to B under the action of a constant horizontal force F.
   (a) Find the work done by this force.
   (b) In part (a), if the block is being pulled by a force F which is always tangential to the surface, find the work done by the force between A and B.



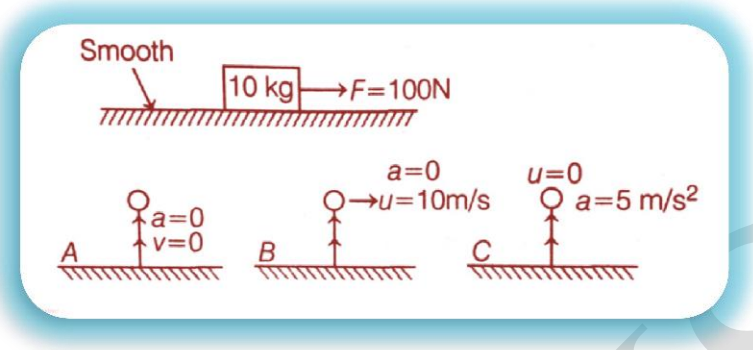
7. A mass of 2 kg is acted upon by a single force F $(3\hat{\imath} + 4\hat{\jmath})$N. Due to force, mass is displaced from (1, 5) to (4, 8). If initially the speed of the particle was 2 m/s, find its final speed.
8. A body of mass 5 kg is acted upon by a variable force. The force varies with the distance covered by the body. What is the speed of the body when the body as covered 25 m? Assume that the body starts from rest.



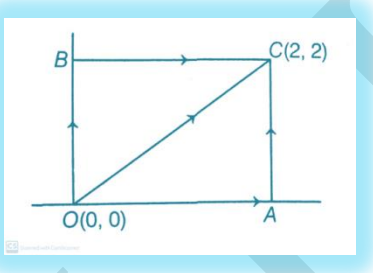
9. The displacement of a particle of mass 2 kg is given as x = $\frac{t^3}{3}$. Find work done by all force acting on the particle during the first 2s.
10. A particle of mass m moves on a straight line with its velocity varying with the distance travelled according to the equation v = $a\sqrt{x}$, where a is a constant. Find total work done by all the forces during a displacement from x = 0 to x = d.
11. A bullet of mass 20 g is fired from a rifle with a velocity of 800 m/s. After passing through a mud wall 100 cm thick, velocity drops to 100 ms^{-1}. What is the average resistance of the wall?
    (Neglect friction due to air and work of gravity)
12. The two blocks in an Atwood machine have masses 2.0 kg and 3.0 kg. Find the work done by gravity during the fourth second after the system is released from rest. (Take, g = 10 m/s^2)
13. A rigid body of mass 2 kg initially at rest moves under the action of an applied horizontal force of 7N on a table with coefficient of kinetic friction = 0.1. Calculate the
    (a) work done by the applied force on the body in 10 s.
    (b) work done by friction on the body in 10 s.
    (c) work done by the net force on the body in 10 s and
    (d) change in kinetic energy of the body in 10s.
14. A uniform chain of length L and mass M overhangs a horizontal table with its two third part on the table. The friction coefficient between the table and the chain is

μ. Find the work done by the friction during the period, the chain slips off the table.

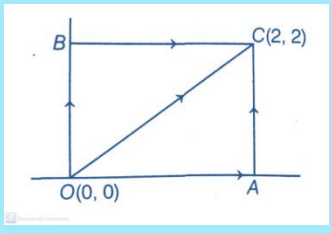
15. A block of mass 10 kg is pulled by force F = 100 N. This motion is observed by three observers. A, B and C as shown in figure.
(a) Find out work done by the force F in 10 s as observed by A, B and C.
(b) Find work done by pseudo force for observer C and verify work-energy theorem for observer C.



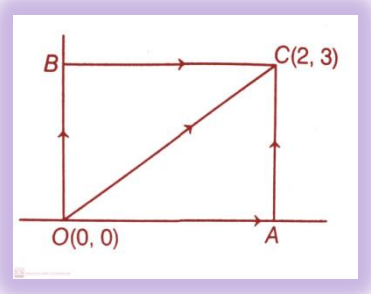
16. A force F = (xî + xyĵ)N acts on a particle which moves in the xy-plane.
(a) Find the work done by F as it moves the particle from A to C (figure) along each of the paths OAC, OBC, and OC.
(b) Determine whether F is conservative or not.



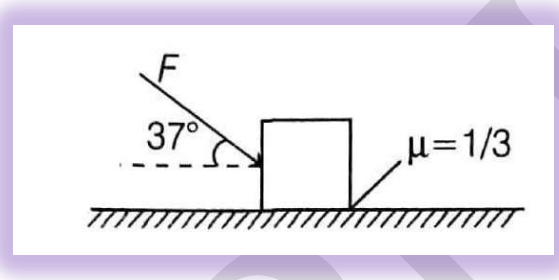
17. A force F = (xî + xyĵ)N acts a particle which moves in the xy-plane.
(a) Find the work done by F as it moves the particle from O to C (figure) along each of the path OAC, OBC, and OC.
(b) Determine whether F is conservative or not.



18. A force F = (y$\hat{i}$ + x$\hat{j}$)N acts on a particle which moves in the xy-plane.
(a) Find the work done by F as it moves the particle from A to C (figure) along each of the paths OAC, OBC, and OC.
(b) Determine whether F is conservative or not.



19. A block of mass M = 9 kg is moving with uniform velocity of 2 m/s on a rough horizontal surface under the action of constant force F. The force acts at an angle 37° to the horizontal. Find work done by the force F during an interval of 4 s of motion.
(a) 400 J (b) 300 J (c) 320 J (d) 100 J



20. A force F = a + bx acts on a particle in the x-direction, where a and b are constants. Find the work done by this force during a displacement x from x = 0 to x = d.
(a) (a + bd)d (b) $\left(a+\frac{bd}{2}\right)d$ (c) $\left(a+\frac{bd^2}{2}\right)d$ (d) None of these

21. A car of mass m starts moving so that its velocity varies according to the law v = $a\sqrt{s}$, where a is a constant, and s is the distance covered. The total work performed by all the forces which are acting on the car during the first t seconds after the beginning of motion is
(a) $\frac{1}{8}ma^4t^2$ (b) $\frac{1}{8}ma^2t^4$ (c) $\frac{1}{4}ma^4t^2$ (d) $\frac{1}{4}ma^2t^4$