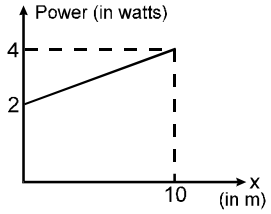
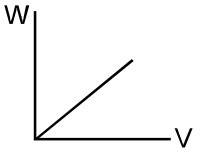
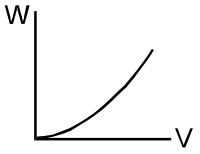
1. A particle A of mass $\frac{10}{7}$ kg is moving in the positive direction of x. Its initial position is x = 0 & initial velocity is 1 m/s. The velocity at x = 10 is : (use the graph given)



(A) 4 m/s (B) 2 m/s (C) $3\sqrt{2}$ m/s (D) 100/3 m/s

2. A particle, initially at rest on a frictionless horizontal surface, is acted upon by a horizontal force. A graph is plottedof the work done on the particle W, against the speed of the particle v. If there are no other horizontal forces acting on the particle the graph would be.

(A) 

(B) 

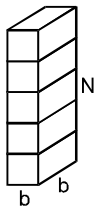
(C) 

(D) 

3. A man pulls a bucket of water from a depth of h from a well. If the mass of the rope and that of bucket full of water are m and M respectively, the work done by the man is

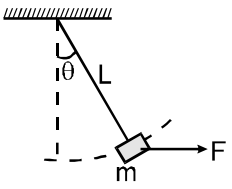
(A) (M + m)gh (B) $\left(M+\frac{m}{2}\right)gh$ (C) $\left(\frac{M+m}{2}\right)gh$ (D) $\left(\frac{M}{2}+m\right)gh$

4. N similar slab of cubical shape of edge b are lyging on ground. Density of material fo slab is D. Work done to arrange them one over the other is :



(A) $(N^2 - 1)\, b^3\, Dg$ (B) $(N - 1)\, b^4\, Dg$ (C) $1/2\,(N^2 - N)\, b^4\, Dg$ (D) $(N^2 - N)\, b^4\, Dg$

5. An object of mass m is tied to string of length L and a variable horizontal force is applied on it which starts at zero and gradually increases (it is pulled extremely slowly so that equilibrium exists at all times) until the string makes an angle θ with the vertical. Work done by the force F is :

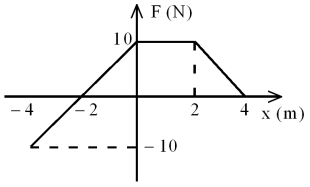


(A) mg L (1 – cos θ) (B) mg L (1 – sin θ) (C) mg L (D) mg L (1 + tan θ)

6. One end of a light spring of force constant k is fixed to the ceiling. The other end is fixed to a block of mass m. Initially the spring is relaxed. The work done by an external agent to lower the hanging body of mass m slowly till it comes to equilibrium is:

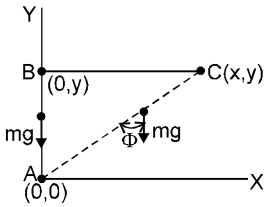
(A) $3\ \frac{m^2 g^2}{2k}$ (B) $\frac{m^2 g^2}{2k}$ (C) $-3\ \frac{m^2 g^2}{2k}$ (D) $-\frac{m^2 g^2}{2k}$

7. A force varies the position as shown in the figure . Find the work done by it from :



(a) $x = -4$ to $+4$ m (b) $x = 0$ to -2 m

8. In the figure shown, evaluate the work done by the weight mg acting on a particle of mass m, as the particle is moved (by the application of other forces) from



(A) A to B (B) B to A (C) A to B to C (D) A to C directly
(E) A to B to C to A

Answers

RACE # 23

1. (A) **2.** (B) **3.** (B) **4.** (C) **5.** (A) **6.** (D) **7.** (a) 30 J (b) – 10 J
8. (a) – mgy (b) mgy (c) – mgy (d) – mgy (e) 0