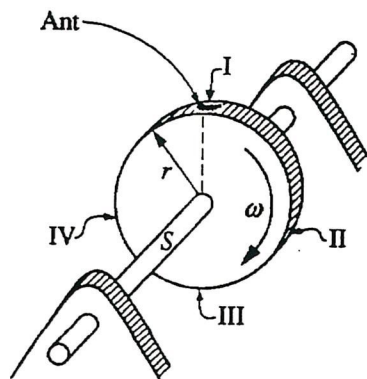


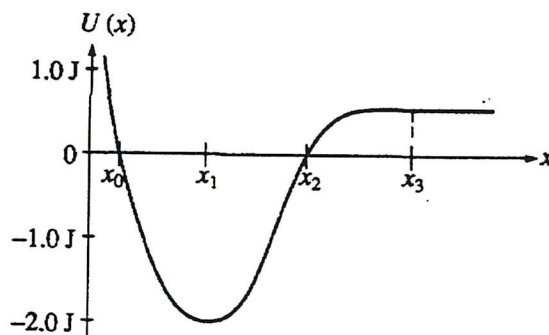
Questions 12-13



An ant of mass m clings to the rim of a flywheel of radius r , as shown above. The flywheel rotates clockwise on a horizontal shaft S with constant angular velocity ω . As the wheel rotates, the ant revolves past the stationary points I, II, III, and IV. The ant can adhere to the wheel with a force much greater than its own weight.

12. It will be most difficult for the ant to adhere to the wheel as it revolves past which of the four points?
- (A) I
 (B) II
 (C) III
 (D) IV
 (E) It will be equally difficult for the ant to adhere to the wheel at all points.
13. What is the magnitude of the minimum adhesion force necessary for the ant to stay on the flywheel at point III?
- (A) mg
 (B) $m\omega^2 r^2$
 (C) $m\omega^2 r^2 + mg$
 (D) $m\omega^2 r - mg$
 (E) $m\omega^2 r + mg$

14. A weight lifter lifts a mass m at constant speed to a height h in time t . How much work is done by the weight lifter?
- (A) mg
 (B) mh
 (C) mgh
 (D) $mght$
 (E) mgh/t



15. A conservative force has the potential energy function $U(x)$, shown by the graph above. A particle moving in one dimension under the influence of this force has kinetic energy 1.0 joule when it is at position x_1 . Which of the following is a correct statement about the motion of the particle?
- (A) It oscillates with maximum position x_2 and minimum position x_0 .
 (B) It moves to the right of x_3 and does not return.
 (C) It moves to the left of x_0 and does not return.
 (D) It comes to rest at either x_0 or x_2 .
 (E) It cannot reach either x_0 or x_2 .