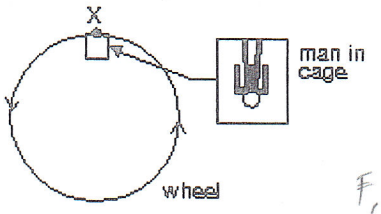
5. A giant wheel, 40 m in diameter, is fitted with a cage and platform on which a man can stand. The wheel rotates at such a speed that when the cage is at X (as shown) the force exerted by the man on the platform is equal to his weight. The speed of the man is:



A) 14 m/s
B) 20 m/s
C) 28 m/s
D) 80 m/s
E) 120 m/s

$F_c = 2mg = \frac{mv^2}{r}$

$\sqrt{2gr} = v$

$= 28\ m/s$

6. An object of mass m and another object of mass $2m$ are each forced to move along a circle of radius 1.0 m at a constant speed of 1.0 m/s. The magnitudes of their accelerations are:
A) equal
B) in the ratio of $\sqrt{2}$: 1
C) in the ratio of 2 : 1
D) in the ratio of 4 : 1
E) zero

$a_c = \frac{v^2}{r}$ no mass here

7. At time $t = 0$ a 2-kg particle has a velocity in m/s of $(4\ m/s)\hat{i} - (3\ m/s)\hat{j}$. At $t = 3$ s its velocity is $(2\ m/s)\hat{i} + (3\ m/s)\hat{j}$. During this time the work done on it was:
A) 4 J
B) –4 J
C) –12 J
D) –40 J
E) $(4\ J)\hat{i} + (36\ J)\hat{j}$

$W = \Delta KE = \sqrt{2^2+3^2} - \sqrt{4+9}$

$\sqrt{13} - 5$ 15-25

8. A man pushes an 80-N crate a distance of 5.0 m upward along a frictionless slope that makes an angle of 30° with the horizontal. The force he exerts is parallel to the slope. If the speed of the crate is constant, then the work done by the man is:
A) –200 J
B) 61 J
C) 140 J
D) 200 J
E) 260 J

$W = F \cdot d$

$80 \cdot 5 \sin 30$