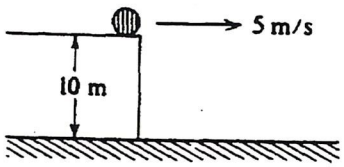
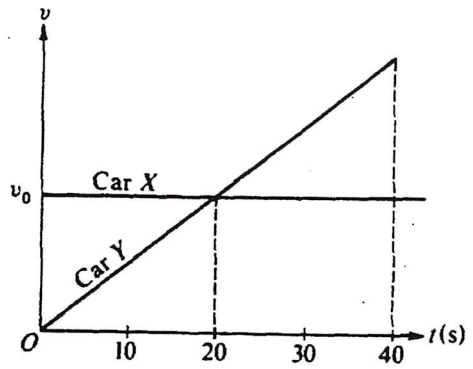
1. Torque is the rotational analogue of
   (A) kinetic energy
   (B) linear momentum
   (C) acceleration
   (D) force
   (E) mass



2. An object slides off a roof 10 meters above the ground with an initial horizontal speed of 5 meters per second as shown above. The time between the object's leaving the roof and hitting the ground is most nearly
   (A) $\frac{1}{2}$ s (B) $\frac{1}{\sqrt{2}}$ s (C) $\sqrt{2}$ s
   (D) 2 s (E) $5\sqrt{2}$ s

3. A simple pendulum of length ℓ, whose bob has mass m, oscillates with a period T. If the bob is replaced by one of mass $4m$, the period of oscillation is
   (A) $\frac{1}{4}T$ (B) $\frac{1}{2}T$ (C) T
   (D) $2T$ (E) $4T$

Questions 4-5



At time $t = 0$, car X traveling with speed v_0 passes car Y, which is just starting to move. Both cars then travel on two parallel lanes of the same straight road. The graphs of speed v *versus* time t for both cars are shown above.

4. Which of the following is true at time $t = 20$ seconds?
   (A) Car Y is behind car X.
   (B) Car Y is passing car X.
   (C) Car Y is in front of car X.
   (D) Both cars have the same acceleration.
   (E) Car X is accelerating faster than car Y.

5. From time $t = 0$ to time $t = 40$ seconds, the areas under both curves are equal. Therefore, which of the following is true at time $t = 40$ seconds?
   (A) Car Y is behind car X.
   (B) Car Y is passing car X.
   (C) Car Y is in front of car X.
   (D) Both cars have the same acceleration.
   (E) Car X is accelerating faster than car Y.