

PolyU SCIENCE Young Talents Competition

Physics - Sample Questions

1.



When we use the scissors to cut an object, which of the following statements is correct?

- A) The pivot is at the rotation axis in the middle of the scissors.
 - B) The forces applied by the hand form a couple.
 - C) The force applied on the scissors by the hand is always equal to the force applied on the object by the scissors.
 - D) The net torque about the pivot is zero.
2. A car starts from rest with uniform acceleration a . After a certain time, its acceleration becomes $-a$. It continues to travel until it stops finally. If the total displacement of the car is L , what is the total time of travel?
- A) $\sqrt{\frac{aL}{2}}$
 - B) $\sqrt{\frac{2L}{a}}$
 - C) $\sqrt{\frac{4L}{a}}$
 - D) \sqrt{aL}

3.

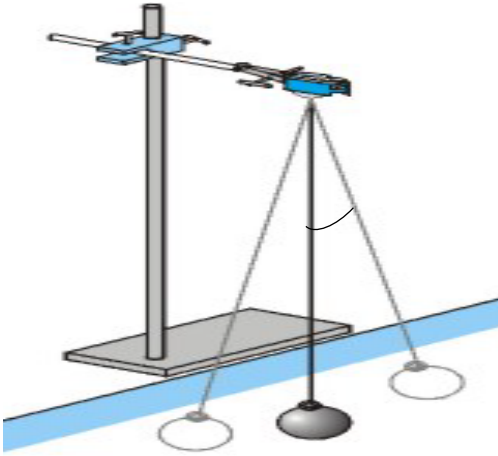


Figure (a)

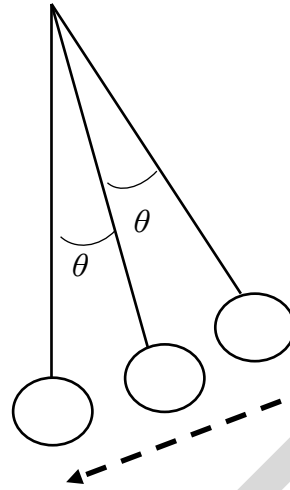
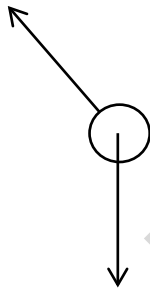


Figure (b)

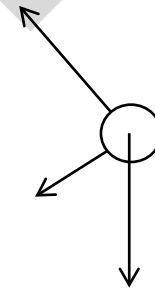
A simple pendulum consists of a metal bob suspended by a light string (Figure (a)).

The bob is displaced so that the string makes an angle 2θ with the vertical. It is then released from rest (Figure (b)). Assuming that friction and air resistance are negligible, which of the following correctly shows all the forces acting on the metal bob when the string makes an angle θ with the vertical?

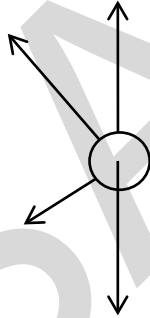
A)



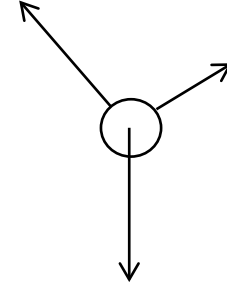
B)



C)



D)



4.



A man pulls a suitcase of mass 20 kg with a force at an angle of 60° to the horizontal. The suitcase moves at a constant velocity. Find the normal reaction acting on the suitcase, given that the frictional force acting on the suitcase is 15 N.

- A) 170.2 N
- B) 187.5 N
- C) 196.2 N
- D) 226.2 N