

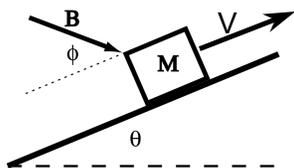
A ball with a mass of 1 kg moves from a height of 1 meter to a height of 2 meters. The work done by gravity on the ball is:

- 1) 0 J
- 2) Roughly +10 J
- 3) Roughly -10 J
- 4) Roughly +20 J
- 5) Roughly -20 J
- 6) Question can't be answered without knowing the initial and final speeds
- 7) Question can't be answered without knowing whether it moves straight up or takes some other path.
- 8) None of the above.

Suppose you want to ride your mountain bike up a hill. You can either charge straight up the hill or take a less-steep spiral path that is much longer. Assume that you start and end at rest. Which of the following is true?

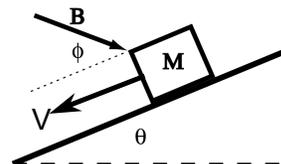
- 1) On the long path, you will do less work but it will take more time.
- 2) The longer time it takes you to get up the spiral path means you do more work.
- 3) The longer distance of the spiral path means that you need to do more work.
- 4) You need to exert more force to get up the steep path so you need to do more work.
- 5) You need to exert more force to get up the steep path but since the time is shorter the work is less.
- 6) You can exert less force to get up the spiral path but the distance is longer so the work is the same either way.
- 7) None of the above.

A box is moving **up** an incline at a constant speed,  $V$ . The box has mass  $M$ . There is friction between the box and the incline and an external force of magnitude  $B$  and angle as shown acts on the box. Which of the following forces does **positive** work on the box?



- 1) The external force  $B$ .
- 2) The normal force.
- 3) Friction.
- 4) Gravity.
- 5) None of the above.
- 6) Both the external and normal forces.
- 7) Both the external force and gravity.
- 8) Both the external force and friction.
- 9) Both friction and gravity.
- 10) All forces except the normal force.

A box is moving **down** an incline at a constant speed,  $V$ . The box has mass  $M$ . There is friction between the box and the incline and an external force of magnitude  $B$  and angle as shown acts on the box. Which of the following forces does **negative** work on the box?



- 1) The external force  $B$ .
- 2) The normal force.
- 3) Friction.
- 4) Gravity.
- 5) None of the above.
- 6) Both the external and normal forces.
- 7) Both the external force and gravity.
- 8) Both the external force and friction.
- 9) Both friction and gravity.
- 10) All forces except the normal force.