

CoLoS

Fall 1999

Test about force and motion

Date:

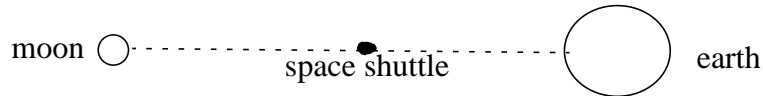
Name:

Age:



Class:

Part 1

A space shuttle is moving on a straight path from the earth to the moon or in the opposite direction. The shuttle is jet-propelled.



Below 6 situations are described and the question is about the related total force. Please mark each of the described situations with one of the letters A to K, which to the best of your knowledge gives the correct answer.

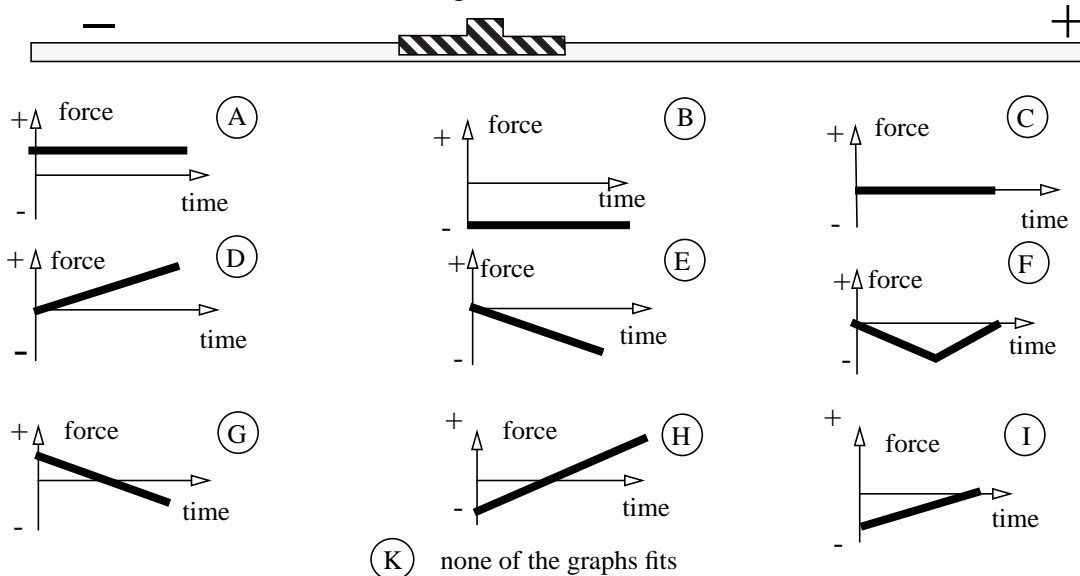
<p>moon direction of total force  earth</p>	<p>The sum of all applied forces on the shuttle is directed towards the earth and</p> <p>A is constant</p> <p>B is increasing in magnitude</p> <p>C is decreasing in magnitude</p>
<p>moon direction of total force  earth</p>	<p>The sum of all applied forces on the shuttle is directed towards the moon and</p> <p>D is constant</p> <p>E is increasing in magnitude</p> <p>F is decreasing in magnitude</p>
	<p>G in total no force is needed</p> <p>K no answer is valid</p>

Situations:

- The shuttle is moving towards the moon. It's velocity is increasing linearly (constant acceleration). ☐
- The shuttle is moving towards the moon with constant velocity in the same direction. ☐
- The shuttle is moving towards the earth. It's velocity is decreasing linearly (constant acceleration). ☐
- The shuttle is moving towards the earth. It's velocity is increasing linearly (constant acceleration). ☐
- The shuttle has been started from earth and accelerated until it has reached a fixed (constant) velocity. What kind of force is needed for an ongoing movement with this velocity?..... ☐
- The shuttle is moving towards the moon and slows down linearly (constant acceleration). ☐

Part II

A slider is moving on an air cushion track, either to the right (+) or to the left (-). Since the slider is hovering and takes on only small velocities, all effects due to friction forces and air resistances can be neglected.



A force can be applied to the slider in horizontal direction. Please mark each of the following situations 7 to 14 with one of the offered force/time-diagrams A to K, which shows how the force on the slider varies with time.

Situations:

7. The slider moves to the right with a fixed (constant) velocity..... ☐
8. The slider moves to the right and its velocity is increasing linearly (constant acceleration) ☐
9. The slider moves to the left (in the negative direction) with a fixed (constant) velocity. ☐
10. The slider moves to the right and its velocity is decreasing linearly (constant acceleration). ☐
11. The slider moves to the left and its velocity is increasing linearly (constant acceleration). ☐
12. The slider moves to the right and its velocity is first decreasing and then increasing. ☐
13. The slider was first pushed to the right and then left alone.
Which diagram describes the applied force after this moment? ☐
14. The slider moves to the left and its velocity is decreasing linearly (constant acceleration). ☐