QUESTIONS FOR THE INERT

1. When a car suddenly brakes to a screeching stop, you lurch forward. Why?

   You don't actually lunge forward. You and the car are going the same speed, when the car comes to a sudden stop, by Newton's First Law (NFL) you want to continue moving forward. You are only lunging forward relative to the car's motion.

2. In what kind of path would the planets move if there were suddenly no gravity?

   The planets would stop moving in orbit and follow a straight path that is tangential to the point when the gravity stopped.

3. Must a spacecraft continually fire its rockets to maintain a constant speed in deep space once it is out there? Why or why not?

   No, once the rocket is moving it will continue to move in a straight line at a constant speed until it either fires its rockets again or gets close to a body (planet or moon) that exerts enough gravitational force to affect its motion.

4. In terms of inertia, what is the disadvantage of a small, lightweight camera when taking a picture? Why is a massive tripod usually preferred by most professional photographers, or why do cameramen (camerawomen?) use large cameras at sporting events instead of small lightweight digital camcorders?

   A very heavy tripod is used to make the camera / tripod system more massive i.e. increase the inertia. With more mass the system is less likely to vibrate or be affected by things like a slight wind outside. Less vibration will lead to a clearer picture.

5. When will objects change their state of motion?

   Then there is a net force present, in other words when the forces are not balanced.

6. If the force of friction acting against a small sliding body is 10 N, how much force must be applied to keep the object moving at a constant speed? What would be the net force in this case?

   You must apply exactly 10 N so that the Net force is zero.

7. Discuss, in terms of Newton's First Law of Linear Motion, how a quick jerk to a dusty coat or rug succeeds in removing the dust.

   By moving the rug forward, you are also moving the dust particles on the rug forward as well. When you jerk the rug backwards, the dust keeps moving forward and leaves the rug.