Disclaimer: This mock exam is only for practice. It was made by tutors in the Polytechnic Tutoring Center and is not representative of the actual exam given by the Academic Department.

1. A cheetah, starting from rest, accelerates uniformly at 8 m/s² for 3 s and then continues running at constant speed for an additional 2.8 s. How much ground does the cheetah cover during the entire 5.8 s?

2. A car speeding along a straight road increases its speed from 30 m/s to 50 m/s over a distance of 200 m. If the acceleration is constant, how much time elapses while the car moves this distance?

3. A car travels 43 km to the east, then 65 km to the north. If the total time of the trip is 2.4 hours find the magnitude of the average velocity.

4. A stone is thrown at an angle of 35° above the horizontal axis with an initial speed of 6.3 m/s. What will be the speed of the stone 0.12 seconds after it was thrown?

5. Block A has a mass of 8 kg, and Block B has a mass of 2 kg. They are in contact with each other and supported by a frictionless horizontal surface. If a force of 20 N is exerted on A to the direction of B, what is the contact force between the two blocks?

6. An equilateral triangle frame that has negligible mass has a mass tied onto each of its vertices. Each side length of the triangle frame is 1 m and the three masses are 2 kg, 5 kg, and 7 kg. How far is the center of mass from the center of the triangle?

7. A 2 kg mass and a 2.5 kg mass are suspended by a massless string on either side of a frictionless pulley. If the masses are released from rest, how far does the heavier mass fall in 2 s?

8. What is the normal force exerted on a 65-kg person by an elevator that is accelerating upward at 2.6 m/s²?

9. What is the highest speed at which a car can drive over the top of a hill that has a curvature 0.016 m⁻¹ without leaving the ground? Note that the curvature of a surface is defined as 1/r.

10. A string attached to an engine pulls a 10 kg box 220 m along a horizontal road. The string makes 36° with the road, and the tension in the string is 320 N. Find the work done by the engine.