

General Physics I–Honors: PHYS 101H (Fall 2023)
Quiz 6

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Instructions

In this quiz you will apply your understanding of rocket motion, centre of mass, moment of inertia and angular motion. Read the following instructions carefully.

DO NOT TURN OVER THIS SHEET UNTIL INSTRUCTED.

Please write your name on the quiz.

You have ten minutes to attempt all three questions in this quiz.

You may use electronic calculators.

You may **not** use:

- any formula sheets or notes;
- electronic devices, including phones, tablets and laptops (unless previously arranged);
- textbooks or other reference resources;
- course notes or slides.

Question 1**3pts**

Find the final speed for a rocket that accelerates from rest by expelling 10% of its initial mass as gas at a speed of $v_0 = 50$ m/s.

Question 2**4pts**

Find the centre of mass and moment of inertia (about an axis through the centre of mass) of a system of three particles, each with equal mass m , at positions $(1, 2)$, $(-1, 0)$, and $(0, -2)$ in the (x, y) plane.

Question 3**3pts**

Explain the relationships between torque, angular momentum and rotational motion, using full sentences. You should use equations where necessary.