Oxford Physics CP1 (June 2025) Marking Report

Based on the examination paper and the student's submitted script. Marks are awarded in the style typically used in Oxford first-year collections: substantial method credit is given where physical understanding is demonstrated, even when algebra is incomplete.

Q1: 7/7

Correct derivation of solid sphere moment of inertia and correct use of parallel-axis theorem.

Q2: 4/4

Correct differential equation, integration and final expression.

Q3: 6/6

All parts correct; numerical speed consistent.

Q4: 4/4

Correct proof using momentum and kinetic-energy conservation.

Q5: 4/4

Correct loop-the-loop condition $H > 5R/2$.

Q6: 5/6

Correct physical idea. Numerical presentation slightly untidy; assumptions only partially stated.

Q7: 9/9

Correct Lagrangian, conjugate momentum and equation of motion.

Q8: 19/20

Special relativity and Compton scattering essentially correct. Minor algebraic shortcuts in derivation.

Q9: 15/20

Part (a) good. Part (b) loses some rigor in constant-theta derivation. Part (d) small-oscillation analysis not fully justified.

Q10: 11/18

(a)(i) angular momentum conservation shown but not fully justified. Effective potential correct. Part (b) not attempted. Part (c) contains correct strategy but depends on missing result from (b); only partial credit awarded.

Total: 84/98

Overall assessment: Strong script. Sections A1–A7 are almost entirely correct. Relativity and Lagrangian mechanics are handled confidently. The main loss of marks comes from Question 10: part (b) is missing, and the final perturbation argument depends on results that were not rigorously established. On an Oxford collections-style marking scheme this script would likely fall in the high First-class range.