



Physics Club - summer of Physics part 1

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1 Introduction and welcome

Hello members and welcome to the Summer of Physics 2025! This programme will release physics problems (mostly taken from Olympiads) that should not take more than half an hour to complete. This is totally optional, but it should provide some challenging and interesting problems for you to tackle alongside enjoying your summer breaks!

2 Question (20 marks)

Two identical balls, A and B, each of mass m , undergo a collision. Initially, B is stationary and A has velocity u_0 . After the collision, A has velocity v_A and B has velocity v_B .

(a) For an elastic collision along a straight line, determine the motion of the masses after impact.

(b) In an inelastic, two dimensional, collision, A has an initial kinetic energy of 8.00 J and 2.00 J is converted into heat on collision. After impact the directions of A and B make equal angles, θ , with the direction of u_0 . Determine:

- The energy conservation equation
- The momentum conservation equation(s)
- θ
- The change in momentum of A