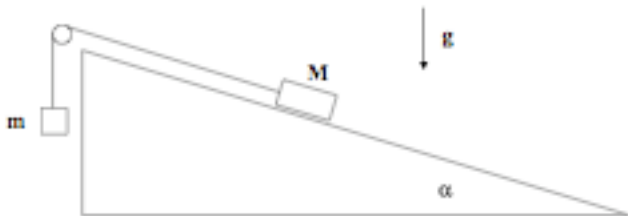


Problem 3. An object of mass M slides without friction on a plane inclined at an angle α , as shown in the figure. The object of mass M is connected to an object of mass m by a string, passing over a pulley as shown. String and pulley are assumed to be massless.



Solve for the motion of the mass M by the Lagrangian method. Your solution should clearly exhibit the following steps:

- (i) Choose generalized coordinate or coordinates.
- (ii) Write down expressions for the kinetic energy T and the potential energy U .
- (iii) Write down the Lagrangian.
- (iv) Write down the Lagrange equations of motion.
- (v) Solve the Lagrange equations of motion.
- (vi) Discuss relevant limiting cases for the parameters of the problem.