MNS Department
Semester: Summer-2025; Course ID: PHY 111
Course Title: Principles of Physics I; Total Marks: 15

Assignment-2

- Assignment submission last date: 4 September, 2025.

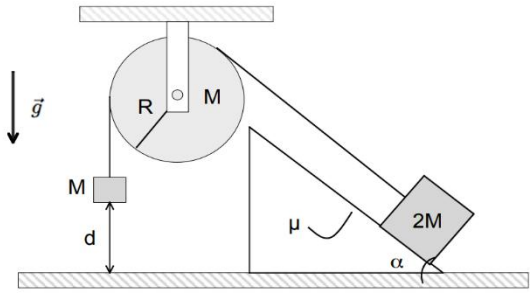

Fig. 1

1. An Atwood machine shown in fig. 1 consists of a fixed pulley wheel of radius $R = 50\ cm$ and uniform mass $M = 1.0\ kg$ (a disk), around which an effectively massless string passes connecting two blocks of mass M and $2M$. The lighter block is initially positioned a distance d above the ground. The heavier block sits on an inclined plane with opening angle $\alpha = 15°$. There is a coefficient of friction $\mu = 0.15$ between the surfaces of this block and the inclined plane. Constant gravitational force acts downwards, assume that the string never slips, and lighter block moves down.

   a) (3 marks) Draw complete force freebody diagram for the each object.

   b) (9 marks) Determine the angular acceleration of the disk. (show detail calculation)

   c) (3 marks) Find the tensions in the string and amount of net torque acting on the disk.