Mechanical & Materials Engineering
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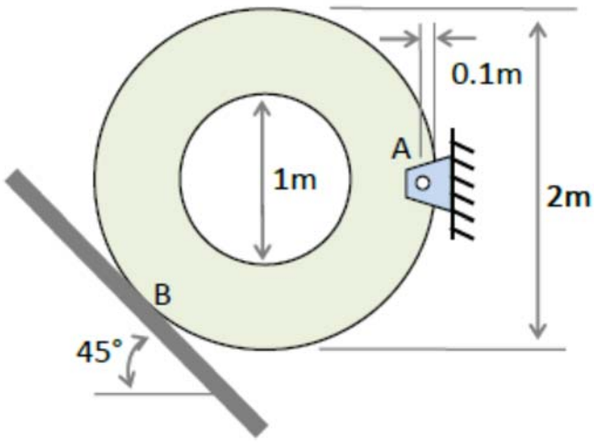
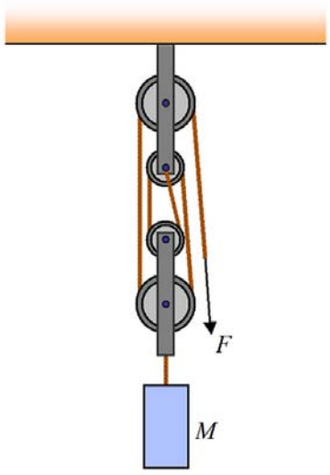
ME 122 Homework 6. Due 6/7 May 2019

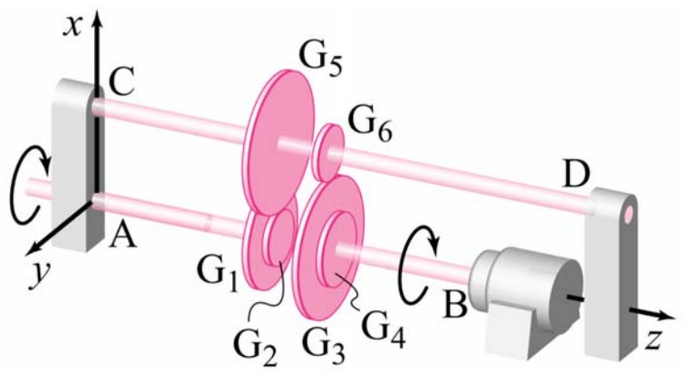
1. The ring below has an inside diameter of 1 m, an outside diameter of 2 m, and a thickness of 0.05 m. If the ring is made of pure aluminum and contacts a frictionless inclined plane at point B, then determine the reaction at point B. You must account for the weight of the ring to solve this problem. Use the engineering format and start with a FBD.



2. A block of mass m is lifted at constant velocity, via an arrangement of pulleys as shown below. Determine the pulling force F. Ignore the mass of the pulleys. Use the engineering format and start with a FBD.



3. For the gear train shown in the figure, find
    a. the overall gear ratio
    b. the torque amplification M_{out}/M_{in}.



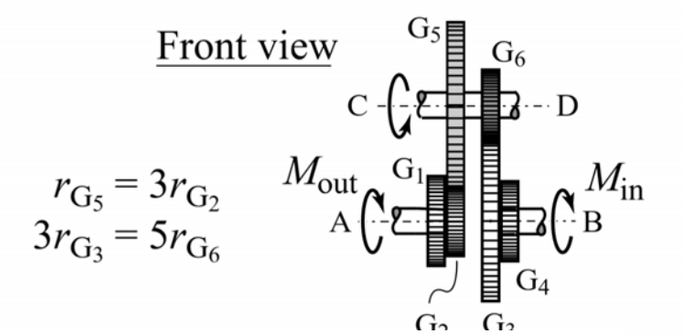


Image courtesy of Ruina and Pratap (2010)

$rG_5 = 3rG_2$ refers to the ratio of the radii of gear **5** to gear **2**