# Homework-3

Engineering Mechanics (ME1020)

Instructions:

1. Copying is strictly not allowed and will lead to negative marks

2. Late submission will lead to zero marks

3. Prepare answer scripts using "word or latex", handwritten scripts are not allowed

4. The filename should be in the following format "Roll No_HW3".

5. The file should be in PDF format.

Q1.) Consider the situation given below in which a metal block is placed on an inclined rough surface with $\mu_s = 0.8$ and $\mu_k = 0.6$. To move the block up the inclined surface, force P_1 and P_2 are applied externally as shown. Also, $P_1=2P_2$.
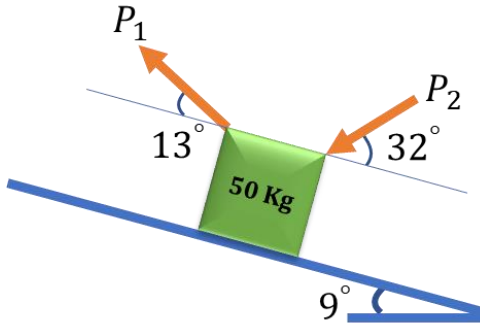
a) Draw the free body diagram and resolve the forces and weight.

(1 Mark)

b) Write the equations of force equilibrium. (0.5 Mark)

c) Find the value of P_1 and P_2 required just to move the block from its rest position.

(2 Marks)

d) Find the value of maximum force of friction, f.

(0.5 Mark)

e) Draw graph between f versus P (*sum of all the components including weight of the body opposing the frictional force*) and show the points on ordinate and absicca corresponding to μ_s and μ_k.

(1 Mark)

Q2.) **A ladder of weight 20 N as shown in figure is placed along a smooth vertical wall. In this position, the ladder is just to slip.**

10 m

20 N

6 m

8 m
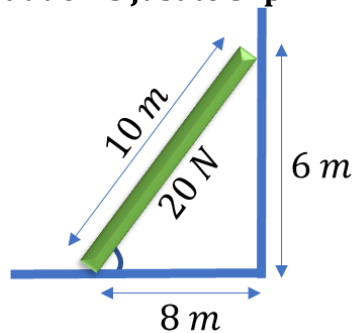
a)   Draw the free body diagram and also mention the reaction forces.

(1 Mark)

b)   Write the equations of force equilibrium.

(2 Marks)

c)   Find the values of reaction forces and friction force.

(1 Mark)

d)   Find the value of maximum frictional force.

(1 Mark)