Homework-1

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_HW1"**
5. **The file should be in PDF format**

Q.1) Consider the real-life problem of the platform shown in figure 1a. The model of the problem is given in figure 1b. The platform is fixed at point A and attached to a string with tension T at point C. The weight of the platform is represented by the point load acting at its center of gravity, G.

Fig: 1a

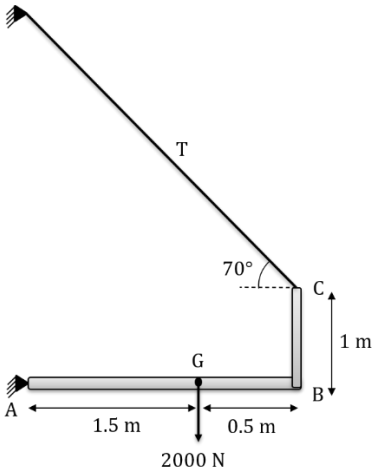

Fig: 1b

a) Draw the free body diagram of the platform. **(1 marks)**

b) Resolve the tension T in two mutually perpendicular forces. **(0.5 marks)**

c) Write the equations of force equilibrium, $\sum F_x = 0$, $\sum F_y = 0$. **(1 marks)**

d) Take the moment about point A **(1 marks)**

e) Find the value of T by using force equilibrium equation $\sum M_A = 0$ **(0.5 marks)**

f) Calculate the reaction forces at point A. **(1 marks)**

Q.2) Consider the mass string system shown in figure 2.

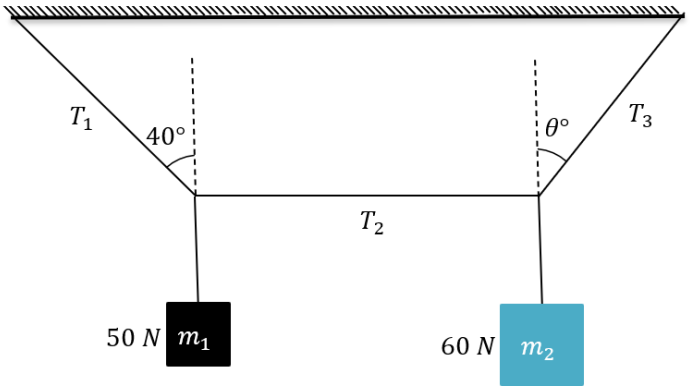

Fig: 2

a) Draw the free body diagram of the system. **(1 marks)**

b) Resolve the tension T_1 in two mutually perpendicular forces. **(0.5 marks)**

c) Write the equations of force equilibrium for the mass m_1 system. **(0.5 marks)**

d) Calculate the value of T_1 and T_2 using the equation from part (c). **(1 marks)**

e) Resolve the tension T_3 in two mutually perpendicular forces. **(0.5 marks)**

f) Write the equations of force equilibrium for the mass m_2 system. **(0.5 marks)**

g) Calculate the value of T_1 and T_2 using the equation from part (f). **(1 marks)**

Hint: 1. For analysis, do not consider the fixed support attached to the string.

2. For Q.2, Split the problem in two parts for mass m_1 and m_2. Both parts will have same tension T_2