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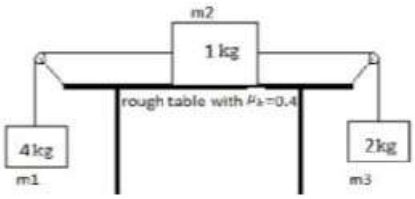
Quiz 10%

Part I: explain the following briefly and accordingly

1) State Newton's first law of motion
2) If a car is travelling eastward with constant speed of $30m/s$, what is the resultant force acting on it?
3) A ball is thrown with an initial velocity of $(10\hat{i} + 15\hat{j})m/s$. When it reaches the top of its trajectory, what are (a) its velocity and (b) its acceleration? Neglect air resistance.

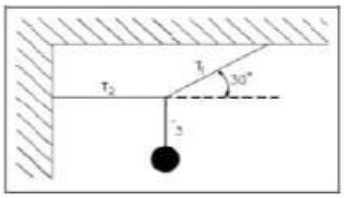
Part II: show the necessary steps for the following problems

1) Three blocks with masses 4kg, 1kg, and 2kg are connected as shown below. The coefficient of kinetic friction between the 1kg block and the table is 0.4. Find the acceleration of the system and tension in each cord.

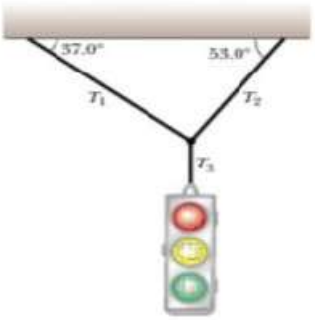


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2) The object in Figure below has a weight of 98N. The object is suspended by cables as shown. Calculate the tensions (T_1) in the cable at 30° with the horizontal, T_2 and T_3.



3) A traffic light weighing 122 N hangs from a cable tied to two other cables fastened to a support, as in Figure below. The upper cables make angles of 37.0° and 53.0° with the horizontal. These upper cables are not as strong as the vertical cable, and will break if the tension in them exceeds 100 N. Will the traffic light remain hanging in this situation, or will one of the cables break?



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