> Answers without **supporting work** or **necessary unit** will not be given full credit. If the meaning of the question isn't clear, please ask TA! You have **35mins** to complete this mini-test.

Q.1 Fig. (1) shows three blocks attached by cords that loop over frictionless pulleys and Block B lies on a frictionless table, the masses are $m_A = 3$ [kg], $m_B = 1$ [kg], $m_C = 4$ [kg]. If we release the blocks.

(a) What is the acceleration of block B? (8 points)

(b) What is the tension in the cord at the left? (2 points)

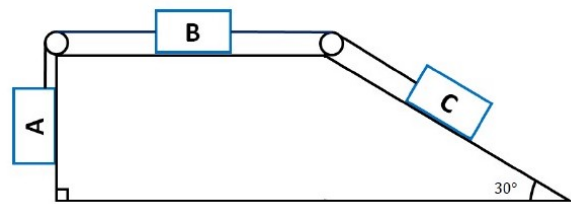Assume that $g = 10$ [m sec^{-2}], and each answer should have direction.

Figure 1

Q.2 An initially stationary block of mass M on a plane inclined at angle θ to the horizontal floor. The coefficient of static and kinetic friction of the plane are μ_s and μ_k, respectively. Assume that above system is on Earth and in the air, so we need to consider the magnitude of gravitational acceleration $|\vec{g}| = g$ and drag force $|\vec{D}| = D = \alpha \cdot v^2$, where α just a coefficient and v is the speed of the block.

(a) List the two conditions under which the block can slide. (5 points)

(b) What is the terminal speed of the block? (5 points)

Note: Please express the answer by M, θ, μ_s, μ_k, g, D, α or v!