

Name \_\_\_\_\_

1. Two climbers, Jong and Tarun, are climbing a glacier and are connected by a rope. Tarun ( $m = 70kg$ ) slips and falls over a crevasse. Jong ( $m = 75kg$ ) has a climbing ax but doesn't react immediately and they both accelerate. Assume the ice is frictionless and the glacier is flat (i.e. it makes an angle of  $90^\circ$  with respect to the crevasse).

(a) Draw free-body diagrams for Jong and Tarun.

(b) Find their accelerations and the tension in the rope.

- (c) If Jong's reaction time is 1s and the edge of the glacier is  $3m$  away, will Jong save them?

**A:** Yes, **B:** No

2. Two blocks are connected to a rope, which is wound around a pulley. (Atwood's machine)
- (a) If the two masses are equal and are placed at the same height (i.e. equal rope on either side), what will be the acceleration of the masses?  
Now suppose the two masses are placed at different heights. How will they accelerate? **A:**The higher mass will accelerate up until it hits the pulley while the lower mass will accelerate down. **B:** The higher mass will accelerate down and the lower mass up until they are at the same height. **C:** The higher mass will accelerate down and the lower mass up until it hits the pulley **D:** They won't move.
- (b) If the white block is twice the mass of the grey block, (the grey block is 1kg and the white block is 2kg) what will be the acceleration of the white block?

