Cornell
TAM/ENGRD 2030
Prelim 1
March 1, 2011

No calculators, books or notes allowed.
3 Problems, 90 minutes (+ up to 90 minutes overtime)

How to get the highest score?

*Please, please, please* do these things:

- Draw **Free body diagrams** whenever force, moment, linear momentum, or angular momentum balance are used.
- Use correct **vector notation**.
- Be (I) neat, (II) clear and (III) well organized.
- TIDILY REDUCE and box in your answers (Don’t leave simplifiable algebraic expressions).
- Make appropriate Matlab code clear and correct.
  You can use shortcut notation like “$T_7 = 18$” instead of, say, “$T(7) = 18$”. Small syntax errors will have small penalties.
- Clearly define any needed dimensions ($\ell, h, d, \ldots$), coordinates ($x, y, r, \theta \ldots$), variables ($v, m, t, \ldots$), base vectors ($i, j, \hat{e}_r, \hat{e}_\theta, \hat{\lambda}, \hat{n} \ldots$) and signs ($\pm$) with sketches, equations or words.
- Justify your results so a grader can distinguish an informed answer from a guess.
- If a problem seems poorly defined, clearly state any reasonable assumptions (that do not oversimplify the problem).
- Work for **partial credit** (from 60–100%, depending on the problem)
  - Put your answer is in terms of well defined variables even if you have not substituted in the numerical values.
  - Reduce the problem to a clearly defined set of equations to solve.
  - Provide Matlab code which would generate the desired answer (and explain the nature of the output).

**Extra sheets.** Put your name on each extra sheet, fold it in, and refer to it at the relevant problem.
Note the last page is **blank** for your use. Ask for more extra paper if you need it.

Problem 1: ____ /25

Problem 2: ____ /25

Problem 3: ____ /25