

RAA03 – Checklist of things to know/review

**RAA03 Contains all information from lectures up to and including lecture 22: Statics. Below is a short list of important concepts to understand. The goal of this list is to help you organize your thoughts as you study. This sheet does not contain everything that we covered, just the highlights to help point you in the right direction.*

- All of RAA01 and RAA02 Checklist items
- Physical representations :
 - FBDs:
 - Be sure to define your system, and include: only external forces acting on your system, labels for each force, relative scale of each force if asked, coordinate system, relevant angles.
 - e-FBDs:
 - Be sure to define your system, and include: physical object in your system with its correct orientation as presented to you, only external forces acting on your system with their tails at the location of the force on the object, labels for each force, relative scale if asked, coordinate system, labeled reference axis “o”, moment arms, relevant angles.
 - Rotational kinematics:
 - Be sure to include: basic sketch of situation, at least 2 locations of interest, labeled angular velocity directions at the locations you chose, angular acceleration direction between each set of locations, labeled angular displacement, coordinate system, any relevant information about arc lengths.
- Friction:
 - Kinetic friction:
 - Magnitude of kinetic friction? _____
 - Which direction does it act on an object?
 - Coefficient of kinetic friction.
 - Static friction:
 - Magnitude of static friction? _____
 - Maximum static friction?
 - Which direction does it act on an object?
 - Coefficient of static friction.
 - Rolling friction:
 - Magnitude of rolling friction? _____
 - Which direction does it act on an object?
 - Coefficient of rolling friction.
- Mechanical advantage (MA):
 - Determine MA of simple pulley configurations.
- Coupled systems:
 - Identify geometrical constraints and their consequences (e.g. how do accelerations of two coupled systems compare).
- Uniform circular motion (UCM):

- Circular motion quantities:
 - Angular position, angular displacement.
 - Angular velocity.
 - Angular acceleration.
 - Period (T).
 - Frequency (f).
 - Tangential speed.
- See physical representation/FBD bullet point above.
- Radial acceleration = _____
- Apparent weight, and weightless.
- Banked and unbanked curves.
- Lift (see ph201 fall RAA03 exam).
- Universal law of gravity:
 - Proportional reasoning.
 - How do we get the acceleration of gravity “g” from the universal law?
- Rotational kinematics:
 - Quantities that often show up in rotational kinematics problems:
 - Radians to degrees and degrees to radians.
 - Angular velocity (ω).
 - Angular acceleration (α).
 - See physical representation bullet point above.
 - Must write down and start with the most general equation and show which quantities go where. (i.e. start with one or more of the 3 kinematic equations in variable form, then plug in your knowns and simplify/solve).
 - Graphical analysis:
 - Go between angular position vs time to angular velocity vs time and angular acceleration vs time.
- Newton’s three laws of motion in rotational form.
- Torque:
 - Find magnitude of torque due to a force on an object.
 - Find net torque acting on an object:
 - Qualitatively describe what this net torque does to the object.
 - Coordinate system?
- Statics:
 - Equilibrium definition.
 - Qualitative center of mass arguments.