ARCH 331. Study Guide for Quiz 6

This guide is not providing “answers” for the conceptual questions. It is a list of topical concepts and their application you should be familiar with. It is an aid to help prepare for the quiz.

Covers material of Lectures 22, 23, 24 & 25

- Constituents to make concrete
- Construction: cast-in-place, prestress, post-tension, ... & finishing/casting terms
- Behavior in compression vs. tension of concrete
- Design methodology
- Load and Resistance Factor Design
- Working loads
- Factored loads
- Resistance Factors
- “Design” values vs. “Capacity”
- Density of materials and relation to weight
- Load types (and directions) (*like D, L, S...*)
- Load combinations
- Minimum Design Loads & Requirements
- Serviceability and limits
- Creep
- “composite”
- Transformed section
- Depth of the Whitney stress
- Moment capacity (or ultimate strength) vs. nominal moment (or strength)
- Factored design moment (or shear or ....)
- Design stress in reinforcement
- Design stress in concrete (28-day)
- Effective depth vs. depth of a beam
- Reinforcement grades
- Reinforcement ratio
- Under-reinforced vs. over-reinforced
- Purpose of minimum reinforcement area requirement
- Why development length is necessary
- Use of Strength Design Curves ($R_n$)
- Depth with respect to span length and shape
- Purpose of stirrup requirement when concrete capacity is available
- Shrinkage
- Cracks

- Concrete cover and purpose
- Clear span / span length
- #3 bar (meaning of the numeral)
- Why bars need space between/around them
- Purpose of compression reinforcement
- T-section behavior and stresses in flange
- Precast load tables
- One-way slabs design and “unit” strip
- One-way shear vs. two-way shear (load & strength)
- Stirrup strength
- Location of maximum shear in beams
- Why torsional shear stirrups are “closed”
- Torsional (shear) stress (and where maximum occurs)
- Shear stress in round, rectangular, open and closed thin-walled sections
- Development/embedment length
- I transformed, I-cracked, E as a function of weight and cracking
- Minimum thicknesses for deflection control
- Plate vs. Flat Slab
- Openings redistribute stress (or cause concentrations) and increase deflections
- Openings should be reinforced for stresses and deflection control
- Continuous beam or slab analysis with coefficients
- Composite construction
- Space frame behavior
- Space frame supports and loads
- Folded plate behavior
- Folded plate buckling and stiffness requirements
- Design vs. analysis
- $kl/r$ limit for concrete
- Effective column length for sway or non-sway frames
- Columns with ties vs. spirals (stresses, factors, etc.)
- Beam-columns and interaction diagram