

ARCH 331. Study Guide for Quiz 2

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 5, 6, 7 & 8

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| <input type="checkbox"/> Scale (square-cube) effect | <input type="checkbox"/> Factor of Safety |
| <input type="checkbox"/> Normal stress (compression & tension) | <input type="checkbox"/> Equilibrium |
| <input type="checkbox"/> Shear stress (non beams) | <input type="checkbox"/> Newton’s Third Law |
| <input type="checkbox"/> Bearing stress | <input type="checkbox"/> Method of Sections |
| <input type="checkbox"/> Bending & shear stress (beams) | <input type="checkbox"/> Coplanar parallel force systems |
| <input type="checkbox"/> Torsional (shear) stress | <input type="checkbox"/> Free Body Diagram |
| <input type="checkbox"/> Relation of strain to stress & Modulus of Elasticity | <input type="checkbox"/> Reactions at a support and relationship to motion prevented |
| <input type="checkbox"/> Stiffness (relative to AE/L through δ) | <input type="checkbox"/> Short link or cable, roller, rocker, pin or hinge, smooth surface, rough surface, fixed |
| <input type="checkbox"/> Brittle, Ductile & Semi-brittle material behavior | <input type="checkbox"/> Negative result for a variable from equilibrium equations from free body diagram |
| <input type="checkbox"/> Yield strength (or point & proportional limit) | <input type="checkbox"/> “Best” location for summation of moment |
| <input type="checkbox"/> Ultimate strength | <input type="checkbox"/> Statically Determinate vs. Indeterminate |
| <input type="checkbox"/> Strength vs. stress | <input type="checkbox"/> Direction and type of force in a cable with relation to geometry |
| <input type="checkbox"/> Rupture / Fatigue behavior | <input type="checkbox"/> Two-force bodies and relationship to loads |
| <input type="checkbox"/> Orthotropic vs. Isotropic vs. Anisotropic materials | <input type="checkbox"/> Three-force bodies |
| <input type="checkbox"/> Creep | <input type="checkbox"/> Concentrated loads |
| <input type="checkbox"/> Stress concentration | <input type="checkbox"/> Distributed loads – uniform / non-uniform & hydrostatic |
| <input type="checkbox"/> Thermal vs. elastic strains | <input type="checkbox"/> Beam support configurations |
| <input type="checkbox"/> Geometric constraints | <input type="checkbox"/> Simply supported |
| <input type="checkbox"/> Dynamics vs. Statics | <input type="checkbox"/> Overhang |
| <input type="checkbox"/> Serviceability | <input type="checkbox"/> Cantilever |
| <input type="checkbox"/> Deformation with stress (deflection & elongation) | <input type="checkbox"/> Continuous |
| <input type="checkbox"/> <i>Superposition Method</i> | <input type="checkbox"/> w vs. W |
| <input type="checkbox"/> Allowable Stress Design | <input type="checkbox"/> Equivalent center of load area |
| <input type="checkbox"/> Load and Resistance Factor Design | <input type="checkbox"/> Types of beam stresses |
| <input type="checkbox"/> Factored loads | |
| <input type="checkbox"/> Resistance Factors | |
| <input type="checkbox"/> “Design” values vs. “Capacity” | |

- Prestressing or post tensioning
- Influence of moment, material, and cross section on deflected shape
- Internal shear, axial force & bending moment
- Inflection point
- The Equilibrium Method
- The Semigraphical Method
- Areas under a curve and *change*
- Effect of forces on shear diagram
- Effect of moments on moment diagram
- Location of zero shear (x) and relation to maximum moment
- How to find location of zero shear
- Slope relationships with integration
- Positive vs. negative bending moment “shape”
- How to use Beam Diagrams and Formula for shear and bending moment