Quiz Review 1

Topics that you should know about:

A. Structural Mechanics

1. Determination of bending and shear forces of a given determinate beam
2. Sketching of bending moment diagram (BMD) and shear force diagram (SFD)
3. Section transformation
4. Use of flexure equation
5. Definition and location of neutral axis of a transformed section

B. Design of Beams for Flexure

1. Basic section design with given loads
2. Rebar provision and arrangement + Sketch
3. Flexure capacity check with a given section
4. Determination of cracking moment using transformed section method
5. Behavior of neutral axis upon concrete cracking
6. Flexure crack pattern and termination point
7. Crack widths
8. Ways to minimize crack widths without altering a section size

C. Design of Beams for Shear

1. Shear capacity of concrete and stirrups
2. Stirrup design and spacing arrangements + Sketch
3. Shear capacity check with a given section
4. Location of critical section
5. Rough versus precise estimations of concrete shear strength
6. Shear crack patterns
7. Failure mode of shear versus that of flexure

D. General Design Issues

1. Design principles and objectives
2. Integrated design procedures (flexure + shear + serviceability checks)
3. Loading case considerations (worst scenario)
4. Design assumptions
5. Redesign solutions
6. Construction issues (monolithic versus pre-cast; T-beams versus rectangular beams; minimum and maximum spacing of rebars)
7. Development length
8. Effects of environmental loads (snow, wind, earthquake)