



Principles of Structural Engineering
First Year

June, 2011
Final Exam-First Attempt

Time: Three Hours
Closed Book & Notes

Note: Answer Only (5) five Questions Including Q4.

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Q1:

- Define cement, what are its chemical compounds? And how many types of cement are there?
- A concrete has a Young Modulus of Elasticity ($E_c = 28 \text{ GPa}$), find the compressive strength and tensile strength of this concrete in N/mm^2 .

20Marks

Q2:

- Define "Segregation" and how it occurs in concrete? How it could be controlled? And what are its forms.
- Define vibration of concrete, what are the types of vibrators?
- Discuss the quality of mixing water used in concrete mix.

20Marks

Q3:

What are the types and properties of external loads that may be applied at structures? Explain in details with drawings.

20Marks

Q4:

A moment of 500 kN.m and axial compressive force of 400 kN were applied simultaneously at a beam section having 200 mm width and 500 mm height, find the final tensile and compressive stresses induced in this section.

20Marks

Q5:

- Discuss the using of steel reinforcement in concrete structures and its benefits.
- Draw the typical required reinforcement for concrete beam section that can resist tensile flexural stress and shear stress.
- Write the (ASTM-A615) specification for steel reinforcement and draw stress-strain curves for each type.

20Marks

Q6:

- What are the types of foundations? When do you decide to use each type? Explain in details with drawings.
- Define the terms Creep and Fatigue in structures and compare between them.

20Marks

Good Luck