ARBA MINCH UNIVERSITY
INSTITUTE OF TECHNOLOGY
CIVIL and URBAN ENGINEERING DEPARTMENT

Holistic Exam fo St. Design III and IV **Date:** 02 Oct, 2013

Final Examination: 2012/2013 G.C **Time allowed:** hours

Section: G_4C **Maximum marks:** 50 pts

Examiners: Silenat and Weredewold **Semester:** III

Instructions:-

1. **Attempt all questions**
2. **The Examination is closed book**

Part-I Choose the best answer

1. Which of the following is not one of the factors affecting compressive strength of concrete?
   A. Water-Cement ratio
   B. Age of concrete
   C. Supplementary cementitious materials
   D. Temprature
   E. None of the above

2. Which one of the following describes the maximum stain in concrete when a section complete plastic deformation in axial compresson?
   A. 0.001
   B. 0.0035
   C. 0.002
   D. None of the above

3. One of the following is not used to characterize the ULS of shear:
   A. Diagonal compression failure of concrete
   B. Failure of the web reinforcement due to diagonal tension
   C. Sudden Crushing of concrete
   D. splitting of the concrete cover along the bar
   E. None of the above

4. When do we provide Reinforced concrete sections with only web reinforcement? If Vc = Shear strength of concrete, Vmax = The max shear force in the section and Vcr= The critical shear force at “d” distance from the support
   A. When Vc > Vmax
   B. When Vmax > Vc
   C. When Vmax = Vc
   D. When Vcr > Vc

5. Which one of the following is not true about short columns
   A. They have low slenderness ratio
   B. Their strengths are governed by the strength of the materials and the geometry of the cross section
   C. They may fail by either crushing of concrete or yielding of steel,
   D. Their strength may be significantly reduced by lateral deflection.

6. What is the minimum number of longitudinal reinforcing bars for circular columns?
   A. 3
   B. 4
   C. 6
   D. 5
   E. None of the above

7. Which one of the following describes the minimum slab thickness for slabs exposed to heavy dynamic moving loads or slabs accessible to heavy vehicles?
   A. 60mm
   B. 100mm
   C. 120mm
   D. 150mm
   E. None of the above

8. What is the use of bending up bottom steel bars in continuous beams?
   A. It's to resist the tensional stress
   B. It's to provide tensile reinforcement at the top of the beam over the support
   C. It's to increase the load carrying capacity
   D. None of the above

Part-II True/False

1. Anchorage length is defined as that length of embedment necessary to develop the full tensile strength of a reinforcement bar in Reinforced concrete section.
2. For non-sway frame design the additional internal forces or moments arising from horizontal displacements of its nodes can be neglected in design.
3. Sway frame structures should be used to maximize the axial load capacity of columns.
4. The diameter of longitudinal bars shall not be less than 12 mm in the design of columns.

5. When Reinforced concrete column is axially loaded, both concrete and steel are assumed to have equal strains.

Part-III Matcing

A.	B.
1. Ductile type failure of RC sections	a. $\rho < \rho_b$
2. Britle type failure of RC section	b. $\rho > \rho_b$
3. Mechanical reinforcement ratio	c. μ
4. Relative ultimate moment ratio	d. ω

GOOD LUCK

Examiner: Silenat D.