AALTO-YLIOPISTO
School of Engineering
Department of Civil and Structural Engineering

EXAMINATION 12.01.2013

Rak-43.3301 Repair Methods of Structures I (4 cr)

Please write in every paper: -the name and the number of the course
-the date of the examination
-your name and the student number
-the name of the department and the class of studies

Note: No literature allowed in the examination!
Answer shortly and concisely!

1. a) **How would you repair in principle concrete sandwich façade panels of block of flats in the case where zone of carbonation has reached reinforcement bars in the outer layer of precast sandwich panels, and concrete is slightly frost weathered in the inner surface of the outer layer of precast sandwich panels?**
(3 p.)

   b) **How would you repair in principle a façade plastering painted with organic or inorganic coating if a part of the plastering has totally fallen off? The extent of the damaged area covers 25 % of the façade both with organic and inorganic coating.**
(3 p.)

2. a) **Your task is to make a condition survey to a concrete panel façade and to a reinforced concrete parking garage. What are the available non- and moderately destructive research methods for reinforced concrete to examine the condition, what kind of samples can be taken and how those samples can be researched?**
(2 p.)

   b) **What parts should be consisted to the good condition survey report of rendered structures and what is the main content in that?**
(2 p.)

   c) **How can you estimate the remaining service life of the structure?**
(2 p.)

3. a) **Describe stages and research methods in a condition survey of a building damaged by moisture and mould growth.**
(2 p.)

   b) **Describe corrosion reactions of reinforcement steels for concrete.**
(2 p.)

   c) **Define the following concepts: electrolyte, galvanic couple, and Pourbaix diagram.**
(2 p.)

4. **Prepare a table based on systematic durability planning (practical work of the course) in the following cases:**

   a) **Micro organisms in wooden base floor.**
(2 p.)

   b) **Alkali-aggregate reaction of reinforced concrete bridge column in sea water.**
(2 p.)

   c) **Chemical attack of reinforced concrete pile in a marine harbour environment.**
(2 p.)