Telemark University College

Faculty of arts and science

Exam

4504 Geological and groundwater resources

April 30 2012

Duration: 9.00 AM – 2.00 PM (5 hours)

Language: English

Pages: 2

Helping tools: Calculator (handed out by the exam personnel)

Remarks: All problems have equal weight

Attachments: None

The results are to be found on internet via Studweb

Problem 1

   a. Describe three landforms in Norway and their bedrock geology.

      Point:
      - Landforms and landscape
      - Location
      - Types of rock
      - Geological age
      - Forming processes

Problem 2

   a. From what you have learned about ice front deposits this year, in theory and from field experience, describe different types of ice front deposits that are to be found in Telemark county.

      Points:
      - Reasons for their location
      - Surface visible and subsurface deposits
      - Forming processes
      - Grain size properties
      - Aquifers
      - Economic value

Problem 3

   a. Describe the characteristics of the two types of aquifers; confined and phreatic.
   b. How will a confined aquifer act under a pumping test (lowering test)?
   c. Explain why the value of the storage coefficient S of a confined aquifer is so low compared to the S value of a phreatic aquifer.

Problem 4

   a. An infiltration test is done to find the infiltration ability of the soil and the saturated hydraulic conductivity K (m/s). How will you perform such a test?

   b. Apply Darcy's law to calculate a value for saturated hydraulic conductivity K (m/s) from the infiltration test data.
      Data:

      The infiltration pit is square and each side is 0.2 m
      Static water level above the pit bottom is 0.2 m
      Infiltrated volume is 0.0002 $m^3 = 2*10^{-4} \, m^3$
      Infiltration time is 100 seconds