Høgskolen i Telemark

EKSAM
4504 Georesources and ground water

May 5 2011

Time:	09.00 AM – 02.00 PM (5 hours)
Language:	English
Number of pages:	4
Helping tools:	Calculator (handed out)
Remarks:	All four problems have equal weight
Attachments:	1

The results are to be found on Internet via Studentweb

Problem 1

Bedrock maps

a. Define strike and dip for geological features?
b. Show the presentation of strike and dip symbols on a geological map.
   Make vertical cross sections for different folding layering.
c. Calculate and draw a coal seam on the map in Attachment 1. Points A, B and C are exposures of the coal seam. A seam is a layer so thin that it will be a line on the map.

Problem 2

Ice front deposits and their properties

a. What are the two most common ice front deposits?
b. How are the internal structure and grain size properties of these deposits? Draw cross sections and mention the grain size properties.
c. What are the most common technical uses of these deposits? Argue for your answers.

Problem 3

Field School Themes

When you are searching for a ground water source for drinking water supply you will start with a surface mapping. Later you will do well drilling and a pumping test.

a. What are the purposes of the mapping operation?
b. What will you look for and note when you are doing this mapping?
c. Tell about the purposes of a pumping test and how you will perform of a pumping test.

Problem 4

Aquifer management.

A GPR profile and drillings reveal that the layering of an aquifer is

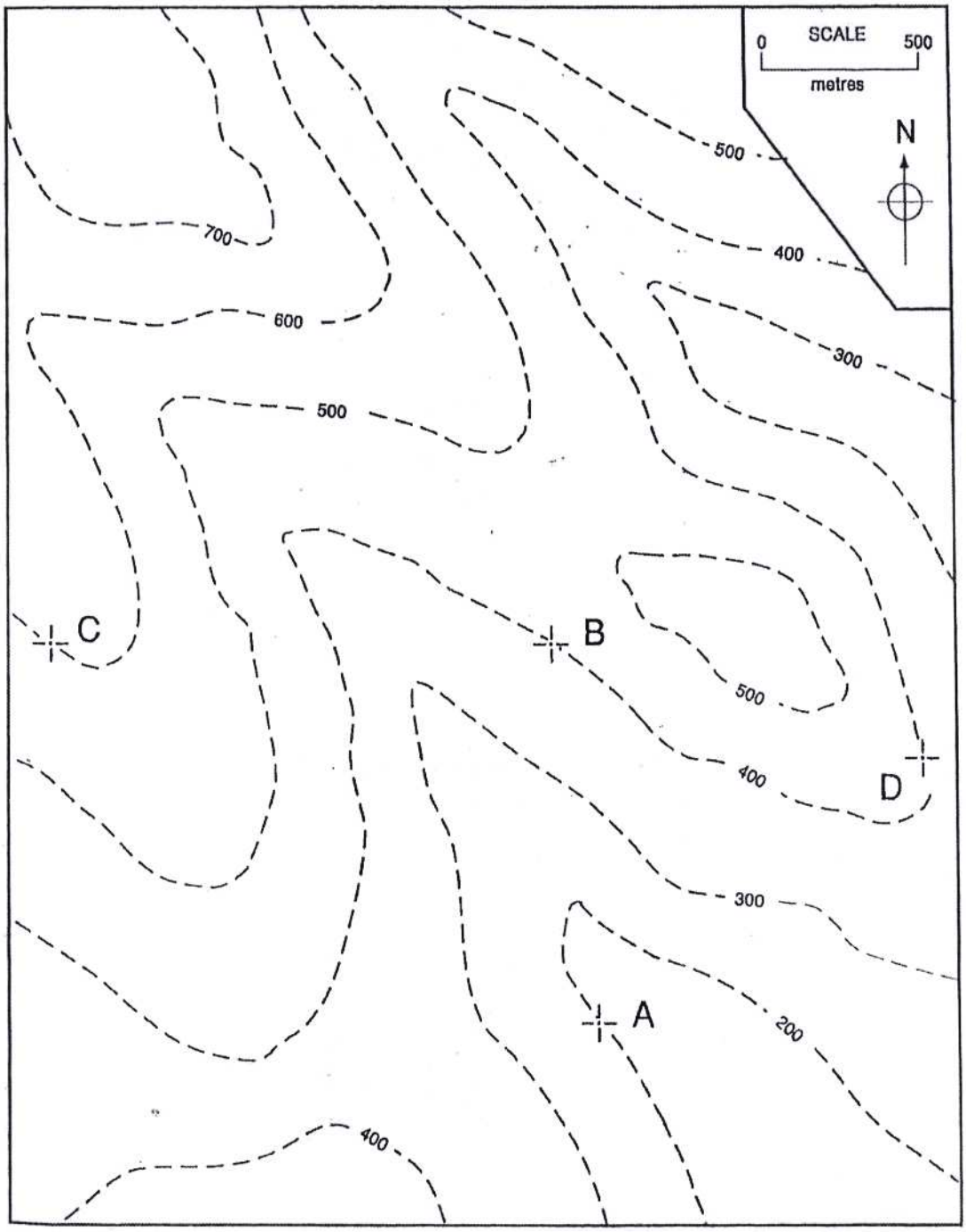
Clay	3 m
Gravel	10 m
Medium sand	10 m

Bedrock surface is at 23 m

A river is running through the field. The river bottom is 4 m below the top surface of the terrain. Measurements in piezometers give a water level of 0.5 m below the top surface.

a. Draw a cross section of the aquifer.
   Is this a confined or phreatic (unconfined) aquifer? Argue for your choice.
   Explain the size of the storage coefficient of this kind of aquifer.
b. The pumping test gives a T value of 2.3 m^2/s.
   Calculate the average hydraulic conductivity for the aquifer.
   Is this aquifer well suited for a large ground water supply? Argue for your answer.

c. At steady state (stationary) conditions at the end of the pumping test the potential gradient close to the well is 0.1. Calculate the discharge towards the well in m^3/s pr. meter width and in m^3/d pr. meter width.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