



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

(INSTITUTIONAL BASED EXAMINATION)

ECE 2302: ENGINEERING GEOLOGY

END OF SEMESTER EXAMINATION

SERIES: APRIL 2017

TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination

-*Answer Booklet, examination pass and student ID*

-*Drawing instruments.*

This paper consists of five questions.

Attempt any THREE questions.

Do not write on the question paper.

QUESTION ONE (COMPULSORY)

- (a) Briefly discuss the classification schemes used in igneous, sedimentary and metamorphic petrology. (6 marks)
- (b) State four observable features that may be used in making inferences on the existence of faults. (4 marks)
- (c) Briefly outline the seismic refraction method of ground investigations. (8 marks)
- (d) An environmental concern has been raised about the presence of a coal seam in some areas of the project map (Figure 1 page 3).
(i) Draw Strike lines and construct cross-section X-Y
(ii) Shade the areas where the seam will not be encountered at depth.
Show your working (12 marks)



Attempt any TWO questions

QUESTION TWO

- (a) i) Define the term tenacity (2 Mark)
- ii) Explain six terms used to describe tenacity in minerals (6 marks)
- (b) Briefly describe the chemical classification of igneous rocks (6 marks)
- (c) Explain the terms *linear*, *Areal* and *Volumetric* with respect to ground investigations. (6 marks)

QUESTION THREE

- (a) Explain the EIGHT geological considerations made in tunneling. (8 marks)
- (b) Explain the limitations of blasting as an excavation method (4½ marks)
- (c) Distinguish between the following;
 - (i) Cleavage, parting and fracture
 - (ii) Lappolith and Lacolith
 - (iii) Porphyroblastic and porphyritic(7½ marks)

QUESTION FOUR

- (a) Describe the two physical properties of minerals that depend on light. Explain their usefulness in identification of minerals. (6 marks)
- (b) Describe the following deformational structures;
 - i) Recumbent fold
 - ii) Reverse fault (4 marks)
- (c) Briefly outline the two most common geophysical methods used in ground investigations. (8 marks)

QUESTION FIVE

- (a) Briefly describe the following groundwater terms.
 - i) Aquifer, Aquiclude, Acquitard
 - ii) Permeability, Porosity, Hydraulic conductivity (6 marks)
- (b) i) Name five prospecting methods used in quarrying (2½ marks)
- ii) Explain three limitations of blasting as an excavation method (4½ marks)
- (c) i) Describe the term lithification
- ii) Explain the processes in lithification (7 marks)

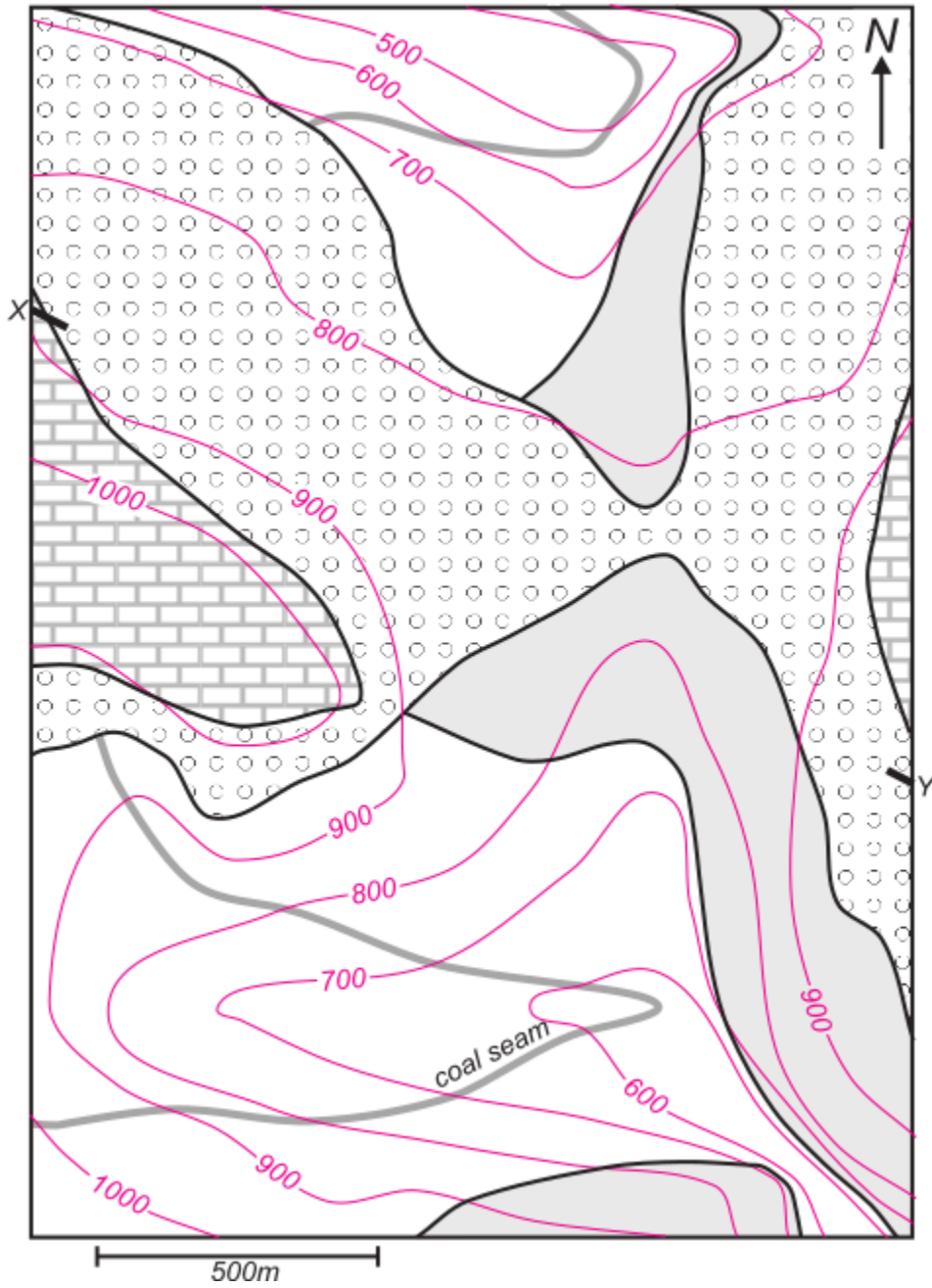


Figure 1: Geological map of project area