



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF INDUSTRIAL TECHNOLOGY

DEPARTMENT OF CIVIL AND WATER ENGINEERING

ENGINEERING GEOLOGY

TCW 2105

Examination Paper

DECEMBER 2015

This examination paper consists of 4 pages

Time Allowed: 3 hours

Total Marks: 100

Special Requirements: None

Examiner's Name: P. Kamwemba

INSTRUCTIONS

1. Answer any four (4) questions
2. Each question carries 25 marks
3. Use of calculators is permissible

MARK ALLOCATION

QUESTION	MARKS
1.	25
2.	25
3.	25
4.	25
5.	25
TOTAL	100

QUESTION 1

(a) Define the following geological terms : (i) magma , (ii) rock , (iii) petrology ,

(iv) mineralogy and (v) physical geology . **(5marks)**

(b) List three metal and two gaseous elements found in magma , **(5 marks)**

(c) Describe the rock cycle . **(15 marks)**

QUESTION 2

Describe the classification and subdivision of sedimentary rocks based on origin (i.e. structured description) . **(25 marks)**

QUESTION 3

(a) List three classes of igneous rocks based on the depth of formation . **(3 marks)**

(b) Name three extrusive and four intrusive igneous rocks . **(7 marks)**

(c) Explain the acidity and base nature of igneous rocks . **(15 marks)**

QUESTION 4

Three vertical boreholes were put down to test the existence of a gold reef on the west side of a dyke as shown in fig. 4. The reef was intersected in all three boreholes .

Given the following information:

Borehole	Elevation of reef intersection (m)	Directions	Horizontal distances (m)
A	- 900	$B - A = 310^0$	121,320
B	- 650	$B - C = 230^0$	418,677
C	- 1 150		

Calculate the amount of true dip and directions of strike and dip . (25 marks)

QUESTION 5

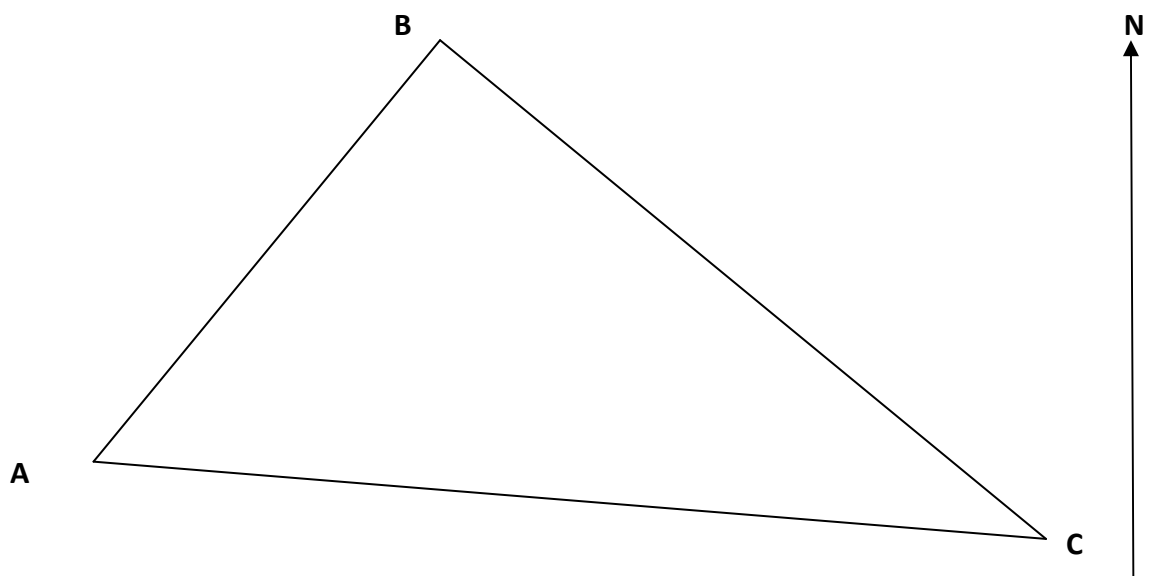
How does weathering result with the production of new minerals and compounds?

(25 marks)

QUESTION 6

Fig. 6 shows a map of an area . Draw a section along line A – B and describe the geological history of the area . (25 marks)

Fig. 4



List of formulae

$$\tan d^{\circ} = \tan D^{\circ} \times \cos c \text{ or } \tan d^{\circ} = \tan D^{\circ} \times \sin s$$

$$\tan c_1 = \operatorname{cosec} (c_1 + c_2) [(\cot d_1 \times \tan d_2) - \cos (c_1 + c_2)]$$

$$\tan c_2 = \operatorname{cosec} (c_1 + c_2) [(\cot d_2 \times \tan d_1) - \cos (c_1 + c_2)]$$