



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF INDUSTRIAL TECHNOLOGY

DEPARTMENT OF CIVIL AND WATER ENGINEERING

ENGINEERING GEOLOGY

TCW 2105

Supplementary Examination Paper

JULY 2016

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 question 4 and any other three
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

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QUESTION 1

Describe the internal structure of the earth.

(25 marks)

QUESTION 2

Three boreholes were drilled vertically from surface to intersect a coal seam at A , B and C as shown in fig. 2.

Given the following information :

Directions	Depths of seam contact (m)	Horizontal distances (m).
A – B = $210^{\circ} 00'$	At A = 404,800	A to B = 213,360
A – C = $110^{\circ} 00'$	At B = 435,280	A to C = 670,560
	At C = 465,760	

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

QUESTION 3

Describe Bowen's reaction series and explain how different igneous rocks are formed according to this theorem.

(25 marks)

QUESTION 4

Fig. 4 shows a plan of an area. Draw a section along line AB and describe the geological history of the area.

(25 marks)

QUESTION 5

(a) Write about the following rock forming minerals : (i) feldspars (**12 marks**)

(ii) the mica group (**8 marks**) and (iii) the olivine group. (**5marks**) .

(25 marks)

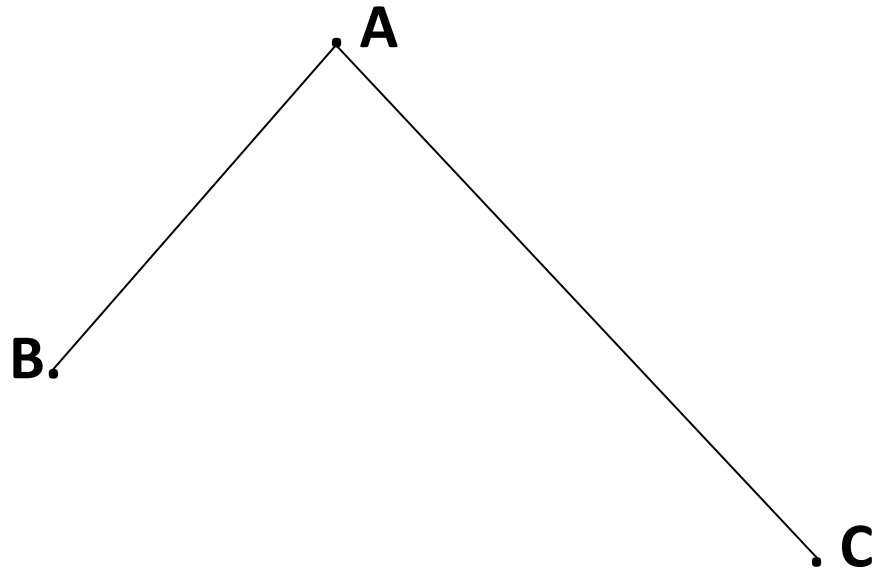
QUESTION 6

Write about the following types of sedimentary rocks : (i) mechanically – formed

(ii) chemically – formed and (iii) organically – formed . **(25 marks)**

DIAGRAMS

Fig.2



List of formulae

$$\tan d^0 = \tan D^0 \times \cos C^0 \text{ or } \tan d^0 = \tan D^0 \times \sin s^0$$

$$\tan c_1 = \operatorname{cosec} (c_1 + c_2) [(\cot d_1 \times \tan d_2) - \cos (C_1 + C_2)]$$

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

$$\frac{\tan s_1 - s_2}{2} = \frac{\sin (d_1 - d_2)}{\sin (d_1 + d_2)} \times \frac{\cot (c_1 + c_2)}{2}$$