REPUBLIC OF SOUTH AFRICA
DEPARTMENT OF MINERALS AND ENERGY
EXAMINATION FOR THE MINE SURVEYORS CERTIFICATE OF COMPETENCY

DATE: 11 April 2003 (Friday) TOTAL MARKS : 100
TIME: 12:30 to 14:30 (2 Hours) TO PASS: 50

GEOLOGY

Note: (1) Answer all questions

QUESTION 1

Area ABCD is an area of ground in which a reef is known to have been dislocated by two parallel faults X and Y whose existence is shown in the section which has been made on the line PQ across the area ABCD.
PQ is at right angles to the strike of the reef and the effects of the faults X and Y on the reef are shown on the section.
Faults X dips East and fault Y dips West, their dips being indicated in the dip diagram given.
It is known that fault Y is younger, and that there is no other faulting in the area, also that the movement on fault Y is at right angles to the strike.
You are required to indicate within the area ABCD the plan positions of the reef and the faults on the upper and the lower levels, and also the reef bearing areas within these limits.

Note: Give your answers on the attached sketch.

(23)

QUESTION 2

Discuss the occurrence of diamonds in South Africa. Describe the different types of deposits under the following headings:

(a) Kimberlite pipes
(b) Fissures
(c) Alluvial deposits

(13)

QUESTION 3

(a) Define the following properties of a rock:

(i) density
(ii) porosity
(iii) compressive strength
(iv) Tensile strength

(b) Describe how the density and porosity of a rock are determined.

(10)

QUESTION 4

Discuss iron ore in South Africa, with reference to the following:

(a) Uses and economic importance
(b) Some economic ores of iron
(c) Major deposit(s) of iron

(10)

QUESTION 5

(a) Explain the following briefly:

(i) Thermal metamorphism
(ii) Dynamic metamorphism
(iii) Dynamothermal metamorphism

(b) (See attached schedule)

Classify the following rocks on the **attached schedule**, which must be **handed in with your answer book:**

Arkose	Laterite
Breccia	Mudstone
Banded ironstone	Quartzite
Bog iron ore	Rock salt
Guano	Sandstone
Chert	Shale
Calcrete	Siliceous sinter
Dolomite	Tillite
Ferricrete	Black turf
Limestone	Tufa

(20)

QUESTION 6

Sketch a typical example of each of the following:

(a) Monocline
(b) Isocline
(c) Symmetrical syncline
(d) Overfold
(e) Asymmetrical anticline
(f) Recumbent fold
(g) Normal fault with loss of ground
(h) Reverse fault with gain of ground
(i) Graben (Trough and Horst)

(9)

QUESTION 7

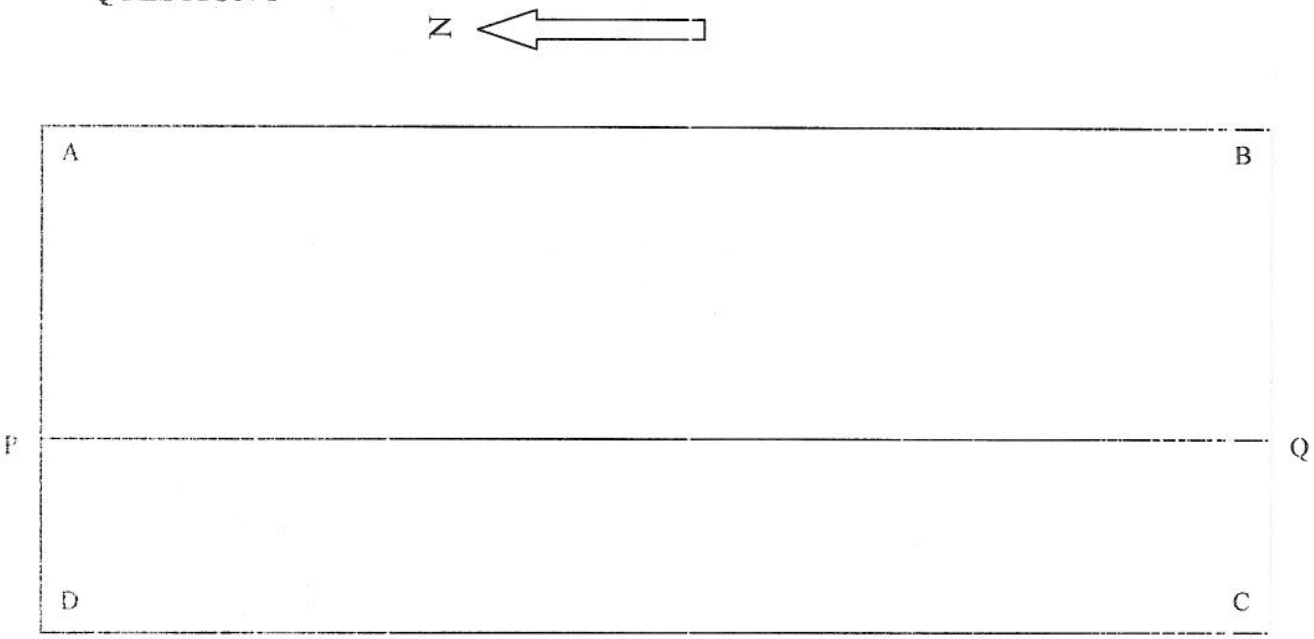
(a) Explain what is meant by "denudation of the earth's crust."
(b) Describe fully the agents which are responsible for the denudation of the earth's crust considering both the mechanical and the chemical processes.

(15)

Total Marks [100]

EXAMINATION NUMBER……..

QUESTION 1



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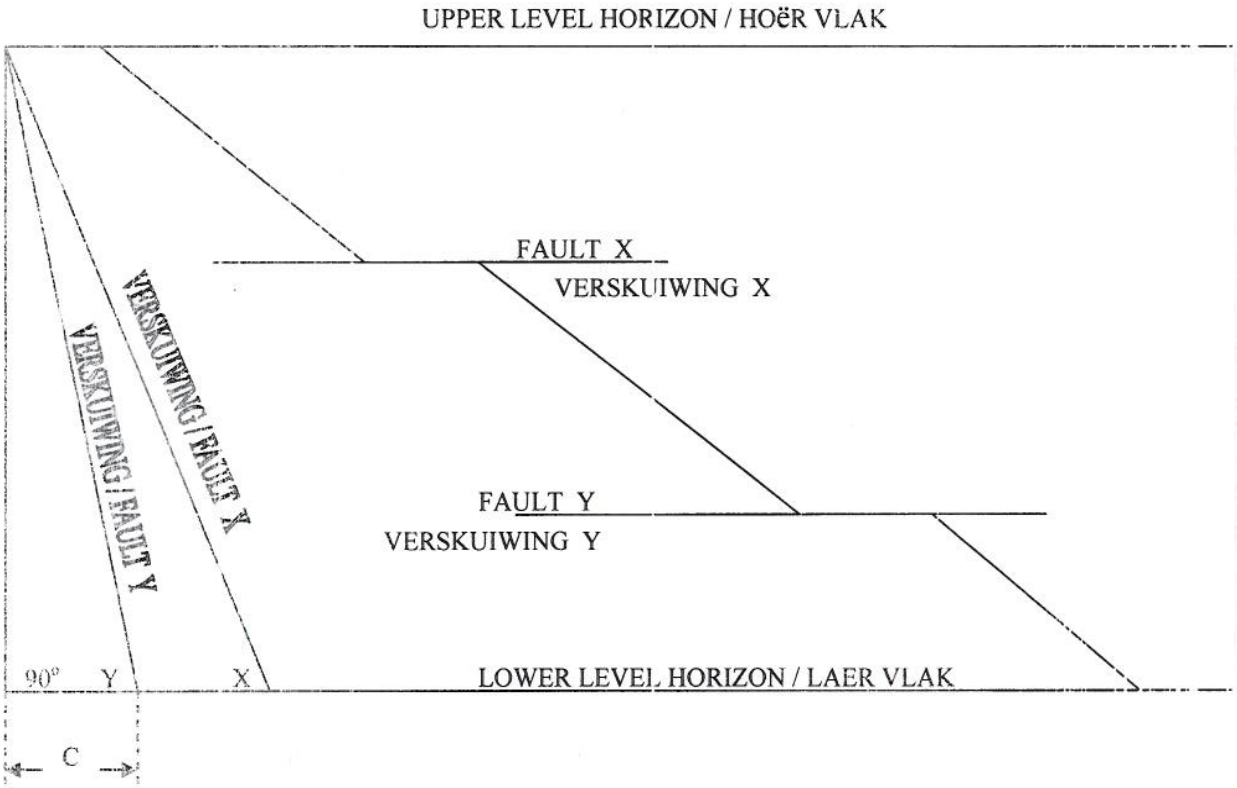

DIP DIAGRAM
HELLINGSDIAGRAM

SECTION ON P - Q

DEURSNIT P - Q

EXAMINATION NUMBER……..

QUESTION 5(b)

Essential Composition	Mechanically formed	Organically formed	Chemically Formed	Residual
Siliceous				
Calcareous				
Ferruginous				
Aluminous				
Phosphatic				
Sulphates and Chlorides				
Heterogeneous				