

GLG121

**Geomorphology,
South African Geology,
Structural Geology,
Sedimentology**

**Degree Supplementary Examination
January 2019**

Subject: Geology

Time: 3 Hours

Marks: 100

This paper consists of THREE pages including the cover page

Internal Examiners

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INSTRUCTIONS

Answer ONE question from each section. Answers must be clearly numbered.

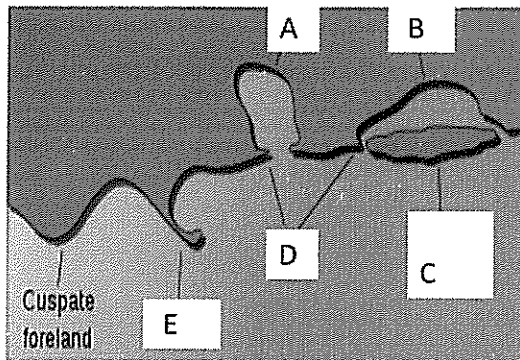
SECTION A (GEOMORPHOLOGY)

Question One

- (i) List 5 karst landforms. [5]
- (ii) Differentiate between intrusive and extrusive landforms, give examples. [9]
- (iii) List five landforms formed by fluvial processes. [5]
- (iv) List and explain any three landforms formed by Eolian processes. [6]

Question Two

- (i) Label the following diagram. [5]



- (ii) Discuss Glacial Landforms and processes. [20]

SECTION B (South African Geology)

Question Three

[25]

a) Give definitions /descriptions of the following terms used in stratigraphy and give examples where possible:

(i) Stratum [2]

(ii) Relative age [2]

(iii) Lithostratigraphy [2]

(iv) Stratigraphic classification [2]

(v) Principle of superposition [2]

b) What is the geological time scale? Sketch the international geological time scale showing the stratigraphic hierarchy and major subdivisions.

[15]

Question Four

[25]

In South African Geology, the Karoo Supergroup has been divided into Dwyka Group, Ecca Group and Beaufort Group, which were formed in different depositional environments. Discuss the lithologies and depositional environments for the different groups /formations of the Karoo Supergroup, and its developmental process/history of the environment change from bottom to top of the sequence.

SECTION C (Structural Geology)

Question Five

[25]

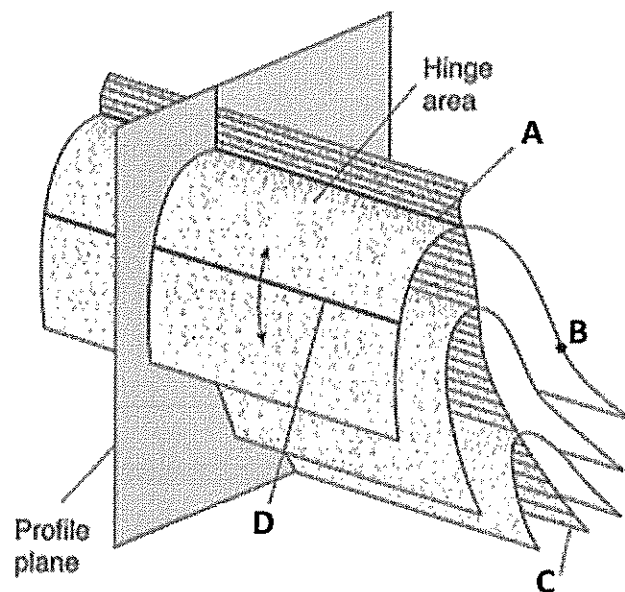
Define the following terms using 1-2 sentences and diagrams where appropriate.

- a) Brittle deformation
- b) Compressive strength
- c) Right-lateral strike-slip fault
- d) Oblique-slip fault
- e) Antiformal syncline

[10]

Question Five B

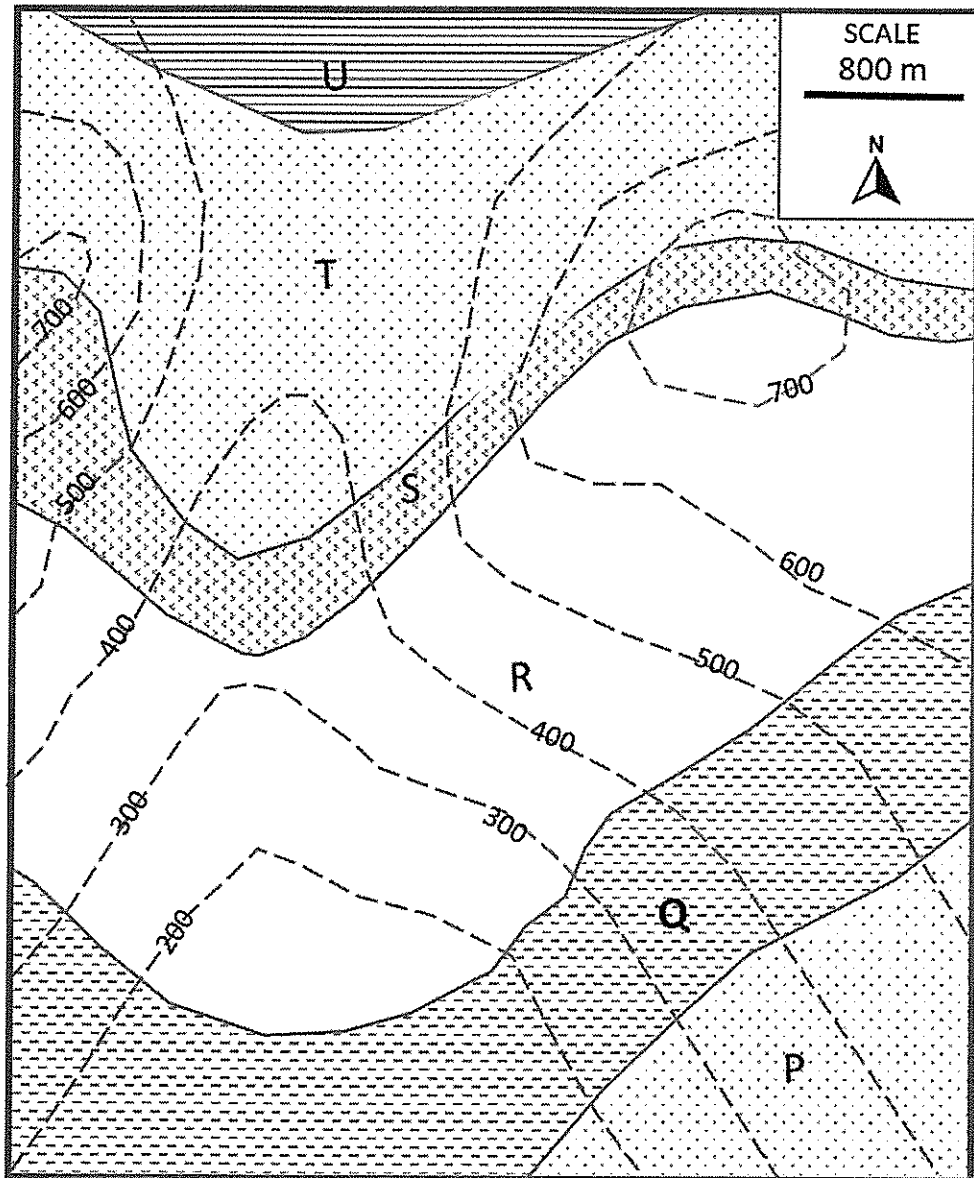
- a) List three types of directed stresses. [3]
- b) On the diagram below, label A-D. [4]



- c) On **MAP A**, continuous lines are the geological boundaries separating the outcrops of dipping strata, beds P, Q, R, S, T and U. Examine the map and note that the geological boundaries are not parallel to the contour

lines, but in fact, intersect them. This shows that the beds are dipping. Before constructing strike lines can we deduce the direction of dip of the beds from the fact that their outcrops "V" down the valley? Draw strike lines for the QR and ST boundaries and calculate the direction and amount of dip. [8]

MAP A



Question Six

[25]

- What is the main difference between joints and veins? [2]
- The diagram shows systematic joints. Define systematic joints. Indicate any three types on the diagram. [5]

- c) Provide the general attributes of dip-slip faults (include some sketches in your answer). [10]
- d) Describe how confining pressure, temperature, strain rate and rock composition influence the type of deformation experienced by rocks. [8]

SECTION D SEDIMENTOLOGY

Question Seven

- a) What affect the sediment composition as it has been transported? [2]
- b) What is the origin of coal? Briefly discuss about coal formation and its types? [10]
- c) In a conglomerate, there are clasts (or pebbles) and matrix (or cement), which one has been deposited first? Why? [3]
- d) Layering is the most common feature in sedimentary rocks. With the aid of a table, list the layering names based on the thickness of the layers. [10]

Question Eight

- a) Which one would weather fast in a humid climate, quartz sandstone or an arkose? Explain your answer. [4]
- b) What is massive bedding? And how does it form?
- c) What is the difference between shale and mudstone? [4]
- d) How are chemical sedimentary rocks formed? Give two examples. [4]
- e) What is the difference between the arkose and arenite? [4]
- f) Discuss the types of sediments in the top set and bottom set of a delta. [5]