



<u>FACULTY</u>	: Science
<u>DEPARTMENT</u>	: Geology
<u>CAMPUS</u>	: APK
<u>MODULE</u>	: GLG3A10/GLG01A3 SEDIMENTOLOGY AND STRATIGRAPHY
<u>SEMESTER</u>	: First
<u>EXAM</u>	: May/June 2019

<u>DATE</u>	: 1 JUN 2019	<u>SESSION</u>	: 08:30-11:30
<u>ASSESSOR(S)</u>	: DR C VORSTER PROF M De KOCK		
<u>MODERATOR</u>	: PROF Z JINNAH (WITS)		
<u>DURATION</u>	: 3 HOURS	<u>MARKS</u>	: 120

NUMBER OF PAGES: 4 PAGES (Including this front page)

INSTRUCTIONS:

1. Answer ALL THE QUESTIONS.
 2. Number your answers clearly
 3. Answer section A and section B in separate books
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SECTION A: (60 MARKS)**QUESTION 1 (15 MARKS)**

Give ONE WORD for the following sedimentological definition or statement (1 marks each):

- 1.1) The term for the size, shape and arrangement of minerals/clasts in a rock
- 1.2) A term for the special arrangement and preferred orientation of clasts in a rock.
- 1.3) Grain motion comprising a series of "hops" or jumps and returns to the bed.
- 1.4) A rock comprising thin, inter-laminated chert and iron-rich sediment.
- 1.5) The ability of fluids in pore spaces to actually move through the pore system.
- 1.6) A term for conglomerates where all pebbles are composed of the same material (e.g. quartz)
- 1.7) Coarse material (> 64mm) contained in volcanoclastic rocks, which were solid at the time of the volcanic eruption
- 1.8) The longer, gentle slope of a ripple on the up-current side
- 1.9) A dome-like mass of biochemically precipitated carbonate rock built up by bacterial or microbial mats.
- 1.10) A fissile sedimentary rock with grain size less than 0.05mm.
- 1.11) Non-clastic sedimentary rocks composed primarily of minerals that crystalize from hypersaline solutions known as brines.
- 1.12) A non-clastic sedimentary rock which contains high amounts of phosphate minerals (15 -20% P_2O_5).
- 1.13) The general classification used for a carbonaceous rock where the structure of the organism (such as coral colonies) responsible for building up the organic framework has been preserved.
- 1.14) Casts or moulds of depressions formed in the underlying beds by currents which can be seen at the base of overturned bedding.
- 1.15) The common name for the trace fossils which can be identified from the vertical tube-like burrows they produced in near shore sands.

QUESTION 2 (10 MARKS)

How would you as a geologist objectively define/describe a clastic sedimentary rock? What parameters would you use?

QUESTION 3 (6 MARKS)

Describe how you would distinguish between an *ignimbrite*, *lapillistone* and a *volcanic breccia*, should you come across them in the field.

QUESTION 4 (8 MARKS)

One of the ways in which carbonate rocks form is through the biomineralization of calcium carbonate (CaCO_3) by organisms (animals/plants). Name and discuss **any four factors** which can have an effect on **carbonate-production ability of organisms**.

QUESTION 5 (5 MARKS)

Briefly describe how **biogenetic chert** is formed.

QUESTION 6 (6 MARKS)

What is the **difference** between *banded iron formation* and *iron stone*?

QUESTION 7 (6 MARKS)

Explain the difference between a wave and a current ripple. You may make use of sketches to support your answer

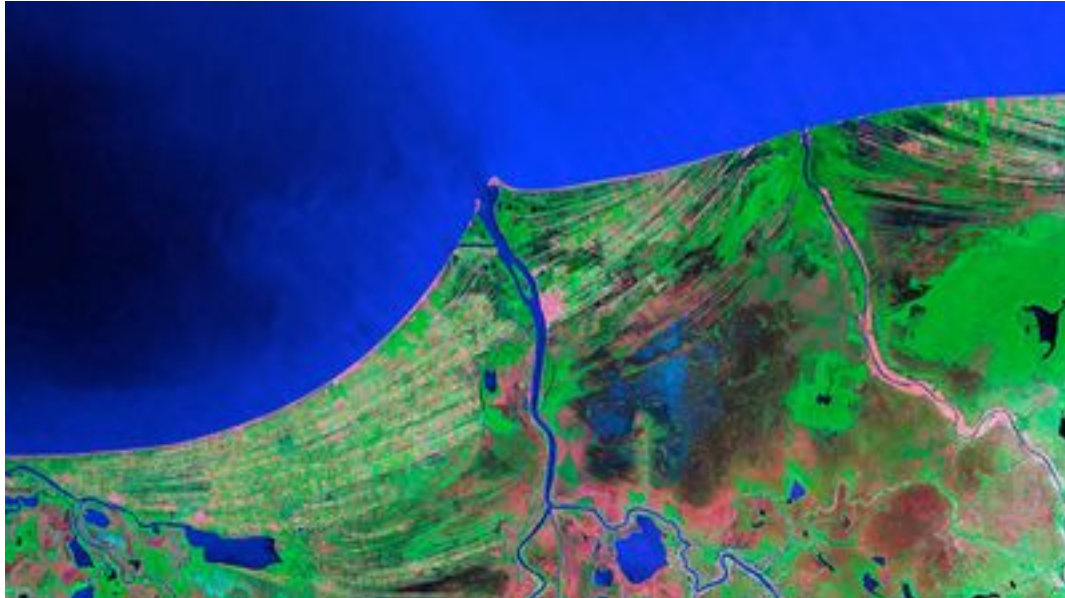
QUESTION 8 (4 MARKS)

Draw a simple sketch to illustrate the difference between normal and reverse graded bedding.

END OF SECTION A

SECTION B:**QUESTION 9 (45 MARKS)**

Answer the question in reference to the delta depicted below:



9.1. Draw and clearly label the expected succession of facies that would be deposited by the delta. (20 marks)

9.2. Discuss the controls on this specific sedimentary environment. (25 marks)

QUESTION 10 (8 MARKS)

Draw a sketch to illustrate the meaning of the following terms concerning the shallow marine environment:

- Foreshore
- Upper and Lower shoreface
- Offshore

QUESTION 11 (7 MARKS)

Explain Walter's Law in terms of a retrograde barrier island system (**illustrate your answer**)

END OF SECTION B