

National Exams May 2013

04-Geol-A3, Sedimentation & Stratigraphy

3 hours duration

INSTRUCTIONS FOR CANDIDATES

1. This is an **OPEN BOOK** examination. Candidates are encouraged to fully understand the *intent and scope* of the questions before attempting to answer them.
2. Answers to eight (8) questions constitute a full examination paper.
3. All questions are of equal value (12 marks each) + 4 bonus marks for neatness.
4. Assumptions made in the interpretation of a question should be clearly stated in the answer.
5. Clarity and organization of the answers, including legible handwriting, are important.
6. The use of freehand sketches and tables to augment or organize answers is encouraged.
7. A non-communicating calculator is permitted.
8. In responding to questions, the question number *should be clearly shown* in the upper left corner of the answer book pages. Answers to questions not clearly identified by the question number will be ignored and given a zero mark.

QUESTIONS - Answer any eight (8)

1. Using not more than 2 pages of the answer book, define and discuss transgressions and regressions as they relate to sedimentation and subsidence
2. How are evolutionary and migratory events and biofacies recognized and differentiated in the rock record?
3. Discuss the relationship between flow regime in terms of the Froude number, associated bed forms and sedimentary structures.
4. Explain the engineering related differences between siliciclastic and carbonate sediments, with supporting reasons and examples.
5. Describe the distinguishing sedimentary features of cyclic deltaic deposits and their engineering significance.
6. Explain concisely, but completely, the role of CO₂ in the formation of limestone.
7. Compare and contrast, with freehand sketches, meandering stream depositional models with alluvial fan models.
8. Define or provide a short description of any ten (10) of the following:
 - Allochems
 - Carbonate compensation depth (CCD, and depth below sea level)
 - Competency (in relation to fluvial and aeolian processes)
 - Debris flow
 - Diastrophism
 - Flute marks
 - Loess
 - Lysocline
 - Milankovitch cycle
 - Oolith
 - Orogenic
 - Pelagic sediments

9. Explain, with illustrations and/or examples as necessary, differences between mudstones, wackes and arenites for terrigenous sandstones.
10. Describe clastic and non-clastic chemical precipitates and biochemical rock types. Name and discuss any engineering related features of at least one rock type from each category.
11. In point form, discuss the role and technical aspects of lithostratigraphy, biostratigraphy, chemostratigraphy and allostratigraphy in the development of the global time scale and list their contribution to the advancement of the principles of stratigraphy.
12. Explain methods for the recognition of biofacies in the rock record and discuss features that are helpful in differentiating them.

End of Examination paper