NATIONAL EXAMS MAY 2014

04-Geol-A3, Sedimentation and Stratigraphy

3 Hours Duration

NOTES:

1. This is an OPEN BOOK exam.
2. Only non-communicating types of calculators are permitted.
3. Answer Question 1 (compulsory) and four more of your choosing.
4. Question 1 and four others constitute a full paper.
5. Each question is worth a total of 20 marks.
6. Only the first five questions answered will be marked.
7. If doubt exists as to the interpretation of any question, submit clear statements of assumptions made in responding to that question, explaining briefly the cause of doubt.
8. Question numbers should be clearly shown on all pages of the answer book.
9. Clarity, neatness and the use of sketches and tables is encouraged.
10. Write neatly and legibly. Strike out mistakes – do not use erasures.
11. Cite references (year, author, journal or publication), where appropriate or warranted.

Q1. [20 Marks – **compulsory**]
Write an essay, of not more than four (4) neatly handwritten one-sided answer book pages in length, on carbonates. Describe the genesis and distinguishing physical, chemical and engineering aspects of two types (for example, clastic and non-clastic). Use diagrams and tables to organize your response for clarity and brevity.

Q2. [20 Marks]
Define and briefly describe, using sketches as needed, the following:

1) Froude Number and its significance in sedimentary geology.
2) Oolites, their origin and properties.
3) Allochems and their significance in the geological record.
4) Eskers and their economic significance.
5) Sensitive or so-called "quick" clays of eastern Canada, Sweden and Norway – their origin and engineering significance.

Q3. [20 Marks]
Explain the formation of mudstones, wackes and arenites. Define and discuss the significant differences between them, with a commentary on their detrital composition. Use diagrams as necessary.

Q4. [20 Marks]
Define, discuss and distinguish between lithostratigraphy, biostratigraphy, chemostratigraphy and allostratigraphy in relation to the global time scale. Create a table with appropriate column headings to supplement and condense your written response.

Q5. [20 Marks]
Define, discuss and distinguish between debris flows and turbidites and their significance in paleontological studies and the rock record. Give examples, using illustrative sketches.

Q6. [20 Marks – 5 for each of a) to e)]

a) Define and illustrate tidal deposits.
b) Explain secondary porosity of sandstones.
c) What is a carbonate reef model?
d) Define and describe with examples, pelagic sediments.
e) Explain aeolian deposits and their engineering characteristics.

Q7. [20 Marks]
Explain briefly the Airy and Pratt model in relation to the origins of topography and the role of isostasy in sedimentation accumulation space.

End of Examination paper