

National Exams May 2013

98-Pet-A1, Principles of Stratigraphy & Sedimentation

3 hours duration

NOTES:

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper a clear statement of any assumptions made in the preparation of his or her answer.
2. This is a CLOSED BOOK exam. Nothing further is permitted, including no calculator.
3. Answer any 10 of the 15 questions. The total value is 100.

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Answer 10 out of the following 15 questions (each worth 10 marks).
Please illustrate your answer with drawings wherever possible.

1. Dunham's classification of limestones is based on depositional texture. Describe the different categories, give examples using drawings, and explain how and where they can form.
2. Describe the main marine evaporite minerals and how and where they form, and discuss their economic importance.
3. Explain in what part of which terrestrial depositional system you would explore for: (a) uranium; (b) coal; (c) placer gold.
4. Describe the main families of clay minerals encountered in sediments and sedimentary rocks, and discuss their importance.
5. Outline the main factors that give rise to transgressions and regressions and indicate how transgressions and regressions can be differentiated in the stratigraphic record.
6. Describe the distinguishing features of debris flows and turbidites and explain their origin.
7. Explain the fundamentals of lithostratigraphy, biostratigraphy and chronostratigraphy.
8. Describe the main families of clay minerals in sediments and sedimentary rocks, and explain their importance.
9. What are the main characteristics of storm-dominated siliciclastic shelf deposits and their bathymetric implications?
10. The various subaqueous bedforms observed in sands (and their counterpart sedimentary structures in sandstones) are related to grain size and mean flow velocity. Explain.
11. How are dolostones (dolomites) thought to have formed?
12. What are the characteristics of the carbonate reef facies model?
13. Describe the distinguishing features of petroleum source rocks, and explain how they arose and evolved with burial.
14. Explain how carbon and oxygen stable isotopes may be utilized in diagenetic and sedimentological studies.
15. Draw and label the geological time scale. Note ages (in millions of years) for some key boundaries.