

**National Exams** December 2015

**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.
2. This is a **NO CALCULATOR PERMITTED EXAM**. This is a closed book exam.
3. This exam paper consists of three pages (including this cover page). There are two parts: **Part A** (Questions 1-11) conveys questions related to sediments, sedimentary rocks and sedimentary processes whereas **Part B** (questions 12-18) conveys questions related to Stratigraphy.
4. In Part A, the questions 1 to 4 are 10 marks each whereas questions 5 to 11 are 5 marks each. Choose any number of questions that make a total of 45 marks. In Part B, the questions 12 to 14 are 10 marks each whereas questions 15 to 18 are 5 marks each. Answer a number of questions that make a total of 30 marks. **Thus, the maximum attainable mark is 75/75 (45 for Part A + 30 for Part B).**
5. Most questions require an answer in essay format. Clarity and organization of the answers are important.
6. **Please note:** The first number of questions permitted to answer in each part (i.e., Part A & Part B) will be marked as they appear in the answer book. Thus, do not answer more than what you have been asked to answer.

**Part A: Questions related to Sediments, sedimentary rocks and Sedimentary processes****Answer any number of questions (1 to 11) that make a total of 45 points.****Question 1 (10 points)**

1. There are a number of sedimentary structures that indicate paleocurrent flow directions.
  - a) State two examples of such kind of directional sedimentary structures and explain how they indicate the paleoflow direction.
  - b) State the different directional patterns that result from plotting paleocurrent data on a rose diagram.
  - c) Give at least one depositional system for each paleocurrent pattern.

**Question 2 (10 points)**

2. A) What are the various components that constitute a sandstone rock? Give examples of each constituent.
- C) Sketch classification of sandstones by using QFL ternary diagram.

**Question 3 (10 points)**

3. Explain the terms wackestone, packstone, grainstone, rudstone and framestone.

**Question 4 (10 points)**

4. Describe and Sketch a deltaic depositional system. Depict the various subenvironments and the nature of sediments that accumulate in each subenvironment.

**Question 5 (5 points)**

5. Stylolites are features commonly present in carbonate rocks and formed due to \_\_\_\_\_ .
  - a) Burrowing
  - b) wave actions
  - c) compaction
  - d) tidal action

**Question 6 (5 points)**

6. Explain the differences in origin between bedded and nodular cherts.

**Question 7 (5 points)**

7. Explain Bouma sequence. What does it represent?

**Question 8 (5 points)**

8. Explain and sketch how rip currents and longshore currents form? Discuss their effect on sediment dispersal.

**Question 9 (5 points)**

9. Sketch an ideal schematic log of fine-grained sediments in storm-dominated shelves between fair-weather wave base and storm wave base. Annotated important sedimentary features in the log.

