

**ES4103: Geochemistry**  
**Mid Semester (Autumn) Examination, 2018**  
**Department of Earth Sciences, IISER-Kolkata**

**Total marks: 20**

**Time: 1 hour**

1. Draw a typical shale-normalized REE pattern for seawater. In the open oceans, negative Ce anomaly becomes more pronounced with depth. Why? [3+4]
2. Precipitation of a crystal is not always possible from a supersaturated solution due to the existence of a nucleation barrier. Discuss why this barrier exists and how it is overcome in case of the eventual precipitation of a crystal. [7]
3. At high very ionic strengths ( $I > 1.0$ ), it has been observed that activity of charged dissolved species increases with ionic strength of the solution. Explain why. [6]

