

1. a) What is diagenesis? What is the difference between early diagenesis and late diagenesis? How to differentiate early diagenetic sandstone from late diagenetic sandstone cemented by calcium carbonate? Explain with field and microscopic observations. (1+2+7)
2. a) What is carbonate compensation depth? Why the depth of carbonate compensation varies in oceans? (1+3)
- b) Discuss the factors which control formation of ooids. (3)
- c) Explain the presence of trilobite fossil in a late Quaternary limestone. (3)
- d) Is it possible to have cross bedding in limestone? Discuss. (3)
3. Which of the following rocks can be considered to understand the condition prevailed during its formation? Explain with justification. (3×3)
- a) soil carbonate with 95% micrite and 5% microsparite.
- b) sandstone showing high amount (45%) sparitic carbonate cement.
- c) sandstone with low amount (10%) of sparitic carbonate cement.
4. a) Explain how magnetic polarity of sediments can be used to find the age of fluvial sedimentary rocks. (4)
- b) How to differentiate between continental and marine carbonate using $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ values? (6)
- c) Sandstone cemented by carbonate underwent a burial of four kilometres and subsequently exposed to surface. The $\delta^{18}\text{O}$ values of the carbonate cement show a spread of 8‰ for the bottom samples and the spread decreases up-section. Explain why the spread in $\delta^{18}\text{O}$ values is high at bottom and lower at top of section. (8)

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