AMERICAN UNIVERSITY OF BEIRUT
DEPARTMENT OF GEOLOGY

FINAL EXAMINATION

Sedimentology (Geol 222) **February 2, 2006**
Dr. Fadi Nader **8:00 am**
Exam rules apply **Time: 2 hours**

PART I: PRACTICAL QUESTIONS

1. **Rock classification (20 points):**
   Name the rocks represented by the photomicrographs (A to F) shown on Plate I (page 5), according to the rock texture and the nature of constituents.
   -
   - For limestones, giv classification s classification table on page 6).

   Name also the porosity type(s) and amount(s) where appropriate.
   * The percentage estimation chart is on page 6.

PART II: DEFINITIONS & SHORT ANSWERS

2. **Define seven out of the ten following terms (20 points):**

Bounding surface [dunes]	Accumulation surface [dunes]
Alluvial fan	Sorting
Dissipative shorelines	Cheniers
Eustatic sea-level change	Hummocky cross-stratification (HSC)
Turbidites	Sabkha

3. **Short answers (20 points):**
   a. List the various laboratory steps followed during a sieving experiment:

   b. Once channels are initiated in an alluvial setting, they may expand and shift position through a combination of:

   c. List the FOUR mechanisms of transport/deposition in an alluvial environment:

d. Name four different types of paleosols (usually, paleosols are recognized on the basis of organic, textural and stratigraphic features):

e. The anatomy of a dune (in section) consists of the following features (you may draw a small sketch):

f. Dune development could be inhibited by (factors):

g. Where rivers flow into a basin, the effluent behavior and consequent depositional patterns (sediment delivery to the basin) depend upon:

h. Define the three distinct zones of a delta-profile:

i. List the major components of carbonate sediments:

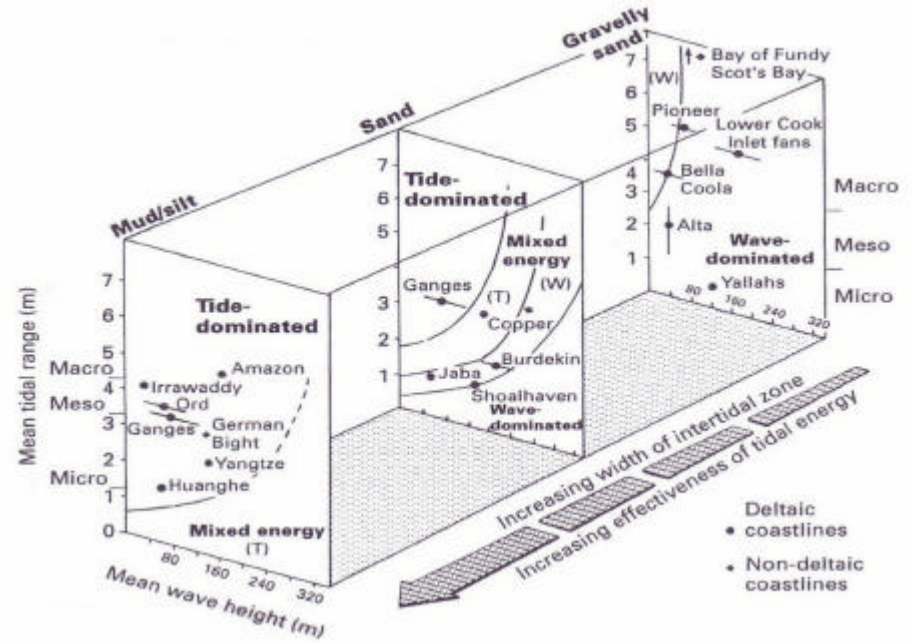
j. What are the three most common marine evaporite minerals and their respective seawater concentration thresholds required for precipitation?

BONUS QUESTION ☺ :

k. Speleothems (cave formations) were grouped into three main categories (White, 1976). These categories are:

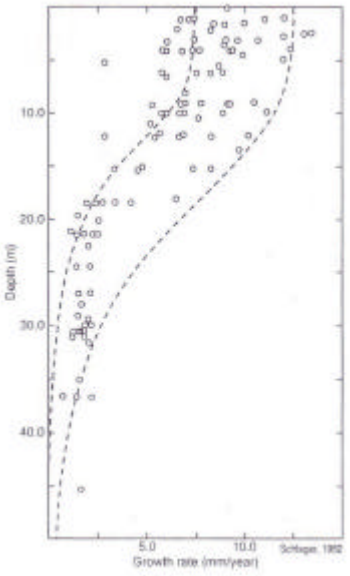
PART III: DIAGRAMS/ FIGURES QUESTIONS

4. **Add a figure-caption/title to the following diagram and discuss it briefly in less than 10 lines (10 points):**

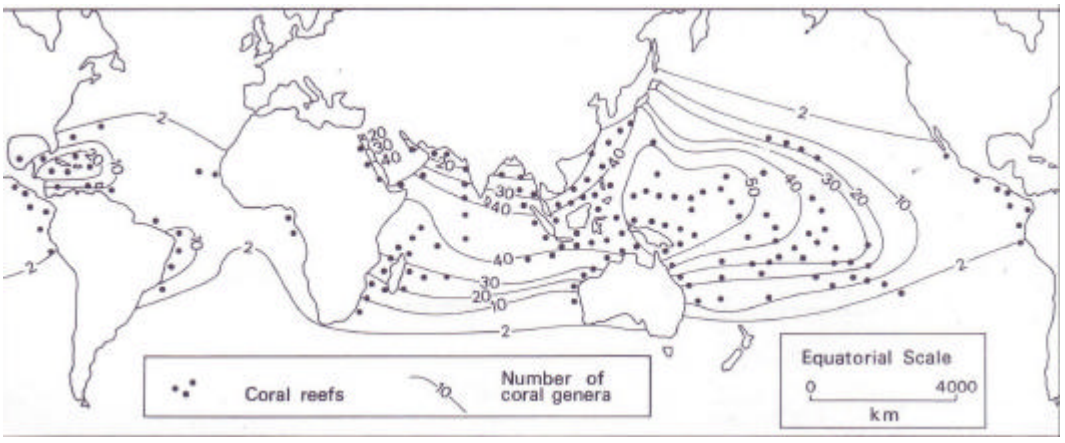


5. **Add a figure-caption/title to the following composite figure including (5A; right) and (5B; below) and discuss it briefly in less than 10 lines (10 points):**

5A →



5B

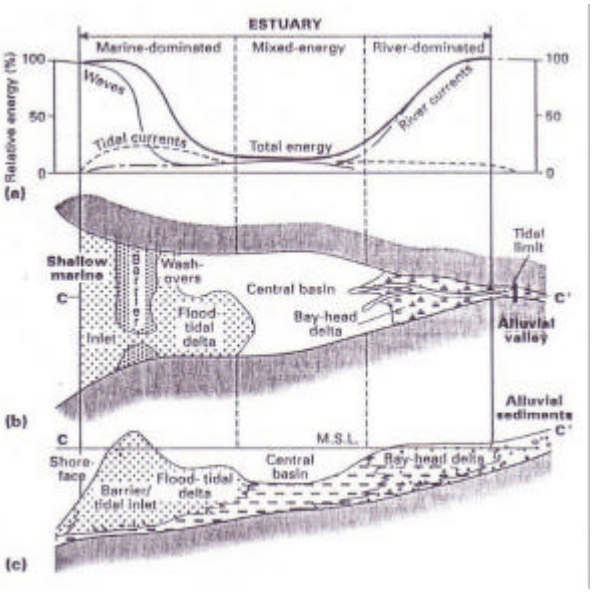


PART IV: DISCUSSION QUESTIONS

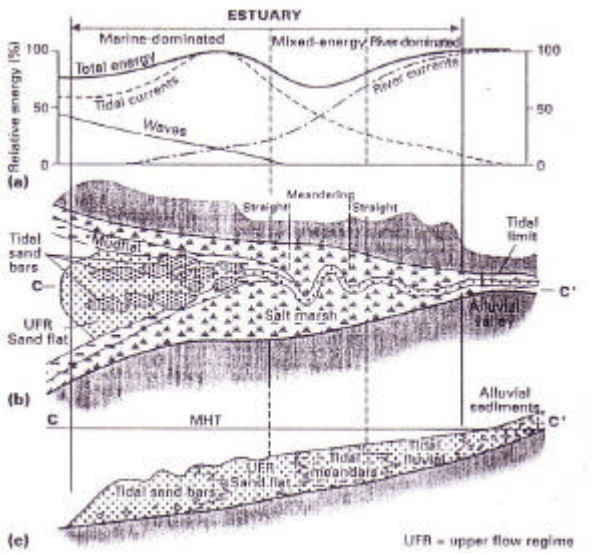
6. Answer one of the two following questions (20p):

a. Discuss special sedimentological environment. To answer this question you need to: 1) d e ; 2) describe the different zones within an estuary; and 3) explain the classification of estuaries based on the dominant processes. *** Make use of the figures (6A) and (6B).

6A



6B



b. Discuss the relationship between sea-level changes and carbonate production/ accumulation (i)? Define the different types of carbonate platforms (ii). Do these platforms behave similarly during sea-level changes (justify your answer; iii) ***Make use of the following figures (6C and 6D).

6C

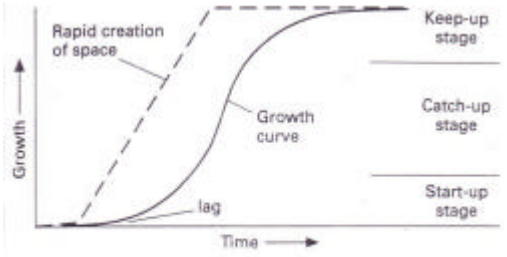


Figure 9.5 Growth curve for carbonate systems (modified from Schlager, 1992).

6D

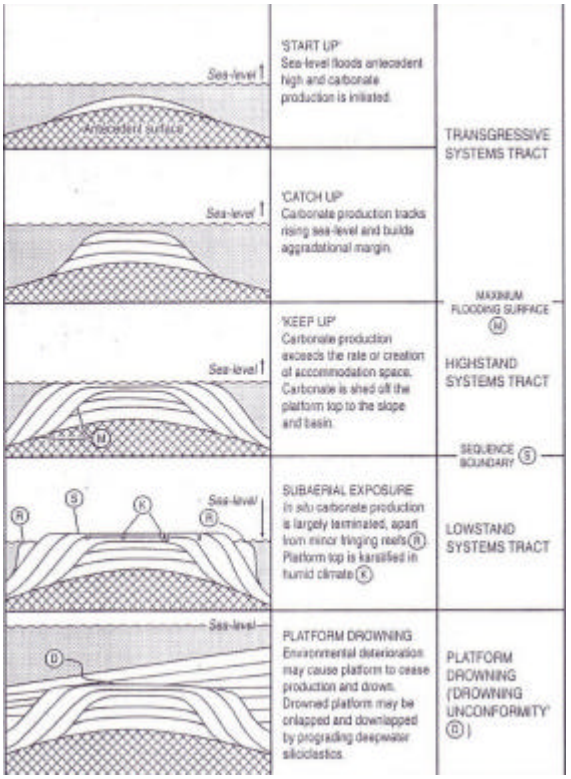


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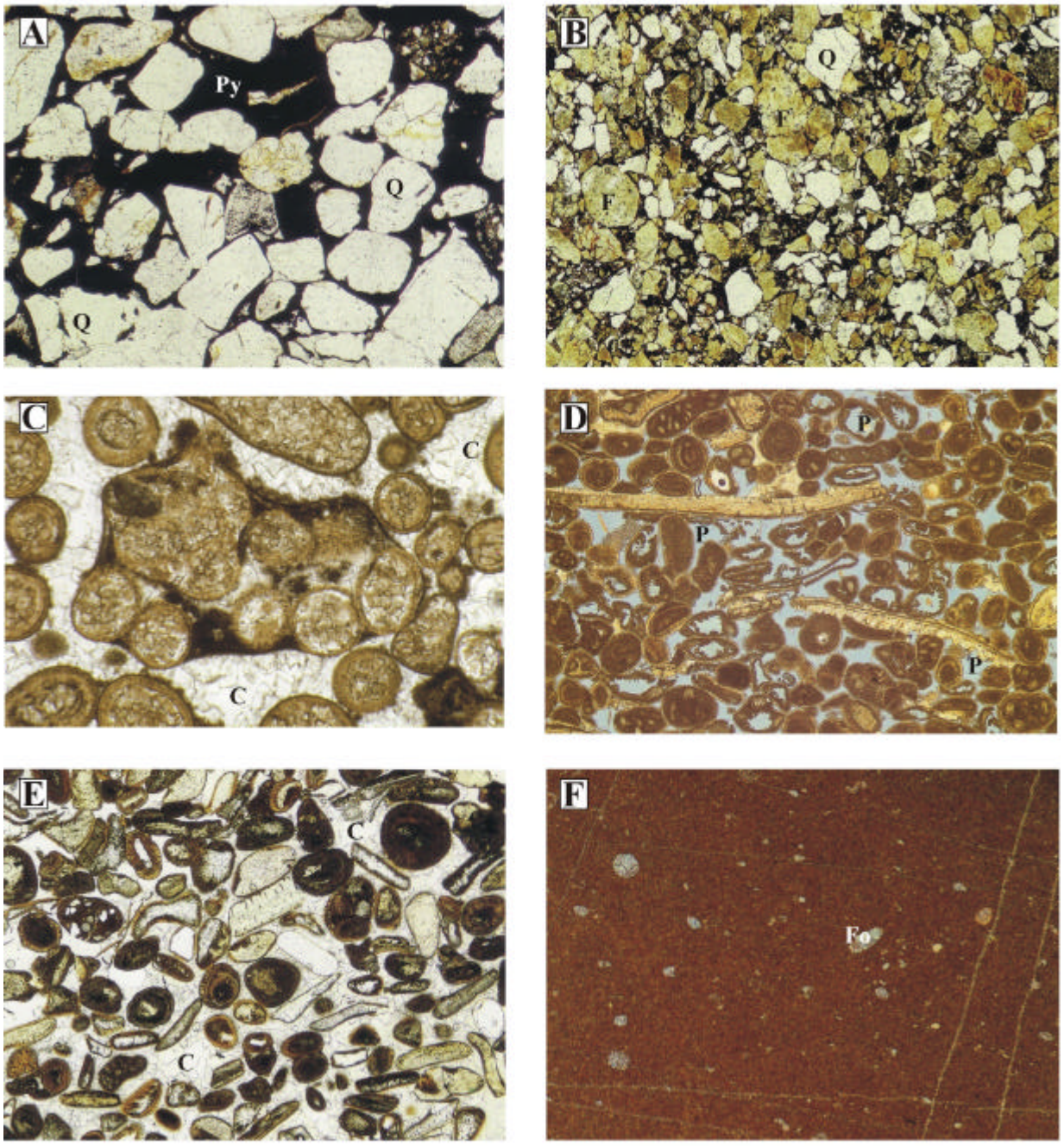
PLATE I
Photomicrographs of sandstones and limestones



F: feldspar; Fo: fossil (mold); Py: pyrite (cement); Q: quartz; C: cement; P: pore.

PLATE II
Folk's limestone and dolomite classification

					Limestone & Partly Dolomitized Limestone					Replacement Dolomite (V)	
					> 10% allochems allochemical rocks		< 10% allochems microcrystalline rocks (III)		undisturbed bioherm rocks (IV)	allochem ghosts	no allochem ghosts
					sparry calcite cement > microcrystalline ooze matrix (I)	sparry calcite cement < microcrystalline ooze matrix (II)	1 - 10% allochems	<1% allochems			
					sparry allochemical rocks	microcrystalline allochemical rocks					
volumetric allochem composition	> 25% Intraclasts				Intrasparrudite Intrasparite	Intramicrudite Intramicrite	Intraclast-bearing micrite	Micrite (if disturbed: dismicrite; if primary dolomite: dolomicrite)	Biolithite	Finely crystalline intraclastic dolomite	Medium crystalline dolomite
	< 25% Intraclasts	> 25% Ooids			Oosparrudite Oosparite	Oomicrudite Oomicrite	Oolite-bearing micrite			Coarsely crystalline oolitic dolomite	
		< 25% Ooids	volume ratio of fossils to pellets	> 3:1	Biosparrudite Biosparite	Biomicrudite Biomicrite	Fossiliferous micrite			Aphanocrystalline biogenic dolomite	Finely crystalline dolomite
				3:1 - 1:3	Biopelsparite	Biopelmicrite	Pelletiferous micrite			Very finely crystalline pellet dolomite	
				< 1:3	Pelsparite	Pelmicrite					

(most abundant allochems)

(evident allochem)

Visual Estimation Chart