

Study Guide for Final Exam

The final will consist of 22 - 25 short-answer, matching, and multiple-choice questions which will cover *chiefly* material from coastal processes on through the end of the course. There *may* be one series of questions involving interpretation of a geologic map or cross-section. About six questions will be on slides; these will be comprehensive and may cover any aspect of the course. Questions will be similar to those on the midterms-- I will be looking for conceptual grasp and idea associations rather than rote memorization.

I have listed below the terms I expect you to be familiar with. In the test I will not introduce or ask you about other technical terms. The questions below are designed to guide your study, and to indicate the sorts of things and idea-associations I would like you to understand.

SHORELINES

Know and understand the following terms:

longshore drift (transport)	spit	stack
wave refraction	bar	
marine terrace	estuary	

1. What determines the direction of longshore drift?
2. What are the main sources of sand to beaches? What are the main processes by which sediment is removed from beaches?
3. How are marine terraces formed? Under what circumstances are they likely to be preserved? How might we be able to determine the relative ages of several terraces?
4. What sort of changes in the beach/shore might occur downdrift (i.e., downshore) from a breakwater that reduces the rate of longshore drift. Updrift from the breakwater?
5. What features would help you to recognize a submergent (drowned) coastline? An emergent one? From a plate tectonic standpoint, where would you expect to find emergent coasts? Submergent ones?

CLIMATE AND CLIMATIC CHANGE

1. Be familiar with the factors which can cause climatic change (e.g. continental drift, astronomical causes, variations in solar radiation, volcanic activity, carbon dioxide concentration, etc.) and understand *how /why* they cause the change.
2. What sort of evidence/techniques are used to determine climatic conditions in the past? What sort of evidence do we have for climatic change? How do we determine past temperatures?
3. How are oxygen isotopes used to deduce past climate?
4. What is the Milankovich theory? According to it, what factors affect the amount of solar radiation reaching the earth's atmosphere? How well do its predictions correspond with observed climatic fluctuations from the geologic record?
5. What do we think are the chief causes for the repeated glaciations the earth has experienced in the last 2 million years? How do these work? What sort of evidence do we have to support this?
6. How might changes in climate affect erosional processes? Think here about the relation of sediment production to climate. In particular, what sort of climatic shifts might cause a stream to aggrade (deposit)? to degrade (downcut)?

WIND AND DESERTS

Know and understand the following terms:

barchan	blowout	playa
transverse dune	loess	bajada
longitudinal (linear) dune	deflation	pediment
parabolic dune	saltation	inselberg
star dune	slip face	

1. In what parts of the globe are deserts most common? Why do they form where they do? (i.e., think about atmospheric/meteorologic causes for the distribution of deserts)
2. What conditions are necessary to make wind an effective agent of erosion? (hint: consider such factors as vegetation, wind intensity and duration, particle size of materials available for transport, etc.)
3. What sorts of areas are likely to be subject to significant deflation? What sorts of human activities will lead to increases in deflation and why?
4. How is sediment transported by the wind? In particular, under what conditions are the different particle sizes entrained (picked up) and how far/high are they transported? Why?
5. Under what conditions of sand supply, wind strength/directional variability, and vegetation would you expect to find each of the following types of dunes? What do each of the dune types look like?
barchan transverse dune longitudinal (linear) dune star dune parabolic dune
6. How do sand dunes move? From looking at a dune (on the ground, in a photo, or on a map), how can you tell which direction it's moving and which direction the prevailing winds are likely to be from?
7. How do sand dunes become stabilized? What sorts of natural environmental changes or human activities can cause stabilized dunes to start moving again, and why?
8. How are loess deposits formed? In what geologic/geographic environments are loess deposits most likely to form or accumulate?
9. What are the major factors leading to desertification? How can desertification be controlled or reversed?

EARTHQUAKES AND THE EARTH'S INTERIOR

Know and understand the following terms:

focus	mantle	S-wave
epicenter	crust	P-wave
magnitude	core	L-wave (surface wave)
intensity	lithosphere	travel time
seismometer		tsunami

1. How are earthquakes caused? Why do we think so?
2. How can we tell how far away an earthquake epicenter is? How are earthquake epicenters located?
3. How do S-waves differ from P-waves? (Which travels faster? What can P-waves penetrate that S-waves cannot?)
4. What does seismology tell us about the internal structure of the earth? That is, what is the evidence for the existence of crust, mantle, and core?
5. Where (in what tectonic/ global settings) are earthquakes most common? Least common? Why?
6. What is the difference between earthquake *magnitude* and *intensity*? What factors affect the intensity of an earthquake?
7. What factors increase both direct and indirect damage from earthquakes?
8. What sorts of sites are most stable/ secure during earthquakes? Least stable/ secure?
9. What sorts of actions can we take to minimize earthquake damage and losses?

PLATE TECTONICS, CONTINENTAL DRIFT, AND GEOMAGNETISM

Know and understand the following terms:

density	divergent boundary
isostasy	convergent boundary
magnetic anomaly	transform boundary
polar wandering curve	subduction zone (trench)
magnetic reversal	mid-oceanic ridge (rise)
paleomagnetic direction	fold–mountain (orogenic) belt
convection	lithospheric plate
plume ("hot spot")	

1. How does the distribution of mid–oceanic rises, trenches, and volcanic arcs fit together in the picture of sea–floor spreading? (What do we think is going on?)
2. Where are fold–mountain belts and volcanic arcs located? Why? (How do we think they are formed?)
3. How does our plate tectonic model explain the origin of basalts, andesites, and granites?
4. Why are continents high and ocean floors low?
5. What is the most important source of heat in the earth?
6. Think about the various lines of evidence that we have to back up our picture of continental drift and sea–floor spreading. (Consider seismic data, magnetism, age of sea floor, geologic structure, fossils).

GEOLOGIC STRUCTURE

Know and understand the following terms:

contact	strike	overturned fold
formation	dip	fold axis
unconformity		plunge (of a fold)

anticline	Know the sequence of beds (i.e. relative ages) exposed when these structures are eroded, so that you can tell an anticline from a syncline a map.
syncline	
dome	
basin	

normal fault	Which of these suggests extension? Compression?
thrust or reverse fault	
strike-slip fault	
graben	

joint	How is it different from a fault?
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Be able to interpret the geologic history of an area from a geologic map or cross-section, i.e., be able to reconstruct, from oldest (first to occur) to youngest, the sequence of events represented by the map or cross-section, including all episodes of folding, faulting, tilting, intrusion, and erosion.

ENERGY & MINERAL RESOURCES

Know and understand the following terms:

peat

lignite

bituminous coal

anthracite

petroleum

oil trap

source rock

reservoir rock

caprock (roof rock)

evaporites

pegmatites

ore

hydrothermal ore deposits

magmatic ore deposits

sedimentary ore deposits

residual ore deposits

placer ore deposits

1. What is petroleum. In what environment does it originate and how is it formed? Why do we think so?
2. What conditions are necessary for oil accumulation? (i.e., source rock, reservoir rock, trap/ caprock). What is an oil trap? Why do we need it? Give some examples of traps.
3. What is oil shale?
4. What is coal? How is it formed? What sort of environment of deposition does it reflect? Why do we think so?
5. What is an ore deposit? What sorts of processes lead to their creation?
6. In association with what sort of rocks are heavy-metal (e.g., copper, lead, zinc, silver, gold) ore deposits generally found? In what plate tectonic environment do we believe these deposits are commonly created, and by what mechanism are they created?
7. How are placer deposits formed? What sorts of materials are commonly concentrated as placer deposits?
8. What sorts of minerals are found in sedimentary ore deposits? In what sorts of geologic/plate tectonic environments do (or did) major sedimentary ore deposits form?
9. How can weathering processes lead to the formation of ore deposits? What sorts of materials may be concentrated in this way?
10. How can magmatic processes lead to the formation of ore deposits? What sorts of materials may be concentrated in this way, and in what sort of geologic/plate tectonic environment would you expect to find them?