Notes on Waves, Tides and Coastlines

Vocabulary: Please number and define each term below in a complete sentence on a separate sheet of paper. (Those terms that are * please illustrate)

<table>
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Chapter 10: Waves

10.1 How a Wave Begins

10.2 Anatomy of Wave

1. Diagram a wave with the all of its parts: (trough, wavelength, wave height (amplitude))

10.3-4 Wave Motion and Wave Speed

1. Why is this statement wrong, explain why: Waves represent a flow of water
   - Represents the flow of ____________, water doesn’t move energy flows through it, water is the ‘medium’

2. How do you calculate the speed of a wave:
   - __________________________

3. Calculate (wavelength= 20 meters, wave period= 10 seconds)
   - 20 meters/10 seconds = __________________________

10.5 Deep-Water Waves

1. Define swell
   - Large uniform waves that appear as a regular pattern of ______ and ___________

2. What are three factors that control wind-wave height
   1. ________________
   2. Wind Duration
   3. ___________ (distance over water, wind blows in a single direction)
   - Only when all three factors combine do large wind waves occur

10.6 Wave Height

1. Define episodic waves, how are they different from wind-waves how are they the same?
   - Large waves up to _______________ that move up to 25 meters/second (60 mph) occur near the edge of the Continental Shelf (600 feet) can occur due to either winds or currents

2. What are the conditions in the ocean, when winds reach speeds of 8-9 meters/second?
   - 1.22 to 2.44 meters in height (see page 254), a maximum wave height of _______________

Wave Steepness
10.7 Shallow-Water Waves
1. Why do waves change directions in shallow water?
   - ocean floor may be irregular, when wave begins to feel bottom in shallow water it changes its
     ____________, ____________ and possible direction

2. Identify: ___________ of waves: Wave crest bend due to different depth changes
   ___________ of waves: Wave crest spread energy sideways due to a meeting with a partial barrier

10.8 The Surf Zone
1. Describe the type of beaches associated with the waves below, which breaker would a surfer prefer?
   - ______________ - break on narrow, steep beaches, lose energy quickly
   - ______________ - more common found over wider, flatter beaches == better rides for surfers

10.10 Tsunamis
1. Define Tsunami - a seismic wave caused by a sudden movement of the Earth’s crust, have very long
   ______________ (up to 200 kilometers)
   2. What is it incorrectly called by most people? A ____________ - has to do with tides!

3. Tsunami speed in the open ocean: 200-250 meters/second or ______________
4. Tsunami height in the open ocean: ______________
5. What occurs when it reaches shallower water? Wave height dramatically increases, ___________, sea
   level drops out, wave can approach in a series of waves or one large wave, depending on
   ______________
6. List some famous tsunamis, where are they all located?
   1. ______________, Sumatra EQ led to more deaths than past 100 years - at last count 300,000 dead
   2. ______________ - Coastal Submarine EQ led to a tsunami that killed 170
   3. ______________ - Maumere, Indonesia 82 foot tsunami killed 1,000 people
   - All are located near ______________

Tides
11.1 Standing Waves
1. Define:
   - ______________ - waves that reflect back on themselves
   - ______________ - the point of least vertical motion in a standing wave
   - ______________ - the trough and crest or alternations of high and low water

The Tides
1. Define
   - ______________ - Area that only receives one high and one low tide
   - ______________ - Area that receives 2 highs and 2 low tides
   - ______________ - Area where high and low tides vary in height (San Diego and Seattle)
   - ______________ - the force that pulls the moon away from the Earth, sending it into outer space
     canceled by Earth gravity

2. How long does it take for the Earth to make one ______________? 24 hours
3. How long does one tidal day take? Why is it different then one day’s time?
- ________________, while Earth rotates, the moon is moving eastward but fall 12 degrees (12 degrees = ________________) behind

4. Copy figure 11.6 (page 284) and indicate high where high and low tides will be, what else changes from ‘t=0’ and ‘t=24’?

5. What is the difference between spring tides and neap tides?
- __________ tide- new moon- Sun on same side of Earth= highest high tide
- __________ tide- 1\textsuperscript{st}, 3\textsuperscript{rd} quarter phases, Sun and Moon at right angles= lowest low tide

Real Tides in Real Oceans
Predicting Tides and Tidal Currents
1. What data does a tide table give?
- ______________ at different locations, calculated by NOAA

11.6 Tidal Bores
1. Where do tidal bores occur, why are they hazardous?
- Large amplitude tides near shallow coasts, bays and river mouths, sometimes creating large breaking waves up to ______________ (Qiantang River China)

Chapter 12: Coastlines
12.2 The Coast
1. What areas does the coastal zone include?
- the ______________

2. What make a primary coast different from a secondary?
- __________ - appearance is due to land processes
- __________ - appearance is due to marine processes

Types of Coasts
1. List the way two primary coasts form and examples of each:
- ______________- sea level has risen, ex. Chesapeake and Delaware Bays

- ______________- river deposition in coastal area, ex. Mississippi and Nile river mouths

2. List the way two secondary coasts form and examples of each:
- ______________- made by wave erosion, ex. Hawaii and California

- __________ - Shallow coasts full of sediments boardered by barrier islands, ex NJ coast and Gulf of Mexico

12.3 Anatomy of a Beach
1. What affects the slope of a beach?
- ______________ that make up beach and ______________

12.4 Beach Types
1. How are beaches categorized?
- ______________
-Composition of beach material
-________________________
-Color of Beach
2. Describe what materials make up beaches, how do they get there?
-________________________ and whatever materials are in the local environment or from upstream, rivers bring sediments, waves and currents break apart minerals
3. Determine the origin of a:
-White Sand Beach- __________________________
-Black Sand Beach- __________________________
-Green Sand Beach- Specific mineral __________________________
-Pink Sand Beach- __________________________
4. What color is the sand along NJ, Delaware, MD…? Where do you think these sediments originated?
-Answers should vary but mainly a ‘khaki’ color, due to mainly __________________________
-Hudson- where does it originate?

12.4 Beach Processes
1. What causes a longshore current?
-Waves approach a beach at an ________________ creating a current in the surf zone
2. Why are longshore currents important?
-Produces longshore transport which move sediments in a ________________ direction in North America

Coastal Circulation Cells
1. Diagram a riptide:

2. What must a swimmer know to escape a rip current?
-Always __________________________ until you are out of the rip

3. How would you see a rip current from the beach?
-Look like ________________ due to sediments suspended in water and being pulled out

Rising Sea Levels
1. What would be some reasons for not buying real estate on a barrier island?
-__________________ take brunt of winter storms
-Almost impossible for government to give you aide for storm or flooding damage
-Most island are only a few feet above sea level, __________________________

12.7 Estuaries
1. Give two reasons why estuaries are valuable ecosystems?
-________________________ into the larger ocean (great solvent)
-Development of __________________________, nutrient rich water accumulates hear
2. How are wetlands related to estuaries?
-________________________ and provide nutrients, food, shelter and spawning areas for marine species