EOSC 114: Natural Disasters
Waves & Tsunami

Here are the clicker questions posed in class. I added a few more for you to use as a study tool for the Mid-term and Final Exam.

No answers are provided. If you have questions about these, post them on the Discussion Board on Connect.

L. May Ver

When wavelength decreases, steepness will _____?

A. Stay the same
B. Increase
C. Decrease
D. Accelerate
E. Slow down

In the middle of Georgia Strait where d = 450 m, which of the following waves is a deepwater wave?

A. L = 200 m
B. L = 1.5 km
C. L = 60 m
D. L = 4.5 m
E. L = 200 km

HINTs:
-check if $d \geq \frac{L}{2}$
-pay attention to *units*!

As wave A with L = 200 m approaches Kits Beach, at what depth does it become a shallow water wave?

A. d = 100 m
B. d = 20 m
C. d = 10 m
D. d = 4.5 m
E. d = 1 m

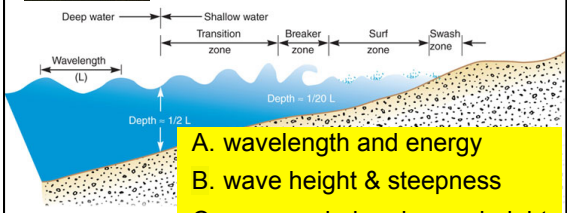
In deep water, do longer waves travel FASTER or SLOWER than shorter waves?

A. Longer waves travel faster than shorter waves because *c* is proportional to *L*
B. Longer waves travel slower than shorter waves because *c* is inverse to *L*
C. All waves travel at the same celerity in deepwater

2 waves are in d = 2 m water
wave A, L = 100 m
wave B, L = 120 m
Which of the following is true?

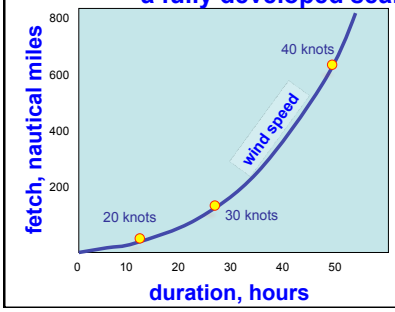
A. The 100m wave is moving faster than the 120m wave
B. The 120m wave is moving faster than the 100m wave
C. Both waves are moving at the same speed
D. There is not enough information to solve this problem

As waves approach the shore, which of the following parameters increase?



A. wavelength and energy
B. wave height & steepness
C. wave period and wave height
D. wave energy and celerity
E. wavelength and height

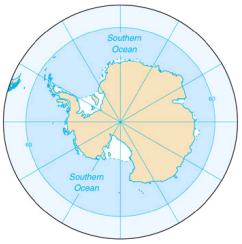
Over a fetch of 400 nautical miles, a wind must blow with a speed of about ___ over ___ hrs to generate a fully developed sea.



A. 800, 40
B. 300, 20
C. 10, 20
D. 35, 40
E. 40, 50

The largest wind-driven waves develop in the Southern Ocean around Antarctica. Which of the following factors (influencing wave height) does the Southern Ocean have the biggest advantage over any other ocean in the world?

A. Ice cover
B. Wind speed
C. Wind duration
D. Fetch
E. Coriolis Force



What do you think happens when two different ocean waves meet?

A. This can't happen, because ocean waves all move in the same direction
B. The bigger wave absorbs the smaller wave's energy, and gets even bigger
C. The smaller wave removes some of the bigger wave's energy
D. The waves combine to produce a more complex wave
E. The waves crash together and break

Why do you think can Tsunami grow to very large H and be very devastating in an enclosed water body?

A. The tsunami interferes constructively with the seiche of the bay.
B. There is destructive interference between the tsunami and wind waves in the bay.
C. The tsunami constructively interferes with tides in the bay.
D. Tsunami energy increases as they approach shallow water in Hilo Bay.

Tsunami waves have wavelengths **L ≈ 200 km** or longer. In the open ocean, if water depth **d ≈ 5 km**, which statement is TRUE?

A. Tsunami waves are deep-water waves
B. Tsunami waves are shallow water waves

Selected equations for Waves Module:

$$d \geq \frac{L}{2} \qquad d \leq \frac{L}{20} \qquad c_{deep} = \frac{L}{T} \qquad c_{shallow} = \sqrt{g \times d}$$

Why are tsunami common in the Pacific Ocean?

A. The Pacific is the largest ocean, so there's more chance of a tsunami occurring

B. There's a huge number of earthquake activity around the Pacific

C. The Pacific is the deepest ocean, allowing a tsunami to become larger

D. Pacific coastlines are the most heavily populated, so tsunami are more likely to be observed there

Which aspect of a tsunami is the MOST predictable?

A. wavelength

B. height

C. period

D. celerity

E. steepness

Waves are the result of energy travelling across the ocean. What **ultimately** happens to that energy?

A. Energy is reflected off the coast, creating new waves that travel in the opposite direction.

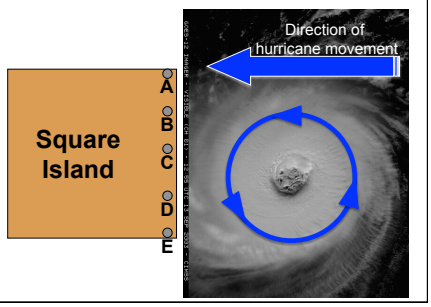
B. Energy is absorbed by the coast.

C. Energy is transformed to friction with the ocean bottom.

D. Energy moves water, rocks, sediments, people, etc.

Hurricane Roland is predicted to hit the coast of Square Island (in the Northern Hemisphere). Which town is MOST at risk for storm surge hazards?

A
B
C
D
E



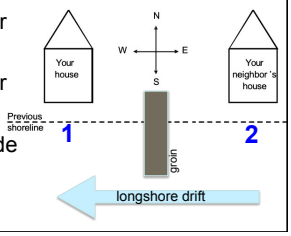
You live in a beachfront house (1). Your neighbour (2) decides to build a groin as shown below. How will the shoreline be affected by the groin?

A. Sand will accumulate along the whole beach front

B. The beach will erode near (1) and build up near (2)

C. The beach will erode near (2) and build up near (1)

D. The entire beach will erode completely



Which direction does longshore drift typically occur in the region shown below?

A. North to South
B. East to West
C. West to East
D. South to North