

Module 4 Assignment: Water Movement

Started: Oct 13 at 8:34am

Quiz Instructions

Question 1

6 pts

Modeling Waves - the equations you need to answer this section are all found in your **textbook section 10.3** and also in the PDF file I posted in Module 4 called *Waves Help*.

What is the speed (in meters per second) of a wave with wavelength of 40 m, traveling over a depth of 30 m? (round your answer to the first decimal place; for example 12.25 should be rounded to 12.3)

Question 2

6 pts

Modeling Waves - the equations you need to answer this section are all found in your **textbook section 10.3** and also in the PDF file I posted in Module 4 called *Waves Help*.

What would be the speed in meters per second of the same wave ($L=40\text{m}$) if it were traveling over a depth of 0.5 m? (round up your answer to the first decimal place).

Question 3

6 pts

Modeling Waves - the equations you need to answer this section are all found in your **textbook section 10.3** and also in the PDF file I posted in Module 4 called *Waves Help*.

If a wave has a wavelength (L) of 160 m and is traveling over a depth of 7 m is it a deep, transitional or shallow water wave?

Question 4

6 pts

Modeling Waves - the equations you need to answer this section are all found in your **textbook section 10.3** and also in the PDF file I posted in Module 4 called *Waves Help*.

Calculate the speed, C , (in meters per second) of a tsunami with a wavelength of 180,000 meters (180 kilometers or 112 miles) and period of 15 minutes traveling over the Pacific (which has an average depth of 4000 meters (4 kilometers or 2.5 miles)).

Round up your answer so that there is no decimal.

Question 5

6 pts

Using the speed of the tsunami that you calculated above, answer the following question:

How long would it take (IN HOURS) for a tsunami to arrive at the coast of southern California if it was generated by an earthquake off the coast of Japan? (the distance between Tokyo and LA is approximately 9,000,000 meters 9,000 km)

You will first need to calculate how many seconds, then convert seconds to minutes, and finally convert minutes to hours. Your answer should be in hours.

Round your answer to the first decimal place (for example 10.634 would be rounded to 10.6)

Question 6

8 pts

were to drop a message in a bottle off the shore of the following locations, where could you

#6

Eastern Australia or wes

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question #6

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4 questions / 1 choice

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nd: Ireland, the UK, or possibly France taken by Gulf Stream Current and North Atlantic Current. But if it turned south, it could end up on west Africa
nd: Eastern Australia or western New Zealand taken by South Equatorial Current and East Australian Current
nd: Shores of eastern Japan taken by CA Current, the North Equatorial Current, Kuroshio Current
nd: North Africa taken by the Benguela Current, South Equatorial Current into the Agulhas Current or it could rejoin the South Equatorial Current going

1 pts

Global Surface Ocean Currents

Under normal conditions, ocean currents follow very regular patterns. If you were to drop a message in a bottle off the shore of the following locations, where could you likely find it and which current(s) would likely take it there?

Origin: Los Angeles, CA (USA)

[Choose] ▼

Origin: Atlantic Coast of Florida (USA)

[Choose] ▼

Origin: The Galapagos Islands

[Choose] ▼

Origin: The Seichelles

[Choose] ▼

Question 7

1 pts

What is NOT a characteristic of western boundary currents?

- ☐ They are broad currents.
- ☐ They are fast moving currents.
- ☐ They move warm water poleward.
- ☐ They are deep currents.

Question 8

1 pts

Why are internal waves important?

- ☐ They play an important role in shaping coastal topography

- ☐ They can remove nutrients from the surface
- ☐ They can mix nutrients to the surface
- ☐ They create wind patterns

Question 9

1 pts

El Nino tends to...

- ☐ increase the east to west flow of the North Equatorial Current
- ☐ cause upwelling of nutrient poor water
- ☐ increase the amount of nutrients available in the photic zone
- ☐ occur primarily in the Atlantic, which causes hurricanes

Question 10

1 pts

What force is responsible for the movement of water masses that are engaged in thermohaline circulation?

- ☐ Coriolis Effect
- ☐ Gravity
- ☐ Trade winds
- ☐ Pressure

Question 11

1 pts

Which below is NOT a major factor that affects surface currents?

- ☐ Wind
- ☐ Coriolis Effect
- ☐ Density
- ☐ Gravity

Question 12

1 pts

Winds blowing off-shore or parallel to shore will cause

- ☐ Wave diffraction
- ☐ Coastal downwelling
- ☐ Coastal upwelling
- ☐ Coastal eddy formation

Question 13

1 pts

What directions to gyres flow in the southern hemisphere?

- ☐ Counter clockwise
- ☐ Always towards the Equator
- ☐ Clockwise
- ☐ clockwise in the Indian ocean and counter-clockwise in the Atlantic ocean

Question 14

1 pts

All of the following are true about the "global conveyor belt", except that...

- ☐ it distributes gases and solids around the globe
- ☐ it brings warm water to the sea surface
- ☐ it transports juvenile organisms
- ☐ it mixes nutrients

Question 15

1 pts

What force generates the tides?

- ☐ The sun and moon generate the tides equally
- ☐ the coriolis effect
- ☐ Mostly the sun
- ☐ Mostly the moon

Question 16

1 pts

In southern California, what is our typical tidal pattern per day (lunar day)?

- ☐ one high and one low
- ☐ two equal high tides and two equal low tides
- ☐ three unequal highs and three unequal lows
- ☐ two unequal highs and two unequal lows

Question 17**1 pts**

When does a wave begin to interact with its bottom?

- ☐ When the bottom is deeper than $\frac{1}{2}$ the wavelength
- ☐ When the bottom is shallower than twice the wavelength
- ☐ When the bottom is deeper than twice the wavelength
- ☐ When the bottom is shallower than $\frac{1}{2}$ the wavelength

Question 18**1 pts**

What is a major challenge to organisms that live in the intertidal zone?

- ☐ downwelling of nutrients
- ☐ Emann transport carries food away from the coast
- ☐ periodic emergence & submergence
- ☐ abundance of wave action over-oxygenates that water

Question 19**1 pts**

What is a rogue wave?

- ☐ A wave much larger than the theoretical maximum wave sustained by a fully developed sea
- ☐ All of the above
- ☐ The constructive interference of many wavelengths
- ☐ A freak, unpredictable wave

Question 20

1 pts

Why does wave refraction occur?

- ☐ Waves break perpendicularly to the shore
- ☐ The density of the wave alters in shallow water
- ☐ Wave lines approach shore and enter into different depths
- ☐ Due to extremely high temperatures

Question 21

8 pts

List and explain the **three factors** that affect the development of wind waves in the open ocean.

(Note that I'm not interested in "breakers" or surf here. I want you to explain how large open-water waves form)

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8 pts



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Question 24

8 pts

Suppose the following:

You are conducting a research study of organisms that live in tide pools.

In order to conduct your observations correctly you need to be able to see the organisms during the lowest tide possible (so that they are exposed the most and for the longest time).

You are trying to decide when to go to your research site and you are considering whether or not to go observe tide pool organisms the next day.

You do not have access to a tide calendar but you went outside the night before and saw that the MOON was HALF FULL (quarter moon).

Should you still plan on going to your research site the following day or should you wait to go conduct your observations on a later day?

Explain why or why not and when would be the BEST time to go conduct your research at the tide pools.

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Question 25

8 pts

According to Video Episode 11, why is it so difficult to predict El Nino events?

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Question 26

8 pts

According to video episode 13, what is a rip current AND how do you get out of a rip current if you are caught in one?

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