PART 1

A. **Print the following on your scantron**
   - Your first and last name (not your codename)
   - I already have your codename – do not write it on your scantron
   - Today’s date and which section you are in (MW or TTh)

B. **Exam Format:**
   - **Part 1:** slide show – 30 seconds per slide
   - **Part 2:** Wall Photo Marine Life ID
   - **Part 3:** the rest of the exam questions
   - **Closed book exam:** No cell phones, lap tops, palm pilots, etc.
   - **Calculators:** Calculators will be provided. Students may not use their own calculators.
   - **You are responsible for preventing other students from cheating off of your exam**
   - **There is another class in the room after the exam** Students who need more time may continue working on the exam in the center area; however
   - **Students who arrive late** may not work past the standard ending time for the class.
   - **Warning:** go to the restroom before the exam. You may not leave the room once you start the exam.

C. **For all questions, choose the best answer from the selection provided.**
   - Answers can (and will) repeat – do not worry about that - choose the best answer for each question

D. **For the on-screen slides**
   - each slide will stay on the screen for 30 seconds
   - the slides will loop and repeat for the rest of the exam period
   - you have thumbnail versions of each of the slides on the attached pages
   - you may use the computers in the adjacent room to view the slides at your own pace
     - use the arrow keys to control the slideshow

E. **Your score**
   - there are 150 questions – of these the first five that you miss will not hurt your score
   - you may apply these 5 “freebies” to questions that you do not “like”, to questions where you smear the answers on your scantron, or to questions that you simply do not know
   - you do not need to indicate which questions you want thrown out – the first five that you miss will be the ones thrown out for you
   - your score will be calculated by dividing the number you get correct by 145
   - if you get all 150 questions correct, you will earn extra credit

F. **Grades**
   - will be posted in the next few days on the outside bulletin board and on my website

G. **When you are finished with the exam**
   - turn in your 2 text booklets and your scantron
   - leave, very very quietly so that you do not disturb students who are still working on the exam
### On-Screen Photo ID #1-21

For EACH photo, pick the best answer from the selection choices provided  
- be as specific as possible.   **Answers and/or letters may repeat.**
Example: if Picture #7 was an sheeted dike, then bubble in ‘a and d’ on your scantron for #7

<table>
<thead>
<tr>
<th>Term</th>
<th>Answer(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>absorption of light</td>
<td>a, b, e</td>
</tr>
<tr>
<td>abyssal plain sediments</td>
<td>a</td>
</tr>
<tr>
<td>atoll</td>
<td>a</td>
</tr>
<tr>
<td>aseismic ridge</td>
<td>b</td>
</tr>
<tr>
<td>basalt</td>
<td>c</td>
</tr>
<tr>
<td>black smoker</td>
<td>d</td>
</tr>
<tr>
<td>CCCD</td>
<td>e</td>
</tr>
<tr>
<td>chert</td>
<td>a, b</td>
</tr>
<tr>
<td>conglomerate</td>
<td>a, c</td>
</tr>
<tr>
<td>delta</td>
<td>a, d</td>
</tr>
<tr>
<td>estuary</td>
<td>a, e</td>
</tr>
<tr>
<td>fracture zones</td>
<td>b, c</td>
</tr>
<tr>
<td>gabbro</td>
<td>b, d</td>
</tr>
<tr>
<td>glauconite sands</td>
<td>b, e</td>
</tr>
<tr>
<td>limestone</td>
<td>d, e</td>
</tr>
<tr>
<td>longshore transport</td>
<td>c, e</td>
</tr>
<tr>
<td>manganese nodules</td>
<td>a, b, d</td>
</tr>
<tr>
<td>a map of ocean floor ages</td>
<td>a, b, c</td>
</tr>
<tr>
<td>marine terraces</td>
<td>a, b, d</td>
</tr>
<tr>
<td>microplankton shells</td>
<td>a, b, e</td>
</tr>
<tr>
<td>Ninety-East Ridge</td>
<td>b</td>
</tr>
<tr>
<td>phosphorite nodules</td>
<td>b, c, d</td>
</tr>
<tr>
<td>pillow basalt</td>
<td>b, c, e</td>
</tr>
<tr>
<td>reflection of light</td>
<td>a</td>
</tr>
<tr>
<td>refraction of light</td>
<td>a, b, c, d, e</td>
</tr>
<tr>
<td>rise</td>
<td>b, d, e</td>
</tr>
<tr>
<td>sandstone</td>
<td>c, d, e</td>
</tr>
<tr>
<td>sea cave</td>
<td>a, b, c, d</td>
</tr>
<tr>
<td>sea arch</td>
<td>a, e</td>
</tr>
<tr>
<td>sea cliff retreat</td>
<td>a, b, d</td>
</tr>
<tr>
<td>sea stacks</td>
<td>b, c, d</td>
</tr>
<tr>
<td>seamount</td>
<td>a, b</td>
</tr>
<tr>
<td>sheeted dike</td>
<td>a, d</td>
</tr>
<tr>
<td>shelf</td>
<td>c, d</td>
</tr>
<tr>
<td>slope</td>
<td>a, b</td>
</tr>
<tr>
<td>spit</td>
<td>b, d</td>
</tr>
<tr>
<td>submarine canyon</td>
<td>a</td>
</tr>
<tr>
<td>tombolo</td>
<td>c</td>
</tr>
<tr>
<td>trench</td>
<td>b, c, d</td>
</tr>
<tr>
<td>tsunami</td>
<td>a, b, c, d, e</td>
</tr>
<tr>
<td>tufa towers</td>
<td>e</td>
</tr>
<tr>
<td>turbidity current</td>
<td>a, c</td>
</tr>
</tbody>
</table>

**ICE:**
- sea ice - a
- icebergs - b

**VOLCANOES:**
- shield - a
- composite - b
#1-21 On-Screen Photo ID

1. ________________________________
2. ________________________________
3. ________________________________
4. ________________________________
5. ________________________________
6. ________________________________
7. ________________________________
8. ________________________________
9. ________________________________
10. ________________________________
11. ________________________________
12. ________________________________
13. ________________________________
14. ________________________________
15. ________________________________
16. ________________________________
17. ________________________________
18. ________________________________
19. ________________________________
20. ________________________________
21. ________________________________
ISLANDS #22-28

barrier bar/islands- **bc**
composite, subduction zone volcanoes- **bd**
MOR shield volcano- **be**
hot spot shield volcanoes- **cd**
caye/coral sand islands- **ce**
Palau Islands! – **de**
a drowned hill!- of “continental rocks” - **abc**
eroded **limestone** continental rocks still on the continental shelf - **ab**
eroded "**granitic**" continental rocks; still on the continental shelf- **ac**
eroded, flooded volcanic crater - **cde**
faulted-off by a transform fault - "**granitic**" continental rocks- **ad**
rifted-off "**granitic**" continental rocks- **ae**
rifted-off "**granitic**" continental rocks with subduction-zone composite volcanoes- **abd**

BLUE HOLE:
blue hole: coral around the top of a seamount - **a**
blue hole: flooded meteor crater- **b**
blue hole: flooded volcanic crater- **e**
blue hole: flooded sinkhole (collapsed limestone cave) - **d**
blue hole: nuclear explosion pit- **e**

REEFS:
Reef: fringing - **abc**
Reef: barrier - **ce**
Reef: atolls - **b**

22. ____________________________ 27. ____________________________
23. ____________________________ 28. ____________________________
24. ____________________________
25. ____________________________
26. ____________________________
### MARINE GEOGRAPHY

Each slide will be displayed for 30 seconds and the slide show will continuously loop and repeat.

Choose from the entire list below for each of the answers. Answers may repeat and not all answers will be used. For answers with multiple letters, bubble-in all letters indicated for that question. For example, if your answer is the Florida Keys, then bubble in “a, c, d and e” for that question.

29. ________________  

30. ________________

| Aleutian Islands | Farallion Islands | Falkland Islands | Montserrat | New Zealand | North Sea | Outer Banks | Padre Island | Palau | Papua New Guinea | Philippines | Red Sea | San Andreas Fault | San Francisco Bay | Sandwich Islands | Sargasso Sea | Sea of Cortez | Shark's Bay | Sicily | Solomon Islands | Sri Lanka | Tahiti | Taiwan | Tonga | Ural Mountains |
|------------------|--------------------|------------------|------------|-------------|-----------|-------------|-------------|-------|-----------------|-------------|---------|------------------|-----------------|----------------|-------------|-------------|-------------|-------|-----------------|-----------|------|--------|--------|--------|------------------|
Part 2
WALL-POSTED PHOTOS

For EACH photo, pick the best answer from the selection provided - be as specific as possible.
Answers and/or letters may repeat. TRANSFER ALL OF YOUR ANSWERS TO YOUR SCANTRON
Example: if Picture #53 was an oyster, then you would bubble in ‘a, b and c’ on your scantron for #53.

31. ________________________________ 51. ________________________________
32. ________________________________ 52. ________________________________
33. ________________________________ 53. ________________________________
34. ________________________________ 54. ________________________________
35. ________________________________ 55. ________________________________
36. ________________________________ 56. ________________________________
37. ________________________________ 57. ________________________________
38. ________________________________ 58. ________________________________
39. ________________________________ 59. ________________________________
40. ________________________________ 60. ________________________________
41. ________________________________ 61. ________________________________
42. ________________________________ 62. ________________________________
43. ________________________________ 63. ________________________________
44. ________________________________ 64. ________________________________
45. ________________________________ 65. ________________________________
46. ________________________________ 66. ________________________________
47. ________________________________ 67. ________________________________
48. ________________________________ 68. ________________________________
49. ________________________________ 69. ________________________________
50. ________________________________ 70. ________________________________
**Marine Life ID**

**#31-70 – Wall-Posted pictures**

For EACH photo, pick the best answer from ENTIRE list of choices provided  
- be as specific as possible.

**Answers and/or letters may repeat.**

Example: if Picture #53 was an oyster, then you would bubble in ‘a, b and c’ on your scantron for #53.

<table>
<thead>
<tr>
<th>abalone</th>
<th>barnacle</th>
<th>cetacean</th>
<th>clam</th>
<th>coral</th>
<th>crab</th>
<th>cuttlefish</th>
<th>dolphin</th>
<th>eel</th>
<th>fish</th>
<th>hydrothermal vent life</th>
<th>jelly (jellyfish)</th>
<th>kelp</th>
<th>lobster</th>
<th>manta ray</th>
<th>manatee (sea cow)</th>
<th>microplankton</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
<td>e</td>
<td>ab</td>
<td>bd</td>
<td>c</td>
<td>ad</td>
<td>ae</td>
<td>d</td>
<td>bc</td>
<td>bd</td>
<td>be</td>
<td>cd</td>
<td>ce</td>
<td>de</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>mussel</th>
<th>nautilus</th>
<th>nudibranch</th>
<th>octopus</th>
<th>oyster</th>
<th>penguin</th>
<th>sand dollar</th>
<th>sea anemone</th>
<th>sea cucumber</th>
<th>sea hares</th>
<th>seahorse</th>
<th>seal or sea lion</th>
<th>sea star</th>
<th>brittle star</th>
<th>feather star (crinoid)</th>
<th>basket star</th>
</tr>
</thead>
<tbody>
<tr>
<td>abc</td>
<td>abd</td>
<td>abe</td>
<td>bcd</td>
<td>abc</td>
<td>cde</td>
<td>abcd</td>
<td>acde</td>
<td>bcde</td>
<td>abcde</td>
<td>a</td>
<td>b</td>
<td>e</td>
<td>bc</td>
<td>cd</td>
<td>ce</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>sea otter</th>
<th>sea pen</th>
<th>sea turtle</th>
<th>sea urchin</th>
<th>scallop</th>
<th>shark</th>
<th>shrimp</th>
<th>snail</th>
<th>sponge</th>
<th>squid</th>
<th>stingray</th>
<th>tunicate</th>
<th>walruses</th>
<th>whales (cetaceans)</th>
<th>&quot;whale shark&quot;</th>
<th>worms</th>
</tr>
</thead>
<tbody>
<tr>
<td>d</td>
<td>ab</td>
<td>abe</td>
<td>ae</td>
<td>abc</td>
<td>bcd</td>
<td>cde</td>
<td>abcde</td>
<td>abcde</td>
<td>b</td>
<td>abd</td>
<td>be</td>
<td>abcd</td>
<td>c</td>
<td>cde</td>
<td>a</td>
</tr>
</tbody>
</table>
PART 3

The tidal graphs below show the tides at three different locations for a period of time around 25-26 hours.

71.

What type of tides?
- red
- tsunami
- leap
- coriolis
- ekman
- geostrophic
- thermohaline
- diurnal
- semi-diurnal
- mixed
- mesopelagic
- radiolarian
Each of the tidal graphs below shows the tides over a period of slightly longer than one month.

74. What type of tides are indicated above?
- red
- neap
- spring
- leap
- tsunamis
- thermohaline
- geostrophic
- coriolis
- mesopelagic
- ekman

75. What type of tides are indicated above?
- red
- neap
- spring
- leap
- tsunamis
- thermohaline
- geostrophic
- coriolis
- mesopelagic
- ekman
76. This symbol indicates a
- warm front moving to the southeast
- cold front moving to the southeast
- warm front moving to the northwest
- cold front moving to the northwest
- typhoon

77. This symbol indicates a
- warm front moving to the southwest
- cold front moving to the southwest
- warm front moving to the northeast
- cold front moving to the northeast
- typhoon
78. What zone is indicated in the graph on the left?
- the CCCD
- the MOR
- the shelf
- geostrophic
- ekman
- thermocline
- halocline
- pycnocline
- euphotic
- aphyotic
- benthic
- upwelling
- the Gulf Stream

79. The graph to the left shows how what increases with depth?
- the CCCD
- the MOR
- the shelf
- geostrophic
- acidity
- temperature
- salinity
- density
- pressure
- euphotic
- aphyotic
- benthic
- upwelling
- the Gulf Stream
80. What zone is indicated in the graph on the left?
- the CCCD
- the MOR
- the shelf
- geostrophic
- ekman
- thermocline
- halocline
- pycnocline
- euphotic
- aphotic
- benthic
- upwelling
- the Gulf Stream

81. What zone is indicated in the graph on the left?
- the CCCD
- the MOR
- the shelf
- geostrophic
- ekman
- thermocline
- halocline
- pycnocline
- euphotic
- aphotic
- benthic
- upwelling
- the Gulf Stream
82. The graphs to the left are for what regions?
- abyssal plains
- MOR
- subduction zones
- the abyssopelagic
- oceanic gyres
- the CCCD
- geostrophic
- neap
- spring
- polar, "hi" latitudes
- equatorial latitudes
- hot spots

83. The graphs to the left are for what regions?
- abyssal plains
- MOR
- subduction zones
- the abyssopelagic
- oceanic gyres
- the CCCD
- geostrophic
- neap
- spring
- polar, "hi" latitudes
- equatorial latitudes
- hot spots
84. This diagram illustrates the
- absorption of long wavelengths before short wavelengths
- CCCD
- refraction of light
- refraction of sound
- DSL
-sofar channel
- mesopelagic
-upwelling
-gyres
-geostrophic
-Coriolis Effect
-Warm front
-Cold Front
-Ekman Transport

85. This diagram illustrates the
- absorption of long wavelengths before short wavelengths
- CCCD
- refraction of light
- refraction of sound
- DSL
-sofar channel
-mesopelagic
-upwelling
-gyres
-geostrophic
-Coriolis Effect
-Warm front
-Cold Front
-Ekman Transport
86. Using your knowledge of the circumference and radius of the earth and the thickness of the atmosphere, which of the following is the closest to reality?
The 6 major dissolved ions are generally found in the following proportions:

<table>
<thead>
<tr>
<th>Ion</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorine</td>
<td>55%</td>
</tr>
<tr>
<td>Sodium</td>
<td>31%</td>
</tr>
<tr>
<td>Sulfate</td>
<td>8%</td>
</tr>
<tr>
<td>Magnesium</td>
<td>4%</td>
</tr>
<tr>
<td>Calcium</td>
<td>1%</td>
</tr>
<tr>
<td>Potassium</td>
<td>1%</td>
</tr>
</tbody>
</table>

Applying the principle of Constancy of Composition to 1000 milliliters of seawater:

For an average salinity of 28.5 ppt,

87. How much chlorine is present?
88. How much sodium is present?
89. How much calcium is present?
90. How much total seasalt is present?

91. If there is \( \frac{1}{5} \) grams of calcium, how many grams of sulfate are present?

92. If there is 0.43 grams of potassium, what is the total salinity of the seawater?

93. What causes/affects tides?

94. Sea ice is made of hypertonic salt-ice crystals called aragonite
   • True         • False

95. Pack Ice is between the Fast Ice and the Polar Ice and sea ice often begins as small, round "ice-plates" called pancake ice.
   • True         • False

96. A siliceous ooze IS A MUD that contains at least 30% shells (tests) which may come from which of the following organisms?

97. Sea level has risen more than 400 feet worldwide since the last major Ice Age.
   • True         • False

98. Where does beach sand ultimately end up?
99. What *causes* most earthquakes, volcanoes and mountain ranges?

100. The Florida Keys are

101. Continental rocks are up to 3.5 BILLION years old. Yet, the oldest oceanic rocks are only 200 million years old. Where are the old oceanic rocks?

102. Most of the world’s oil and gas was formed from dead

103. On average, continental rocks are more dense than the rocks of the oceanic crust.
   • True  • False

104. Dolphins rely on sonar more than eyesight because water absorbs light.
   • True  • False

105. The spin of the spherical earth around its rotational axis creates the Coriolis Effect.
   • True  • False

106. As a consequence of plate tectonics, the total surface area of Earth is decreasing.
   • True  • False

107. Sea arches are usually formed by
   • groundwater and joints
   • rivers
   • wave refraction
   • anticlines and synclines
   • exfoliation

108. The white chalk cliffs of Dover are made of
   • diatoms
   • foraminifera
   • coccolithophores
   • radiolarians
   • dinoflagellates

109. You have a submarine. You are only 6 miles from the Libyan coast….you are within the Libyan territorial sea. The Libyans know that you are out there - somewhere - they are looking for you….. Why are you often able to go undetected in the afternoon?

110. Why is seawater not frozen solid at -1 degrees Celsius (29.6° F)?
111. During El Niño times, worldwide there is more rain than usual.
   • True  • False

112. You are diving underwater at around 40 feet depth. As you look horizontally into
the water, the water appears blue. Why?

113. Tsunamis are caused by the tides.
   • True  • False

114. Shallow divers have longer dive times than deeper divers because the halocline
squeeze at depth limits dive time.
   • True  • False

115. How far below sea level is a diver who is at a depth that produces a \textit{total} pressure
of 45 psi (pounds per square inch)?

116. The Water Density Anomaly refers to

117. The ocean’s salt comes from

118. The Water Density Anomaly refers to why marine fish urinate frequently.
   • True  • False

119. The ocean’s salt comes from mid-oceanic ridges.
   • True  • False

120. Eighty-degree air is comfortable all day; however, eighty-degree water can chill a
swimmer in just 30-60 minutes because water conducts heat away 20 times faster
than air does.
   • True  • False

121. Sea Ice floats on seawater because of the Water Density Anomaly.
   • True  • False

122. The North Pole is ringed by the Circumpolar Current.
   • True  • False

123. Cyclones move from west to east along the equator as they are pushed along by the
   Prevailing Easterlies.
   • True  • False
124. If a balloon is filled with water at the surface and then the balloon is taken to the bottom of the Marianas Trench and released into the water, what will happen to the balloon?

125. If a balloon is filled with air at the surface and then the balloon is taken to the bottom of the Marianas Trench and released into the water, what will happen to the balloon?

126. Pressure increases with depth. What is the TOTAL pressure at 53 fathoms?

127. The Law of the Sea Treaty also defined the Exclusive Economic Zone: the extent of the area that a coastal country can mine the ocean for its mineral, biologic and physical resources. How far out from the coastline does the EEZ extend?

128. The tides are created and effected by the spin of the earth AND the force of gravity from the moon and the sun.
   • True  • False

129. A diver’s BCD stands for Breathing Control Device and it allows the diver to compensate for the bends
   • True  • False

130. Scuba divers’ masks cover both the eyes and the nose to compensate for nitrogen narcosis.
   • True  • False

131. Most islands in the ocean are actually ancient, partially drowned fragments of continents.
   • True  • False

132. Which of the following is FALSE (NOT appropriate) for the Atlantic Ocean?
   • a widening ocean with broad continental shelves, slopes, rises and large abyssal plains
   • U.S. coast with semi-diurnal tides: 2 hi and 2 lo tides per day: hi tides are equal - lo tides are equal
   • two large gyres: the warm northward Gulf Stream is the western portion of the northern gyre
   • trenches, subduction zones and the generation of numerous tsunamis: a Tsunami Warning Center
   • cold, saline waters sink at high polar latitudes and then slowly move toward the equator (includes such currents as the North Atlantic Deep Water and the Antarctic Bottom Water)
133. Which of the following is FALSE (NOT appropriate) for the Pacific Ocean?
   • a shrinking ocean with trenches (deepest depth found worldwide), subduction zones, the Ring of Fire and the generation of numerous tsunamis
   • U.S. coast with mixed tides: 2 hi and 2 lo tides per day: hi tides are not equal - lo tides are not equal
   • two large gyres: the cold California current is the eastern portion of the northern gyre
   • the Ninety-East Ridge: a portion of the Mid-Oceanic Ridge which is exposed above sea level
   • oceanic common water: 34.7 ppt - little or no thermohaline circulation - no major prevailing north-south deep convection currents

134. Because of refraction, objects under water appear __________ to a diver looking through his air-filled diving mask:

135. A diver’s BCD compensates for

136. What is the tallest wave height possible for a wavelength of 175 feet?

137. Shallow divers have longer dive times than deeper divers. Why?

138. Which continent is ringed by the Circumpolar current?

139. Benioff Zones occur at

140. The Red Sea is

141. Emergent (uplifting) coastlines include
   • Maryland
   • Maine
   • California
   • Delaware

142. The equatorial latitudes have no significant pycnocline
   • True    • False

143. The CCCD prohibits vertical mixing of cold, deep and warm, shallow waters in equatorial regions.
   • True    • False

144. Due to the Coriolis effect, air AND water in the Southern Hemisphere veer in what direction?
145. Spring tides imply that the moon is either full or new.
   • True  • False

146. Which of the following is FALSE for El Nino?
   • the trade winds are not as steady or as consistent as "usual"
   • warm equatorial waters "slosh" back against the California and Peruvian coasts of the Pacific Ocean
   • the warm waters create a mixing barrier along these coasts and prevent upwelling of nutrients
   • worldwide there is more rain than "usual"
   • Australia is dryer than normal during El Nino times

147. A diver’s weight belt compensates for

148. Tidal waves (tsunamis) are caused by which of the following?

149. Which of the following could describe a tsunami in the deep open ocean?

150. What is the average salinity of seawater?

151. What coral reef is >1200 miles long and has sections which are older than 25 million years?

152. Eighty-degree air is comfortable all day; however, eighty-degree water can chill a swimmer in just 30-60 minutes. Why?
   • because water absorbs light
   • because water is polarized
   • because water conducts heat away 20 times faster than air does
   • because of the water density anamoly
   • because the CCCD is above the thermocline

153. What region of the ocean has no significant pycnocline?

154. The highest density of life in the ocean is around the edges; particularly in the temperate and polar regions. Whereas the middle of the gyres are relatively clear waters with comparatively low productivity. The Sargasso Sea lies within the North Atlantic Gyre.
   • True  • False

155. Padre Island, Texas and the Outer Banks are

156. New Orleans is on

157. The West Coast of the US is tectonically moving up.
   • True  • False
158. The East Coast of the US is tectonically slowly sinking.
   • True • False

159. Most of Florida is an uplifted slab of marine limestone.
   • True • False

160. A calcareous ooze IS A MUD that contains at least 30% shells (tests) which may come from which of the following organisms?

161. The Ural Mountains are

162. Some marine organisms inflate (and then die) when brought to the surface from deep depths of the ocean. However, other marine organisms do not suffer much pressure damage, do not inflate and can actually live for awhile at the surface after being brought up from deep depths. Why do these organisms not suffer the same pressure effects as the first organisms described?

163. Which of the following is FALSE for hurricanes?
   • cyclones
   • VERY intense Lo pressure spots- usually created around the equator
   • also known as typhoons in Japan
   • the Coriolis effect causes the air to spiral as it moves to the center of the cyclone
   • they move from west to east along the equator as they are pushed along by the Prevailing Easterlies

164. Which of the following is FALSE?
   • Fast Ice is attached to the shoreline
   • Pack Ice is between the Fast Ice and the Polar Ice
   • Polar Ice is year-round sea ice
   • sea ice often begins as small, round "ice-plates" called pancake ice
   • sea ice is made of hypertonic salt-ice crystals called aragonite

165. Which of the following is the closest to the pressure at the bottom of the Marianas Trench?

166. How has sea level changed since the last major Ice Age?

167. The existence of many successive marine terraces along the California coast is due to which of the following?

168. Which of the following is NOT appropriate for the MOR (Mid-Oceanic Ridge)?

169. Which of the following is an example of a convergent plate boundary?
170. The overall surface circulation of the Atlantic Ocean is two horizontal gyres.
  • True  • False

171. Sound travels 4.5 times faster underwater than in air.
  • True  • False

172. What is the maximum depth of water motion from a series of waves with a wavelength of 450 feet?

173. What prohibits vertical mixing of cold, deep and warm, shallow waters in equatorial regions?

174. Due to the Coriolis effect, **air AND water** in the Northern Hemisphere veer in what direction?

175. Surface Tension is caused because

176. Decompression Sickness (DCS, or the bends) is caused by

177. Both waves and the major oceanic surface currents are driven by what natural forces?

178. You are studying the tidepools on the Pacific coast of the United States. Disregarding spring and neap periods, if there is a low, low tide at 10:00am one morning, when will the next low, low tide be?

179. After studying the tidepools of the Pacific coast, you decide to compare them to the tidepools of the Atlantic coast. Again, disregarding spring and neap tides, if there is a low tide at 4:00 am on the Atlantic coast, when will the next low tide occur on the Atlantic coast?

180. What positions of the moon and sun create Spring Tides?

181. What causes the Coriolis Effect?

182. Why do scuba divers’ masks cover both the eyes and the nose?

183. **Most** islands in the ocean are actually what?

184. According to the United Nations Law of the Sea Treaty, how far out from a country's shoreline does its territorial sea extend?
185. To a diver looking through her air-filled mask, a 36-foot whale shark would appear to be how long?

186. **Water absorbs light.** Different wavelengths of light can penetrate to different depths of the ocean. Of the normal visible spectrum, what color of light is generally absorbed first?

187. A **clear** blue color to the ocean generally indicates what about the amount of **microscopic pelagic life** present?

188. Divers can not determine the direction to a sound source because

189. How far below sea level is a diver who is at a depth that produces a **total** pressure of 225psi (pounds per square inch)?

190. Iceland is being ripped apart!
   • True  • False

191. The Marianas Islands are being ripped apart due to the MOR.
   • True  • False

192. The Marianas Islands are made of sialic lava rock.
   • True  • False

193. Easter Island is made of sialic lava rock.
   • True  • False

194. The continental shelf is almost flat and only dips a few degrees from horizontal.
   • True  • False

195. The continental slope is actually less than 15 degrees from horizontal.
   • True  • False

196. An ophiolite is a chunk of the ocean floor when found on the continent.
   • True  • False

197. The Marianas Islands are
   • shield volcanoes  • composite volcanoes

198. The Aleutian Islands are
   • shield volcanoes  • composite volcanoes

199. The Tahitian Islands are
   • shield volcanoes  • composite volcanoes
200. Easter Island is
• shield volcano • composite volcano

201. Iceland is a
• shield volcano • composite volcano

202. The Galapagos are
• shield volcanoes • composite volcanoes

203. The Emperor Seamounts are
• shield volcanoes • composite volcanoes

204. Hydrothermal vents are also known as black smokers.
• True • False

205. White smokers have also been found on the ocean floor.
• True • False

206. The bottom, or 4th, layer of oceanic crust is made of pillow basalts.
• True • False

207. Pillow basalts form when lava cools slowly deep underground in trenches.
• True • False

208. The heat from a black smoker allows thousands of organisms to live around the hydrothermal vent like an oasis on the otherwise barren deep ocean floor.
• True • False

209. To calculate the depth of the ocean floor, you must read the speed of sound in seawater off of a seismic reflection record
• True • False

210. To calculate the depth of the ocean floor, you must read the two-way travel time off of a seismic reflection record.
• True • False

211. What are the shiny, black metallic accretions found on the deep abyssal plains?
• black smokers • gabbros
• white smokers • sheeted dikes
• ophiolites • tufa towers
• oil seeps • manganese nodules
• pillow basalts • turbidites
## MARINE GEOGRAPHY AND GEOLOGY

Choose from the entire list below for each of the answers. Answers may repeat and not all answers will be used. For answers with multiple letters, bubble-in all letters indicated for that question. For example, if your answer is the Florida Keys, then bubble in “a, c, d and e” for that question.

<table>
<thead>
<tr>
<th>Alcatraz - ace</th>
<th>Falkland Islands - cde</th>
<th>Montserrat - acd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aleutian Islands - a</td>
<td>Farallon Islands - abcd</td>
<td>New Zealand - ace</td>
</tr>
<tr>
<td>Andes - b</td>
<td>Fiji - abce</td>
<td>Ninety East Ridge - a</td>
</tr>
<tr>
<td>Antarctica - c</td>
<td>Florida Keys - acde</td>
<td>North Sea - bcd</td>
</tr>
<tr>
<td>Appalachian Mountains - d</td>
<td>Galapagos Islands - abcde</td>
<td>Outer Banks - bce</td>
</tr>
<tr>
<td>Arabian Sea - e</td>
<td>Great Barrier Reef - a</td>
<td>Padre Island - cde</td>
</tr>
<tr>
<td>Azores - ab</td>
<td>Greenland - b</td>
<td>Palau - abcd</td>
</tr>
<tr>
<td>Bahamas - ac</td>
<td>Gulf of California - c</td>
<td>Papua New Guinea - abce</td>
</tr>
<tr>
<td>Bay of Fundy - ad</td>
<td>Gulf of Mexico - d</td>
<td>Philippine Islands - bcde</td>
</tr>
<tr>
<td>Bering Sea - ae</td>
<td>Hawaiian Island Chain - e</td>
<td>Red Sea - abcd</td>
</tr>
<tr>
<td>Bermuda - bc</td>
<td>Himalayas - ab</td>
<td>San Andreas Fault - a</td>
</tr>
<tr>
<td>Borneo - bd</td>
<td>Iceland - ac</td>
<td>San Francisco Bay - b</td>
</tr>
<tr>
<td>British Isles - be</td>
<td>Jamaica - ad</td>
<td>Sandwich Islands - c</td>
</tr>
<tr>
<td>Canary Islands - cd</td>
<td>Japan - ae</td>
<td>Sargasso Sea - d</td>
</tr>
<tr>
<td>Cape Horn - ce</td>
<td>Java and Sumatra - bc</td>
<td>Sea of Cortez - c</td>
</tr>
<tr>
<td>Cape of Good Hope - de</td>
<td>Kuril Islands - bd</td>
<td>Shark's Bay - e</td>
</tr>
<tr>
<td>Caribbean Sea - abc</td>
<td>Line Islands - be</td>
<td>Solomon Islands - ac</td>
</tr>
<tr>
<td>Cascade Range - abd</td>
<td>Madagascar - cd</td>
<td>Sri Lanka - ad</td>
</tr>
<tr>
<td>Channel Islands - abe</td>
<td>Maldives - ce</td>
<td>Tahiti - ae</td>
</tr>
<tr>
<td>Christmas Island - acd</td>
<td>Marianas Islands - de</td>
<td>Taiwan - bc</td>
</tr>
<tr>
<td>Coral Sea - ace</td>
<td>Mediterranean Sea - abc</td>
<td>Tonga - be</td>
</tr>
<tr>
<td>Cyprus - bcd</td>
<td>Midway Island - abd</td>
<td>Ural Mountains - cd</td>
</tr>
<tr>
<td>Easter Island - bce</td>
<td>Monterey Bay - abe</td>
<td></td>
</tr>
</tbody>
</table>
MARINE GEOGRAPHY AND GEOLOGY

Choose your answers from the entire list provided on the previous, facing page.

212. A spectacular chain of atolls just south-southwest of the southern coast of India.

213. On the Canadian east coast of North America; experiences extreme 50-foot tidal ranges.

214. On a subduction zone in the south-south Atlantic Ocean

215. Eroded, 20myo, hot spot island with coral reefs; approximately halfway along the Hawaiian Island chain.

216. A sea that is getting smaller as the Alps grow.

217. Along the coast of Africa, a small sea that is getting wider because the MOR runs down the middle of the sea.

218. An 3000-mile long aseismic mountain range in the Indian Ocean.

219. A drowned hill of continental rocks in San Francisco Bay.

220. A composite Caribbean volcano.

221. Partially drowned and eroded continental rocks on the southeastern Australian continental shelf.

222. Continental rocks tectonically rifted off the southeastern coast of Africa as Pangea came apart.

223. Hot spot shield volcanoes near the equator off the western coast of South America.

224. Off Southern California, islands of continental rocks sliced off the California coast by the northward movement of the Pacific Plate.

225. On a subduction zone in the Mediterranean Sea.

226. On the continental shelf of the southeastern coast of South America.
Answer List for Questions on the next page

Choose from the entire list below for each of the answers. Answers may repeat and not all answers will be used. For answers with multiple letters, bubble-in all letters indicated for that question. For example, if your answer is the tsunami, then bubble in “a, b, c, d and e” for that question.

absorption of light - abe
abyssal plain sediments- a
atoll - ace
aseismic ridge- b
black smokers - d
CCCD - e
chert - ab
conglomerate - ac
delta - ad
estuary - ae
fracture zones - bc
gabbro - bd
glaucnite sands - be
limestone - de
longshore transport - ce
manganese nodules - de
a map of ocean floor ages - abc
marine terraces - abd
microplankton shells – abe
Ninety-East Ridge - b
phosphorite nodules - bcd
pillow basalt - bce
reflection of light - a
refraction of light - abcde
rise - bde
sandstone - cde
sea cave - abcd
sea arch - ae
sea cliff retreat - abd
sea stacks - bcde
seamount - ab
sheeted dike - ad
shelf - ed
slope - abe
spit - bd
submarine canyon - ab
tombolo - c	
trench – bcd
tsunami - abcd
tufa towers – e
turbidity current - ace

ICE:
sea ice - a
icebergs - b

VOLCANOES:
shield - a
composite - b
coral around the top of a seamount - a
flooded meteor crater- b
flooded volcanic crater- c
flooded sinkhole - d
nuclear explosion pit- e
For the following questions
— choose from the answer list on the previous page

227. The Blue Hole
228. the MOR
229. where chimneys of metal sulfides precipitate
230. the layer of the ocean floor above the gabbro
231. the transform faults along the MOR
232. what forms when lava cools underwater along the MOR
233. pancake, floes, Polar, Pack, Fast
234. what causes the ocean to have a red color at sunset
235. why water magnifies visual images
236. these have been mined off the deep ocean floor with vacuum-hoses several miles long
237. Chert is mafic.  
   •  True  •  False

238. Limestone is sialic.  
   •  True  •  False

239. Limestone dissolves (fizzes) when exposed to weak acid.  
   •  True  •  False

240. Chert is made of silicon dioxide.  
   •  True  •  False

241. Chert scratches glass.  
   •  True  •  False

242. Limestone scratches glass.  
   •  True  •  False

243. An ooze is a deep-sea mud with lots of microplankton shells in it.  
   •  True  •  False

244. Very little sediment reaches the deep abyssal plains; the mud piles up very very slowly.  
   •  True  •  False

245. The muds on the top of the deep abyssal plains have a high water content.  
   •  True  •  False

246. Most of the world’s oil is made from dead microplankton.  
   •  True  •  False

247. Chert reacts to dissolve (fizzes) when exposed to weak acid.  
   •  True  •  False

248. Black smokers are made of sialic tufa.  
   •  True  •  False

249. Greenland’s Tufa Towers fringe the MOR trench.  
   •  True  •  False

250. Ophiolites are sialic manganese nodules found around the MOR.  
   •  True  •  False
251. Diatoms are mafic.
   • True  • False

252. Coccolithophores are sialic chemosynthetic turbidites.
   • True  • False

253. Most of the world’s oil comes from decayed manganese nodules.
   • True  • False

254. The White Cliffs of Dover are made of foraminifera chalk.
   • True  • False

255. The White Cliffs of Dover will fizz (react) in weak acid.
   • True  • False

256. The presence of ophiolites in California indicates that there was once obduction along the California coast.
   • True  • False

257. Except for the sediments, the three other major layers of the sea floor are created at the Mid-Oceanic Ridge.
   • True  • False

258. Under the sediments, the solid rock of the continental shelf is pillow basalts.
   • True  • False

259. Most of the world’s oil and gas is formed from dead microplankton that are buried before decomposing on the continental shelves.
   • True  • False

260. Guyots were eroded to sea level, then eroded flat by the waves, then drowned by sea level rise since the last Ice Age.
   • True  • False

261. The tops of most submarine canyons were exposed valleys and rivers during the last Ice Age.
   • True  • False

262. The 90 East Ridge is an extremely active portion of the MOR that does not have a well-defined central rift valley.
   • True  • False
263. The graded bedding found in a turbidite usually shows mud on the bottom of the layer followed by silt in the middle and then sand at the top of the layer.
   - True    - False

264. Chalk is a variety of limestone where the rock is made entirely out of foraminifera tests.
   - True    - False

265. Shield volcanoes are made of basalt
   - True    - False

266. Composite volcanoes are made of sialic lavas.
   - True    - False

267. Sialic is an abbreviation for

268. Mafic is an abbreviation for

269. Granite is mafic.
   - True    - False

270. Basalt is mafic.
   - True    - False

271. In general, continental rocks are mafic.
   - True    - False

272. In general ocean floor rocks are mafic lava rocks such as granite.
   - True    - False

273. The ocean floor basalts are magnetized.
   - True    - False

274. The plates are broken pieces of the asthenosphere sliding over the upper mantle.
   - True    - False

275. In general, sialic rocks are lower density than mafic rocks.
   - True    - False

276. The Earth is the only planet known to have liquid water.
   - True    - False
277. The Earth is actually more than $\frac{4}{5}$ water and less than $\frac{1}{5}$ land.
   • True • False

278. Ninety-Nine percent of the earth’s atmosphere is within 20 miles of the earth’s surface.
   • True • False

279. In general, continental rocks are sialic.
   • True • False

280. In general ocean floor rocks are mafic lava rocks such as basalt.
   • True • False

281. The Earth is actually more than $\frac{2}{3}$ water and less than $\frac{1}{3}$ land.
   • True • False

282. The Big Bang is the theory of how and why Pangea broke apart.
   • True • False

283. Pangea was one of the Earth’s several supercontinents.
   • True • False

284. Panthalassa was the supercontinent before Pangea.
   • True • False

285. The East Pacific Rise does not have a well-developed central rift valley.
   • True • False

286. Fracture Zones are transform faults along the MOR.
   • True • False

287. Most seamounts and guyots are volcanoes on the sea floor.
   • True • False

Don’t forget that the final exam is comprehensive…..
   go back through and review all of your old practice exams
   and all of your notes from the term…..