Oceanography Practice Exam I

Earth Origins, Oceanography History, Plate Tectonics, and Seafloors

Note: 1) The actual midterm will consist of approximately 70 to 80 questions. 2) Many of the questions on the midterm will come from this practice test.

Part I. True or False – Directions: Answer true or false to the following questions or statements. Mark "a" for True and "b" for false on your Scantron sheet.

1. Of all the planets in the solar system, the Earth is the only planet to have large quantities of liquid water on its surface.
a. True
b. False

2. The average depth of the ocean is about 4000 meters.
a. True
b. False

3. The Earth has always had an oxygen-rich atmosphere.
a. True
b. False

4. The volcanic outgassed atmosphere of early Earth is not much different from today's.
a. True
b. False

5. Much of the water that makes up our ocean came from volcanic outgassing of our planet
a. True
b. False

6. The continental crust is much thicker and denser than oceanic crust.
a. True
b. False

7. Radiometric dating works by measuring the proportion of radioactive isotopes to its stable daughter isotope found in minerals.
a. True
b. False

8. It is very important to humanity that every human on our planet be ocean-literate.
a. True
b. False

9. Alfred Wegener had access to a variety of oceanographic research equipment that allowed him to gather the necessary evidence to prove his continental drift hypothesis.
a. True
b. False

10. The scientific method is human's best means of attaining useful, reliable knowledge and understanding concerning our natural world.
a. True
b. False

11. According to plate tectonic theory, continental "drift" occurs by the continents moving over the top of the mantle (along Moho boundary) and plowing through oceanic basalt crust.
a. True
b. False

12. The average age of continental crust is much younger than average age oceanic crust.
a. True
b. False

13 Sources of abyssal pelagic oozes are the shells of very tiny planktonic plants and animals.
a. True
b. False

14 Heat from inside the earth is the driving mechanism for plate tectonic processes.
a. True
b. False

15. Based on the rock record, the Earth developed its ocean by about 4 billion years ago.
a. True
b. False

16. Seafloor spreading is a tectonic process that occurs at a convergent plate boundary.
a. True
b. False

17. The *youngest* oceanic seafloor crust is primarily found in the middle of ocean basins.
a. True
b. False

18. It is hypothesized that the de-watering of subducting, seawater-saturated oceanic tectonic plates causes partial melting of mantle rock to occur in subduction zones.
a. True
b. False

19. The deepest parts of an ocean basin occur near its center - along mid-ocean ridges.
a. True
b. False

20. It is hypothesized that the decompression of over-heated ascending asthenosphere mantle rock beneath mid-ocean ridges causes partial melting of peridotite mantle rock to form basaltic magmas that generate new seafloor – called seafloor spreading.
a. True
b. False

21. Ocean basins are the oldest crustal features found on our planet.
a. True
b. False

22. According to the redioisotopic dating technique, the earth is about 4.6 billion years old.
a. True
b. False

Part II. Multiple Choice: Directions: *Identify the letter of the choice that best completes the statement or answers the question.*

Besides the very light elements like the hydrogen atoms that are found in water, where were the other elements – like carbon, oxygen and nitrogen and the other 92 elements that make up our planet formed? I don't mean where were they stored through the Earth's early hisory. I mean where were the atoms heavier than hydrogen actually constructed in the deep past?

a. In the Earth's upper atmosphere.
b. Deep within the Earth while it was forming.
c. By processes deep in starts or by stars exploding or crashing into each other.
d. At the instant of the "big bang".
e. At the junction between the atmosphere and space.

24. About what percentage of the Earth's surface is covered by water?

a. 71%
b. 90%
c. 66%
d. 75%
e. 82%

25. About what percentage of the water on or near the Earth's surface is contained in the ocean?

a. 55%
b. 75%
c. 85%
d. 97%
e. 100%

26. In the scientific method, scientific theories _____

a. must be tested and verified by observations (factual evidence).
b. must be verified by the leading authorities in the field.
c. must be consistent with previous, universally accepted scientific concepts.
d. must be consistent with the fact that the ocean is of great age.
e. are accepted as absolute fact until proven otherwise.

27. Life on Earth most probably originally formed _____

a. on land.
b. in the ocean.
c. in space.

28 The condensation theory proposes that our solar system formed from a _____

a. single accreting disc (flat cloud) of ancient stellar debris, dust and primoridal gases.
b. set of individual, separate discs.
c. larger star that split into sections.
d. larger planet that split into fragments.

29. The water in the ocean originated from _____:

a. The water from earth's primordial galciers.
b. The water from only volcanic outgassing.
c. The water from only comet strikes.

d. The condensation of water from volcanic outgassing and comet strikes.

30. Evidence suggests the universe began about 14.7 billion years ago in a _____
a. slow accretion of atoms.
b. very large galaxy.
c. cataclysmic explosion of energy and matter from a singularity called the “Big Bang”.
d. protostar.
e. supernova.

31. Until recently, many scientists were tentative in their acceptance of the theory of the chemical evolution of life on Earth. What has changed their minds?
a. The discovery of organic molecules in space.
b. The discovery of organic molecules at geothermal vents on the deep seafloor.
c. Experiments in which organic molecules were synthesized in chambers replicating a hypothetical early Earth environment.
d. All of the above.

32. Life could almost certainly not originate anew on this planet today. This is because:
a. Green plants have filled the atmosphere with oxygen, a compound that can disrupt unprotected large molecules.
b. Ozone now blocks much ultraviolet radiation from reaching the Earth's surface, depriving molecules one of the sources of energy needed for polymerization.
c. Micro-organisms present on the Earth and in the ocean would gladly scavenge any large organic molecules that might form.
d. All of the above.

33. Our position within the galaxy is:
a. At the center.
b. In one of the spiral arms, surrounded by dust and gas.
c. Above the polar axis.
d. At a vast distance from the galaxy itself.
e. We're not in a galaxy.

34. The first life forms on Earth arose:
a. By about 3.5 billion years ago.
b. At the same time as the formation of the Earth.
c. Relatively recently -- about 250,000,000 years ago.
d. About 10,000 years ago.

35. Which hemisphere of the Earth contains the greater proportion of ocean surface?
a. Northern.
b. Southern.
c. Both about equal.

36. What will ultimately happen to the Earth?
a. Any day now, it will disappear as the sun becomes a supernova.
b. In about 5 billion years, the sun will become a supernova, and our planet will blow up with it.
c. In about 5 billion years, the sun will gradually begin to swell, and our planet will get roasted/melted
d. In about 5 billion years the sun will cool and our planet will freeze into a planetary iceball.

37. The ocean continues to grow slowly in volume. One cubic meter of new water is being added daily to the ocean. This new water is coming from
a. tiny comets striking earth upper atmosphere from outer space.

b. conversion of seafloor rocks into water by bacteria.
c. continued volcanic outgassing
d. from the combustion of oil and natural gas.
e. from both a. and c.

38. If we had to make a selection, which of these people would probably be given the title of "first ocean scientist?"
a. Matthew Maury
b. Captain James Cook
c. Christopher Columbus
d. Wyville Thompson (of the *Challenger* expedition).
e. Ben Franklin

39. John Harrison's invention of the chronometer was important because:
a. it enabled sailors to calculate local time.
b. it allowed the calculation of latitude after weeks at sea.
c. it allowed the calculation of longitude after weeks at sea.
d. it was used to calibrate navigational tools.
e. the devices were very valuable and were considered works of art.

40. If selections were to be made, which of these voyages would qualify as the first 100% pure scientific oceanographic expedition?
a. Columbus' 1496 trip.
b. The *Challenger* expedition.
c. Benjamin Franklin's first voyage across the Atlantic to take up his post as American Ambassador to France.
d. Captain Cook's voyage to Tahiti in the ship *Endeavour*.
e. The Chinese voyages undertaken during the Ming Dynasty.

41. Long-range ocean travel was first under taken by the _____, later by the _____, and last by the _____. (Select the proper chronological order.)
a. Europeans/Polynesians/Scandinavians (=Vikings)
b. Europeans/Scandinavians/Polynesians
c. Polynesians/Europeans/Scandinavians
d. Scandinavians/Polynesians/Europeans
e. Polynesians/Scandinavians/Europeans

42. Polynesian navigators depended on _____ for accurate navigation.
a. luck.
b. stars, clouds, and the flight direction of birds.
c. the appearance and taste of seawater.
d. wave direction and shape.
e. all of these things, and more.

43. Captain James Cook accomplished all of these tasks *except*:
a. First European to contact the Hawaiian Islands.
b. First to circumnavigate the world
c. Made three major voyages of discovery.
d. Mapped the coasts of Australia and New Zealand.
e. First European to explore the South Pacific.

44. Matthew Maury is known primarily for:
a. his co-discovery of gold at Sutter's Mill in California, triggering the gold rush and subsequent

large-scale use of shipborne passenger transportation.
b. being the first person to sense the worldwide pattern of surface winds and currents, and to base sailing directions on this knowledge.
c. interpreting the scientific information coded in Captain Cooks private notebooks.
d. founding the United States Naval Academy at Annapolis, Maryland.
e. co-writing, with Alfred Thayer Mahan, *The Influence of Sea Power Upon History* (1890).

45. The first scientific expedition to use an echo sounder occurred during the:
a. late 1700's
b. early 1800's
c. late 1800's
d. early 1900's
e. *late 1900's*

46. *Glomar Challenger* is known mainly for:
a. being the first modern scientific survey ship to circumnavigate the globe.
b. being the first nuclear powered scientific research vessel.
c. being owned and operated simultaneously by four governmental agencies.
d. taking the first complete cores of deep-sea sediments.
e. sinking in 1983 under mysterious circumstances.

47. At the present time, oceanographic research is primarily the province of:
a. private individuals, privately funded.
b. private individuals, funded through national or local grants.
c. private corporations, privately funded.
d. academic institutions or governmental agencies, publicly funded.
e. private corporations, publicly funded.

48. What is the name of the outermost solid layer of the Earth?
a. hydrosphere
b. lithosphere
c. asthenosphere
d. outer core

49. About how many kilometers (miles) is it from the Earth's center to the outer edge of the **outer core?**
a. 12,523 kilometers (7,827 miles)
b. 3,486 kilometers (2,167 miles)
c. 1,264 kilometers (790 miles)
d. 2,880 kilometers (1,800 miles)
e. 35 - 72 kilometers (22 - 45 miles)

50. Here are five lists of elements. Which list represents the main components of the Earth's crust?
a. oxygen, uranium, thorium
b. oxygen, silicon, uranium
c. oxygen, silicon, aluminum
d. iron, aluminum, carbon
e. iron, hydrogen, oxygen

51. The core of the Earth is composed primarily of:
a. uranium

b. nickel
c. metallic hydrogen
d. iron
e. lead

52. One cubic meter of which of is the most dense?
a. seawater
b. granite rock
c. basaltic rock
d. seabed sediment
e. mantle

53. As you know, Earth is layered inside. The layers have different sizes and densities. How do geologists knows about these layers deep under our feet?
a. From drilling and digging down into the various layers.
b. From observing the characteristics of lava and gas issuing from volcanic vents.
c. From observing the transit times through the Earth of seismic waves generated by large earthquakes.
d. From comparisons with drill cores taken by robot spacecraft on Mars and Venus.
e. None of these.

54. Why is the inside of the Earth still hot?
a. Because the outer layers have prevented the escape of heat trapped during the planet's initial formation.
b. Because the decay of large radioactive elements is creating heat in the Earth's inner layers.
c. Because a nuclear process like that found in stars is at work in Earth's interior.
d. Because huge quantities of oil and natural gas occasionally burn deep within the Earth.
e. Both a. and b. are the primary contributors to earth's interior heat.

55. What do these things have in common: Paleomagnetism, seafloor spreading, Pangaea, Wadati-Benioff zones, transform faults, fracture zones, seamount chains, Pacific hotspots.
a. They are all used to study earthquakes.
b. They were discovered in the *Challenger* expedition.
c. They are used to investigate the potential for undersea mining and mineral resource exploitation.
d. They are used to predict earthquake activity and warn people of imminent danger.
e. They are involved with the evidence that supports the theory of plate tectonics.

56. When an object is resting in buoyant equilibrium in water, moving neither up nor down:
a. It weighs less than the water surrounding it.
b. It displaces a volume of water equal in weight to the objects weight.
c. It displaces a volume of water which weighs slightly more than its own weight.
d. It displaces a volume of water which weighs slightly less than its own weight.
e. It weighs more than the water surrounding it.

57. An example of an object in buoyant (or isostatic) equilibrium would be:
a. An ice cube floating in a glass of water.
b. The lithosphere floating in the asthenosphere.
c. A table standing on a concrete floor.
d. A person standing on a gravel driveway.
e. a. and b. above.

58. At which of these locations is the Earth's crust thickest?
a. Beneath Denver, high in the Rocky Mountains.
b. Beneath Los Angeles, at the Pacific coast.

c. Beneath Washington, D.C., on the trailing edge of the continent.
d. Beneath the ocean floor 2,000 kilometers south of Honolulu.
e. The crust is about the same thickness all over the Earth.

59. Which type of crust is made largely of silicon, oxygen, magnesium, and iron? Hint: its the denser of the two types of crust.
a. Granitic rock (sial)
b. Basaltic rock (sima)

60. Which type of crust makes up the deep seafloor (beneath the abyssal pelagic sediments)?
a. Granitic rock (sial)
b. Basaltic rock (sima)

61. Which type of crust is the thicker of the two?
a. Granitic rock (sial)
b. Basaltic rock (sima)

62. Which type of crust comprises the bulk of the continents?
a. Granitic rock (sial)
b. Basaltic rock (sima)

63. Which of these layers makes up the biggest proportion of Earth?
a. Atmosphere
b. Hydrosphere
c. Crust
d. Mantle
e. Core

64. Why is the inner core a solid?
a. Because it is so hot.
b. Because it is under tremendous pressure.
c. Because of a chemical reaction with the outer core.
d. Because it is composed mainly of iron and nickel.
e. It is not a solid.

65. Would you agree that the position of the true geological edge of a continent is almost always the same as the position of its shoreline?
a. agree (yes)
b. disagree (no)

66. A "mystery" in our understanding of plate tectonics has been, until recently, the nature of the power source capable of moving the plates and the continents embedded within them. Recent evidence indicates the power source to be:
a. The readjustment of the surface to continual shrinking of the whole Earth.
b. Convection currents within the Earth's mantle along with slab pull forces is moving the plates.
c. The action of ocean currents is dragging along the seafloor, causing the seafloor and the continents to move.
d. the continual vibration from earthquakes and volcanoes slowly moves the continents equatorward under the influence of centrifugal force.
e. The whole business is quite new, actually, having been triggered by H-bomb tests in the Pacific in the mid-1950s.

67. If two oceanic plates are colliding at a convergence zone, what would you expect to see?
a. A mid-ocean ridge.

b. Continental collision mountains system
c. A deep sea trench paired with an active volcanic island arc.
d. A deep sea trench paired with an active volcanic continental arc.
e. Passive margin

68. Land-based evidence for plate tectonics can be seen in:
a. the distribution of *Glossopteris* flora and fauna.
b. evidence of ancient glaciations.
c. the alignment of mountain ranges.
d. the correlation of rocks in now widely separated continents.
e. all of these.

69. The youngest seafloor rocks are found:
a. nearest the continental slopes.
b. along the rift valleys of the mid-ocean ridges.
c. beneath the deep sea trenches.
d. evenly distributed over the ocean basins.
e. underlying the continental shelves.

70. The magnetic striping of the seafloor is considered evidence of seafloor spreading and
a. subduction down the rift valleys.
b. spreading centers in the trenches.
c. changes in the Earth's axis of rotation.
d. periodic reversals in the polarity of the Earth's magnetic field.
e. periodic collapses of the Earth's gravitational field.

71. The Earth's oldest rocks are found:
a. In the deepest part of the flat ocean bottom.
b. At the mid-ocean ridges.
c. On volcanic islands like Hawaii.
d. In the trenches.
e. At the cores of the continents.

72. New oceanic crust is being generated:
a. In the deep trenches.
b. In submarine canyons.
c. In the rift valleys of the mid-ocean ridges.
d. At the centers of large continents.
e. In all of these places.

73. The force driving the crustal plates is believed to be:
a. Magnetism.
b. Gravity.
c. The pull of the sun and the moon.
d. Deep water currents pulling on the ocean basins.
e. Convection cells in the upper mantle and the tug of the subducting plates.

74. Oceanographers believe the breakup of Pangaea occurred about:
a. 1 million years ago.
b. 10 - 25 million years ago.
c. 190 to 225 million years ago.
d. 750 million years ago.
e. 2 billion years ago.

75. Which of the following is not directly associated with subduction zones?
a. Belts of deep-focus earthquakes.
b. Tectonic plates diverging or pulling apart.
c. Presence of deep-sea trenches.
d. Zones where old seafloor descends into the mantle.
e. Explosive arc volcanism

76. The mid-ocean ridges are recognized as:
a. subduction zones.
b. transform or lateral plate boundaries.
c. divergent plate boundaries.
d. convergent plate boundaries.

77. Analysis of plate motion suggests:
a. California is going to sink into the Pacific any day now.
b. Part of California west of the San Andreas Fault is moving northward.
c. Part of California and Baja California are moving southward into the Peru Trench.
d. Southern California is being subducted into the Malibu Trench.

78. What is the average rate that lithospheric plates move?
a. About 3 kilometers per hour.
b. About 3 kilometers per thousand years.
c. About 3 centimeters per hour.
d. About 3 centimeters per year.
e. About 3 centimeters per million years.

79. The rigid outermost layer of the Earth is called:
a. The asthenosphere.
b. The lithosphere.
c. The mantle.
d. The Mohorovicic discontinuity.
e. The outer core.

80. Ophiolites are:
a. fragments of dense oceanic crust contained in accreted (obducted) terranes.
b. bits of fossilized worms useful in dating marine sediments.
c. young, serpent-shaped rocks formed at subduction zones.
d. fragments of meteorites lying on the seabed.
e. formations comprising more than half the solid ocean floor.

81. Although 99% of the ocean floor is unexplored, have people reached essentially the deepest spot in the ocean and returned safely to the surface?
a. Yes, and the first time was only a few years ago.
b. Yes, and the first time was in the1950s.
c. Yes, and it was a French expedition led by Jacques-Yves Cousteau's son Jean-Michel.
d. No, not yet, though a trip is now being planned.
e. No, and such a trip is not considered possible.

82. A turbidity current is:
a. A fast surface current of water that runs parallel to beaches and that causes a rapid decrease in water clarity.
b. The cause of mid-ocean maelstroms (whirlpools).
c. A phenomenon associated with violent atmospheric storms at sea.

d. Something that always occurs at river mouths in shallow water, but does not extend into water more than 50 meters (165 feet) deep.
e. A dense mixture of sea bottom sediment and seawater that travels down submarine canyons as a density current.

83. The average width of the continental shelves is about ____ kilometers (____ miles).
a. 16 (10)
b. 35 (22)
c. 67 (42)
d. 100 (160)
e. 800 (1,280)

84. Submarine canyons occur:
a. At the part of an ocean basin nearest the poles.
b. At the part of an ocean basin nearest the equator.
c. Near the edges of ocean basins associated with continental shelves and slopes.
d. At the center of an ocean basin, at the edges of the mid-ocean ridge.
e. On the edges of trenches.

85. The continental shelf _____
a. is very narrow on the East Coast of the United States.
b. is a steeply dipping zone dropping off to the deep seafloor.
c. is a mountainous feature found along the edges of continents.
d. is a very gently sloping platform along the edge of a continent with a variable landscape, including submarine canyons.
e. all of the above.

86. Which of the following statements accurately describes passive continental margins?
a. They are regions of bordered by oceanic trenches.
b. They are characteristic of the margins of the Atlantic Basin – far from a plate boundary.
c. They are areas of frequent earthquakes and volcanoes, where crustal plates are converging or are in collision.
d. They are areas where crustal plates are actively moving apart.
e. They are usually different in topography from the adjoining coast.

87. The transition between the shelf and the deep seafloor is
a. the littoral zone.
b. the continental slope and rise.
c. the abyssal plain.
d. the mid-ocean ridge.
e. the submarine canyon.

88. Submarine canyons are
a. found worldwide, on all kinds of shelves.
b. steep-walled and narrow.
c. cut into firm rock by turbidity currents.
d. cut into the shelf and may extend almost to the shore.
e. all of these.

89. The origin of deltas is related to:
a. glacial deposition and the formation of moraines.
b. river mouth deposition of sediments eroded from continents.
c. glacial erosion and the formation of troughs and fjords.

d. volcanic activity in coastal regions.
e. biological activity of corals, cyanobacteria, and small shelled organisms.

90. The great heaps of unconsolidated sediment at the base of the continental slope are known as:
a. the continental rise.
b. the abyssal hills.
c. the abyssal plains.
d. the mid-ocean mountains.
e. the mid-ocean ridge.

91. The origin of submarine canyons is not well understood, but most likely is _____
a. erosional, created by rivers during periods of sea level rise.
b. tectonic, and represents down-folds of rock within the continental shelf.
c. organic, resulting from the activities of burrowing organisms.
d. glacial, the work of glaciers depositing rock debris on the shelf.
e. erosional, created by underwater turbidity currents.

92. The trailing edge of a continental mass (facing a divergent plate boundary) is most likely to exhibit features associated with
a. frequent earthquake activity.
b. active continental margins.
c. widespread volcanism.
d. passive continental margins.

93. Active continental margins are located
a. along the east coast of the United States.
b. along the east coast of South America.
c. on the west coasts of both North and South America.
d. all around Africa.

94. The landscape of the deep seafloor would best be described as _____
a. a vast, featureless plain.
b. a smooth descent with the deepest portions farthest from land.
c. similar in rock type, sediment thickness, and erosional processes to those found on the land.
d. having ridges, trenches, seamounts, abyssal plains and hills, and other features different from those found on land.

95. The characteristics of deep trenches indicate _____
a. they are erosional features similar to the Grand Canyon in Arizona.
b. they are deep, elongated creases in the seafloor where oceanic crust is being subducted.
c. they are glacial troughs dating back to the Ice Age.
d. they are erosional canyons cut by turbidity currents.

96. Mid-ocean ridge mountain systems, like that running down the middle of the Atlantic,
a. are similar in origin to the Alps, the Rockies, and the Appalachians.
b. are composed of folded and faulted marine sedimentary rocks.
c. are constructed of tensional fault-bounded blocks of volcanic basalt with a central rift valley.
d. are similar in size and composition to most continental mountains.

97. The volcanic islands bordering the deep-sea trenches
a. result from a series of quiet, continuous basaltic eruptions.
b. are accumulations of sediments on the margins of the trenches.

c. are formed from the activities of coral and other organisms.
d. are explosive volcanoes that emit volatile-rich, intermediate-composition lavas.

98. The deepest parts of the Pacific Basin are located:
a. in the center, surrounding the island of Hawaii.
b. in the eastern part of the basin, off North America.
c. in the rift valley of the East Pacific Rise.
d. near the margins of South America, Japan, and the Mariana's Islands.

99. Most deep sea hydrothermal vents (hot springs) are located along _____
a. passive continental margins.
b. active areas of seafloor spreading and active faulting.
c. the edges of the deep sea trenches.
d. the margins of the Hawaiian chain.
e. on the abyssal plains.

100. In general, continental shelves tend to be wider in the
a. Pacific ocean, because its margins tend to be active.
b. Atlantic ocean, because its margins tend to be active.
c. Pacific ocean, because its margins tend to be passive
d. Atlantic ocean, because its margins tend to be passive.

101. An analysis of the sequential breaking of transatlantic telephone and telegraph cables led to a better understanding of
a. the distribution of submarine trenches.
b. the composition of sediments.
c. turbidity currents
d. hydrothermal vent communities.

102. Which is greater, the average height of the continents or the average depth of the ocean?
a. the average height of the continents.
b. the average depth of the ocean.

103. Which is greater, the height of the world's tallest mountain or the depth of the world's greatest trench?
a. the height of the mountain (Mt. Everest).
b. the depth of the trench (Challenger Deep).

104. The pelagic oozes on the seafloor mostly consist of:
a. boulders and cobbles from glaciers oozing off the land.
b. bones and teeth of bottom-dwelling fishes.
c. fine muds washed down the continental slope to the seafloor.
d. microscopic hard parts of planktonic single-celled surface living organisms.
e. treated sewage from urban areas.

105. Which of the following metals is also found in manganese nodules:
a. iron.
b. uranium.
c. lithium.
d. silver.
e. gold.

106. Underlying the unconsolidated pelagic sediments of the seafloor are:
a. Basalt pillows and other mafic basement rocks.

b. Granite boulders.
c. Glacial deposits left from the Ice Age.
d. Ancient remnants of sunken continents.

107. Large volumes of continentally-derived may be transported long distances from shallow shelf waters to deep bathyl water depths by _____
a. storm waves.
b. icebergs.
c. tidal action.
d. turbidity currents.

108. Carbonate sediments are rare in very deep sea sediments (below CCD) because _____
a. The organisms providing shells do not live in the deep sea.
b. The abundance of muds and clays cover the carbonate shells.
c. The carbonate shells dissolve in very deep water.
d. The organisms do not live beyond the edge of the continental shelf.

109. Most of the deep seafloor of the North Pacific Ocean basin is covered with _____.
a. foraminiferan ooze.
b. windblown dust and sand.
c. red and brown clays.
d. diatom ooze.

110. Pelagic Oozes are _____.
a. Terrigenous sediments.
b. Biogenous sediments.
c. Hydrogenous (or authigenic) sediments.
d. Cosmogenous sediments.
e. All of these.

111. The sediment that covers the greatest area of the deep seabed.
a. Terrigenous sediments.
b. Biogenous sediments.
c. Hydrogenous (or authigenic) sediments.
d. Cosmogenous sediments.

112. The most abundant sediment in the ocean (by volume).
a. Terrigenous sediments.
b. Biogenous sediments.
c. Hydrogenous (or authigenic) sediments.
d. Cosmogenous sediments.

113. Sediments made by precipitation of dissolved minerals in seawater
a. Terrigenous sediments.
b. Biogenous sediments.
c. Hydrogenous (or authigenic) sediments.
d. Cosmogenous sediments.

114. Sediments made up of hard parts of organisms.
a. Terrigenous sediments.
b. Biogenous sediments.
c. Hydrogenous (or authigenic) sediments.
d. Cosmogenous sediments.

115. Which sediment derived by weathering and erosion of rock (continents and islands)
a. Terrigenous sediments.
b. Biogenous sediments.
c. Hydrogenous (or authigenic) sediments.
d. Cosmogenous sediments.

116. Sediment of extraterrestrial origin?
a. Terrigenous sediments.
b. Biogenous sediments.
c. Hydrogenous (or authigenic) sediments.
d. Cosmogenous sediments.

117. Best sediment type to be used to learn about seabed age and history?
a. Terrigenous sediments.
b. Biogenous sediments.
c. Hydrogenous (or authigenic) sediments.
d. Cosmogenous sediments.

118. Which sediment type for pelagic clays?
a. Terrigenous sediments.
b. Biogenous sediments.
c. Hydrogenous (or authigenic) sediments.
d. Cosmogenous sediments.

119. In terms of shear volume and quantity, most marine sediments are associated with:
a. the edges of the deep trenches.
b. the deep sea floor away from the continental slopes.
c. seamounts.
d. mid-ocean ridges.
e. the continental shelf, slopes and rises.

120. In the process of sedimentary *lithification*, loose, unconsolidated sediments:
a. are subducted into the mantle at a deep trench.
b. are buried, compacted and cemented into solid rock.
c. slip into the center of the mid-ocean ridges and become new seafloor.
d. are uplifted to form the edges of continents.
e. are uplifted to form high mountains like Mt. Everest.

121. Select the finest particles (grain size) in this list.
a. sand.
b. silt.
c. clay.
d. cobble.

122. Scientists can derive information about _____ from observing deep ocean cores:
a. basin age
b. mineral resources
c. water temperature in years past
d. the history of life in the upper layers of water
e. (All of the above.)

123. Very small particles sometimes fall surprisingly quickly from near the ocean surface to the seabed, thus avoiding being carried great lateral distances by currents. This is possible because

a. the particles, though tiny, are very heavy and fall quickly.
b. the particles adhere to large particles and fall with them.
c. the particles are compressed in the fecal pellets of small marine animals.
d. the particles resist the action of currents and fall straight to the bottom.

124. The oldest pelagic sediments found on today's deep seafloors are about:

a. 180 million years old.
b. 60 million years old.
c. 1 billion years old.
d. 6,000 years old.
e. 600 million years old.

125. The oldest pelagic sediments on today's sea bottoms are comparatively young because:

a. the rocks of the underlying ocean floor react chemically with the lowest sediments, converting them directly into rock.
b. the ocean floor is recycled through plate tectonics, dragging the oldest sediments into the mantle at subduction zones.
c. sediments have been falling to the ocean floor only comparatively recently.
d. the physical and biological processes that make sediments have been active only a comparatively short time.
e. sediments are consumed by bottom-dwelling marine organisms.

126. San Diego County's geology reflects _____

a. a long history of subduction-related magmatism followed by transform faulting.
b. a long history of seafloor spreading-related magmatism followed by hot spot activity.
c. a short history of transform faulting followed by some subduction-related magmatism.
d. a long, quite history of subsidence and sedimentation.
e. a short history of subduction-related magmatism followed by passive margin sedimentation

127. Geologic hypotheses and theories are developed through a process known as

a. plate tectonics
b. uniformitarianism
c. scientific method
d. systems approach
e. none of the above

128. Best description for the complete Earth system.

a. A series of layers that have similar densities, but different compositions
b. Concentrically-nested shells called the hydrosphere, lithosphere, mantle, core, biosphere, and atmosphere
c. A series of layers that have different densities, but similar compositions
d. Igneous, metamorphic and sedimentary rocks
e. A mantle covered by crust, ocean, and atmosphere

129. Which of the following is the San Andreas Fault associated with?

a. transform plate boundary
b. passive plate margin
c. oceanic hot spots
d. subduction zone boundaries
e. all the above

130. Water that initiates partial melting in subduction zones came from _____
a. rivers, lakes and streams.
b. deep within the mantle.
c. Seawater that saturated the down-going oceanic slab
d. the atmosphere.
e. water does not initiate subduction zone melting

131. Melting mechanism for partial melting in subduction zones.
a. rainwater.
b. soil.
c. groundwater.
d. rivers and lakes.
e. dewatering of subducting slab lowers mantle rock melting temperature.

132. The driving force behind plate tectonics and global volcanism is _____.
a. the heat generated by the burning of fossil fuels
b. the heat produced by sunlight and retained by carbon dioxide and other gases
c. internal heat produced by gravitational accretion and radioactive isostopes in mantle.
d. increased gravitational energy as the Earth moves nearer the sun
e. all of the above

133. Seafloor spreading is associated with which type of tectonic setting?
a. Divergent plate boundaries
b. Convergent plate boundaries
c. Transform plate boundaries
d. Hot spots
e. all of the above

134. The fastest-moving tectonic plates have the _____
a. Most passive margins
b. Least mid-ocean ridges
c. Most subducting edge.
d. Most continental material
e. Least oceanic material.

135. Which of the following statements are true?
a. ocean basins are relatively young, continents are very old.
b. ocean basins are very old, continents are relatively young.
c. ocean basins and continents are about the same age.
d. we do not know how old ocean basins and continents are.
e. ocean basins are sunken continents.

136. San Diego's continental crust was generated at a _____
a. spreading center
b. hot spot
c. subduction zone
d. passive margin

Continue to next page:

Part IV Matching: Questions 137 through 143

Directions: ***Match the tectonic feature (Letter) with its associated term (letter(s))***

a. subduction zone

b. mid-oceanic ridge

c. pluton

d. hot spot

e. Moho discontinuity

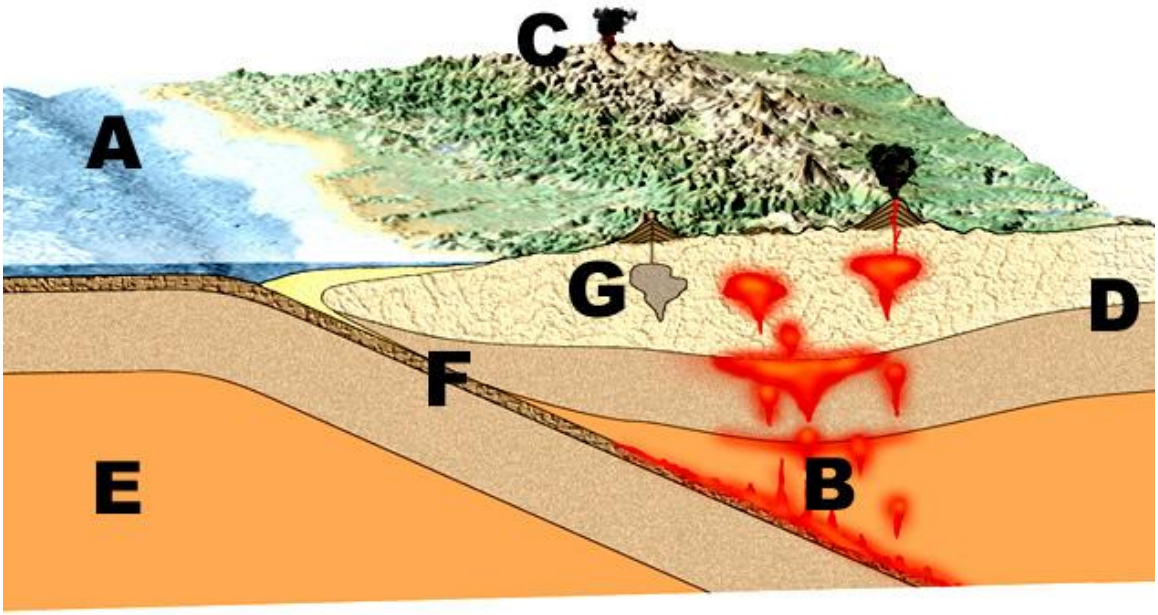
a+b active volcanic arc

a+c mantle wedge/zone of dehydration melting

a+d oceanic trench

a+e passive margin

b+c oceanic athenosphere



____ 137. Feature A

____ 138. Feature B

____ 139. Feature C

____ 140. Feature D

____ 141. Feature E

____ 142. Feature F

____ 143. Feature G

Continue to next page:

Part V - Matching: Questions 144 through 149

Directions*: Match the tectonic feature (Letter) with its associated term (letter(s))*

a. Young oceanic lithosphere

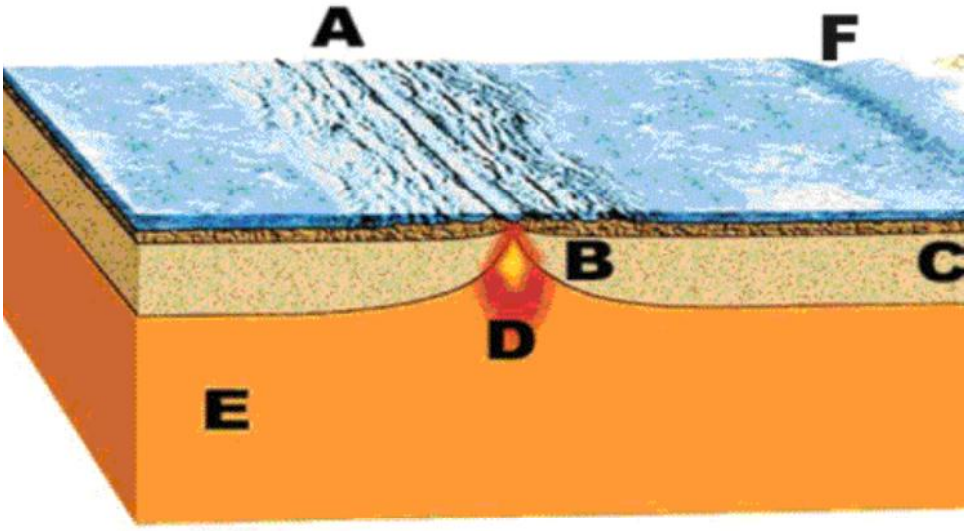
b. Older oceanic lithosphere

c. Zone of decompression melting

d. Mid-oceanic rift valley

e. Oceanic asthenosphere

a+b Oceanic trench



____ 144. Feature A

____ 145. Feature B

____ 146. Feature C

____ 147. Feature D

____ 148. Feature E

____ 149. Feature F

Continue to next page:

Part VI - Matching: Questions 150 through 144

Directions: ***Match each specified geographic locality (Letter) with its associated tectonic setting (letter)***

a. transform plate boundary

b. hot spot

c. passive continental margin

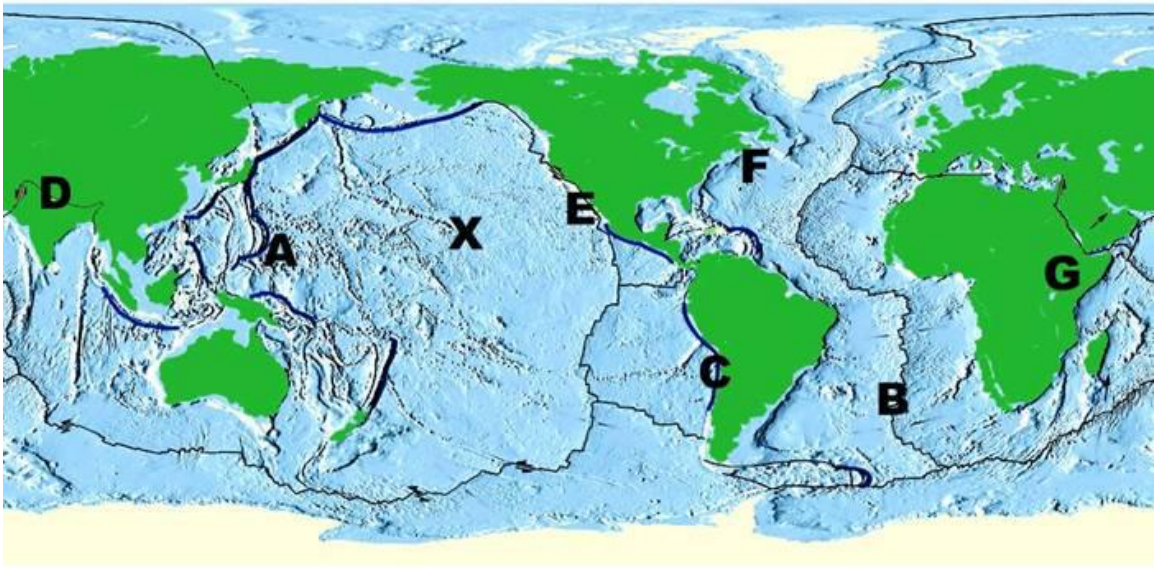
d. oceanic seafloor spreading center at divergent plate boundary

e. oceanic-oceanic subduction at convergent boundary

a+b continent-continent collision at convergent plate boundary

a+c oceanic-continental subduction at convergent plate boundary

a+d continental rift at divergent plate boundary



____ 150. Locality A

____ 151. Locality B

____ 152. Locality C

____ 153. Locality D

____ 154. Locality E

____ 155. Locality F

____ 156. Locality G

____ 157. Locality X

Continue to next page:

Part VII - Matching: Questions 158 through 162

Directions: Match the geographic feature (Capital Letter) with its associated continental margin terms (small-case letter(s)).

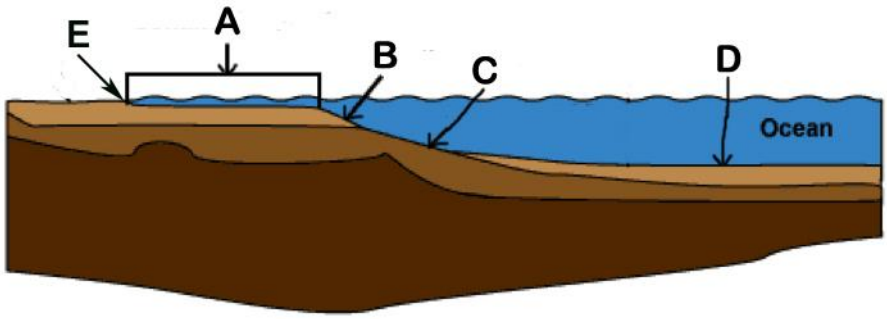
a. Continental rise

b. Littoral zone

c. Continental shelf

d. Abyssal plain

e. Continental slope



____ 158. Feature A

____ 159. Feature B

____ 160. Feature C

____ 161. Feature D

____ 162. Feature E

End of Practice Exam :)