

OCN 201 SPRING 2014 FINAL EXAM – GOETZE

Name _____ ID# _____

Section _____

OCN 201 Spring 2014 Final Exam (75 pts)

True or False (1 pt each). A = TRUE; B= FALSE

1. Ctenophores are the most basal phyla in the animal tree of life.
2. Presence of a notochord is one of the defining features of chordates.
3. The total world catch of commercial fisheries has been increasing exponentially in the last 10 years.
4. The 1% light level defines the base of the epipelagic zone.
5. Your closest living invertebrate relative is an echinoderm.
6. Primary producers are more abundant than primary consumers in the ocean.
7. Bioluminescence occurs only in the deep sea.
8. The Miller-Urey Experiment was important because it was the first demonstration of the creation of life from simple organic compounds.
9. The Antarctic is the region that will warm the most due to climate change.
10. Ciliates are heterotrophs.
11. The three domains of life are the Archaea, Prokaryota, and Eukaryota.
12. Eukaryotes first appeared > 1 billion years later than photosynthetic prokaryotes in Earth's history.

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13. Meroplankton spend only part of their life cycle in the water column.
14. The surface of the Earth has warmed $\sim 0.76^{\circ}\text{C}$ over the past century.
15. Missing links are important transitional fossils that document intermediate morphological states between ancestor and descendent groups.
16. New production is primary production fueled by the recycling of nutrients within the euphotic zone.
17. Many animals in the aphotic zone are black or red.
18. The fish kills that can occur in dead zones are due to anoxia in bottom waters.
19. Coral age and growth can be estimated from the number and width of bands within stony corals.
20. Individual transferable quotas (ITQ) are a fisheries management mechanism that gives commercial fisherman some ownership rights over the fishery.
21. *Prochlorococcus* and *Synechococcus* are photoautotrophic bacteria.
22. Zooxanthellae are important chemoautotrophic symbionts that live within tubeworms at hydrothermal vents.

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23. Osteichthyes are the most diverse, most numerous, and most successful of marine vertebrates.
24. The white cliffs of Dover are composed primarily of the calcium carbonate plates from coccolithophores.
25. Primary production in the ocean is primarily limited by nitrogen and oxygen availability.

Multiple Choice (2 pts each)

26. Animals in the deep scattering layer (DSL) are coming to the surface at night
- A. To increase their metabolism in warmer, surface waters.
 - B. To escape predation in the mesopelagic zone.
 - C. To feed in higher biomass surface waters.
 - D. To find mates in a dilute ocean.
27. Transparency, reflective sides, and counterillumination are all adaptations
- A. that involve bioluminescence.
 - B. for predation avoidance.
 - C. that are found only in vertebrate animals in the dysphotic zone.
 - D. found in animals inhabiting the aphotic zone.
28. The 'Tragedy of the Commons' occurs when:
- A. There is no regulation to prevent habitat destruction in the benthos.
 - B. Individuals act in self-interest.
 - C. Oil tanker spills decimate coastal wildlife.
 - D. Resources are held in common, but costs are shared by everyone.
 - E. B & D.

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29. Pallium feeding enables:

- A. Mixotrophs to augment their nutrient uptake through heterotrophy.
- B. Heterotrophic protists to consume organisms larger than themselves.
- C. Cephalopods to reach prey hidden in cavities.
- D. Corals to survive bleaching events.
- E. Parasitic fish to suck blood and tissue from their hosts.

30. The Darwin point is:

- A. The place at which coral growth is exceeded by island subsidence, and an atoll drowns
- B. Another name for the hotspot (melting anomaly) that creates the Hawaiian Island chain.
- C. The point at which two diverging lineages become distinct species.
- D. A peninsula in the Galapagos, where Darwin conceived of the idea of evolution by natural selection.
- E. The idea that natural selection is responsible for standing genetic diversity within populations.

31. Which of these organisms is not a cnidarian:

- A. Coral
- B. Ctenophore
- C. Anenome
- D. Scyphomedusae
- E. Box jellies

32. The trophic pyramid occurs because:

- A. Only 10% of the biomass at 1 trophic level is converted to biomass at the next higher trophic level.
- B. The ocean is nutrient limited.
- C. Overfishing reduces population size.
- D. There is not much food in the deep sea.

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33. Plankton are defined by their:

- A. Diverse phylogenetic affinities.
- B. Small size.
- C. Weak swimming ability.
- D. Feeding mode.

34. The fish that support the largest commercial fishery in the world feed by:

- A. Carnivory
- B. Mixotrophy
- C. Planktivory
- D. Deposit feeding.

35. Mysticetes:

- A. Include the large baleen whales.
- B. Include the toothed whales, dolphins, porpoises
- C. Undergo long-distance migrations between summer feeding grounds and winter breeding grounds.
- D. Have 1 blowhole opening.
- E. A & C.

36. Stromatolites are important early fossils because they:

- A. Demonstrate that life evolved in the deep sea.
- B. Provide the first unambiguous evidence of prokaryotic life.
- C. were found in Australia, which was extremely cold in early Earth history.
- D. Typically contain organic compounds similar to those found in space (e.g., on meteorites).
- E. Provide the first evidence of eukaryotes.

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37. The largest accidental oil spill in the world was:

- A. During the Gulf War, 1991
- B. From the Exxon Valdez tanker spill, 1989
- C. From the Deepwater Horizon offshore oil rig, 2010
- D. From the Ixtoc I offshore oil rig, 1979

38. Which is the correct order of abundance in the ocean for the following organisms:

- A. Bacteria > microplankton > viruses > larvaceans
- B. Viruses > nanoplankton > micronekton > whales
- C. Viruses > bacteria > tuna > microplankton
- D. Microplankton > nanoplankton > whales > small pelagic fish
- E. Viruses > whales > bacteria > microplankton

39. Primary production is :

- A. Reported in units of $g\ C\ m^{-2}$
- B. Primarily limited by nutrient and light availability in the ocean.
- C. A rate process (measured per unit time).
- D. The production of autotrophic biomass.
- E. B, C, & D.

40. Regenerated production is based on nutrients that are:

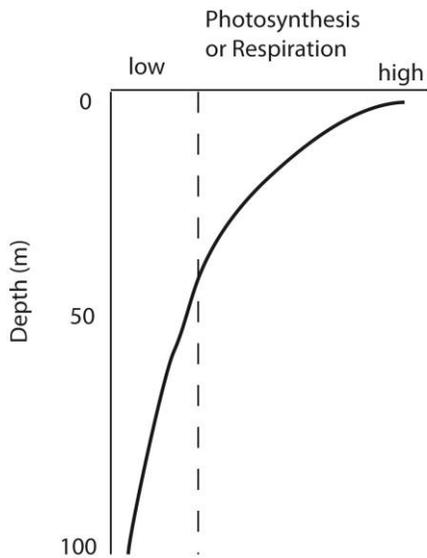
- A. Brought into the euphotic zone from deeper waters through mixing
- B. Upwelled in equatorial divergence zones
- C. Recycled in deep water, and upwelled into the euphotic zone
- D. Recycled in the food web
- E. Upwelled in coastal ecosystems

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Short Answer (3-5 pts each):

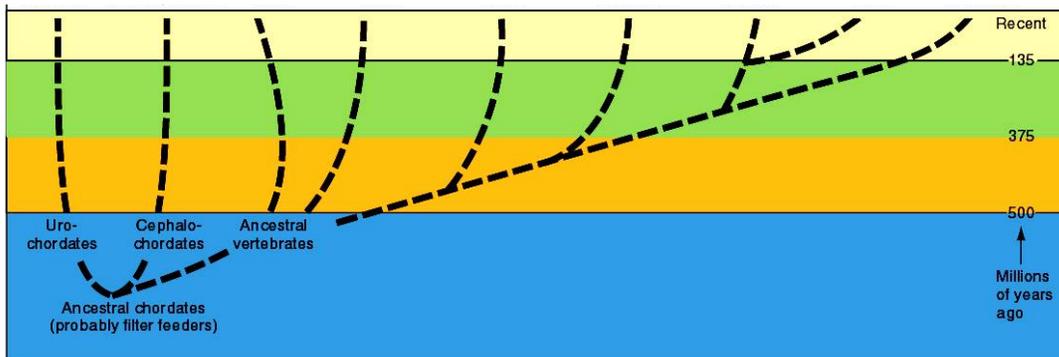
(5 questions)

- 1) (5 pts) For the graph below depicting how photosynthesis and respiration change with depth during daylight hours, indicate which line represents photosynthesis and which represents respiration (2.5 pts). Also mark (circle or arrow) and label the location of the compensation depth (2.5 pts).



- 2) (4 pts) List and define the 4 key concepts that underlie evolution by natural selection (1 pt each).

- 3) (6 pts) On the graph below, write in the names for all major lineages of chordates above their appropriate position in the tree (5 pts). Which major lineage has no true marine representatives (1 pt) ?



- 4) (5 pts) Write down the equation for respiration and define your terms.