

**Chapter 17**

1. Oil comes from
  - a) volcanoes, which bring hydrocarbons to the earth's surface from the mantle.
  - b) dinosaurs whose dead bodies rotted millions of years ago and turned to oil.
  - c) the bodies of planktonic marine organisms, converted by anaerobic bacteria to simpler organic compounds.
  - d) the bodies of planktonic and benthic freshwater organisms, converted by anaerobic bacteria to simpler organic compounds.
  - e) ferns and other prehistoric plants, whose dead bodies rotted millions of years ago and turned to oil.
  
2. Low oxygen basins may be necessary in the initial stages of petroleum formation because
  - a) otherwise the oil would have burned off.
  - b) otherwise the methane would evaporate.
  - c) bottom scavengers are scarce, giving time for the bodies of dead animals to be transformed by anaerobic bacteria into organic compounds.
  - d) the basins permit the oil to pool in them.
  
3. Petroleum geologists looking for evidence of oil under the ground look for
  - a) anaerobic basins where the oil has pooled.
  - b) domes of impermeable rock which may have trapped petroleum and natural gas.
  - c) Texaco signs.
  - d) large numbers of dead marine organisms.
  
4. Deep sedimentary layers are older and \_\_\_\_\_ than shallow ones and are more likely to produce \_\_\_\_\_
  - a) hotter ... oil than natural gas.
  - b) hotter ... natural gas than oil.
  - c) cooler ... oil than natural gas.
  - d) cooler ... natural gas than oil.
  
5. Which of the following is the most accurate statement about methane hydrate deposits.
  - a) They are scientifically uninteresting but they provide an inexpensive alternative to oil.
  - b) They are scientifically uninteresting and they are currently too expensive and dangerous to extract.
  - c) They may be implicated in past climate change, and today they offer an inexpensive alternative to oil.
  - d) They may be implicated in past climate change, but they are currently too expensive and dangerous to extract.
  
6. Which of the following is *not* true about sand and gravel as a marine resource?
  - a) It provides about 20% of the world's total production of sand and gravel.
  - b) Sand and gravel are second only to oil in dollar value of marine resources.
  - c) Aragonite sand from the Bahamas is used in the production of cement and glass.
  - d) Some marine gravel contains diamonds.
  
7. Sea salts produced in evaporation ponds provide all but which of the following products?
  - a) Bromine used in antiknock gasoline.
  - b) Gypsum used in wallboard.
  - c) Silica used in glass.
  - d) Potassium salts used in fertilizer.
  - e) magnesium salts used to make magnesium for aircraft.
  
8. Desalination of seawater can be done by
  - a) distillation.
  - b) freezing the water. The salt is excluded from the ice crystals.
  - c) reverse osmosis.
  - d) a and b.
  - e) a, b, and c.

9. Marine sources of protein, including both food directly used by humans (fish, crustaceans, etc.) and products used to feed other animals raised for food, account for about \_\_\_\_ of total *animal* protein consumed by people.
- 0.01%
  - 1.3%
  - 18%
  - 29%
  - 81%
10. The most important marine fishery by weight in 2006 was
- the anchoveta fishery.
  - the halibut fishery
  - the salmon fishery.
  - the tuna fishery.
  - the shrimp fishery.
11. Among the many reasons given for the large catches of marine fish over the past 50 years include all but which of the following?
- Improved technology for finding fish (for example sonar and satellites.)
  - Improved abundance and size of commercial fish (for example tuna and billfish).
  - Improved methods for catching fish (for example nets vs. hook and line)
  - Improved methods for processing fish (for example factory ships to instantly freeze fish).
12. *Catch per unit effort* (CPUE) is defined as the amount of fish caught in a given amount of time spent fishing (including traveling to the fishing grounds). When fish populations collapse due to overfishing you would expect (and we are presently observing)
- the catch per unit effort to increase, with a consequent decrease in the cost of seafood.
  - the catch per unit effort to increase, with a consequent increase in the cost of seafood.
  - the catch per unit effort to decrease, with a consequent decrease in the cost of seafood.
  - the catch per unit effort to decrease, with a consequent increase in the cost of seafood.
13. The concept of *maximum sustainable yield* refers to
- the maximum amount of each type of fish that can be caught annually without endangering the future population.
  - the maximum amount of each type of fish of fish that can be caught annually while keeping the population at its maximum possible level.
  - The maximum amount each type of fish that could be caught if all fishing activity were directed at that one species.
  - The maximum amount of each type of fish that could be caught in a single year without endangering the future population, if after that year all fishing stopped for that species.
14. Drift net fishing was banned internationally in the 1990s, partly because
- it was unsporting.
  - it was ineffective in catching fish.
  - drift nets break loose, becoming *ghost nets* that slaughter animals unnecessarily for years after.
  - drift nets interfere with shipping by tangling in propellers.
  - it was considered a lazy way to fish.
15. More dolphins are killed by humans than are baleen whales. Why?
- Dolphin meat is more tender and therefore more highly prized.
  - The International Whaling Commission (IWC) protects baleen whales but not dolphins.
  - Tuna fishers sometimes inadvertently catch dolphins, which drown in their nets.
  - The Marine Mammal Protection Act of 1972 protects baleen whales but not dolphins.
  - Dolphin meat doesn't taste as good as baleen whale meat does, but dolphins are easier to catch.

16. Mariculture has been hailed as a possible solution to the world-wide need for protein. At present most mariculture focuses on the production of \_\_\_\_\_, but ultimately there will be the need to raise \_\_\_\_\_
- high value species like salmon and abalone ... low value species like herbivores
  - high value species (mostly herbivores) ... low value species like salmon and abalone
  - low value species like salmon and abalone ... high value species like herbivores
  - low value species (mostly herbivores) ... high value species like salmon and abalone
17. The main product we get from kelp and other seaweeds is
- protein.
  - rope.
  - algin.
  - psychedelic drugs.
  - glue.
18. Chemists are attracted to chemicals produced by sea creatures like sponges, bryozoans, and tunicates, as possible sources of medicines. The potential drugs mentioned in the text include all except
- cancer-fighting drugs.
  - anti-viral medicines.
  - anti-inflammatory medicines.
  - drugs to counteract seasickness.
19. Which of the following is *not* true of shipping containers and containerships?
- A containership can be almost as large as an aircraft carrier.
  - Standard container sizes are defined by the International Organization of Standardization (ISO).
  - There are about 10 different standard container sizes.
  - The use of shipping containers has cut the cost of shipping to less than 1% of the retail value of most products.
20. Modern international laws of the sea are based on
- Mare Legislatum*, meaning *Law of the Sea*, a document written by the Roman emperor Julius Caesar.
  - Mare Legislatum*, meaning *Law of the Sea*, a document written by the Dutch jurist Hugo Grotius.
  - Mare Liberum*, meaning *A Free Ocean*, a document written by the Roman emperor Julius Caesar.
  - Mare Liberum*, meaning *A Free Ocean*, a document written by the Dutch jurist Hugo Grotius.
21. The Bosphorus is the narrow strait separating Europe and Asia Minor and joining the Black Sea with (ultimately) the Mediterranean Sea. It is 640 meters (2100 ft) wide at its narrowest point. The land on both sides is Turkish. It is a major shipping channel for all the countries that border the Black Sea. According to the 1982 Draft Convention on the Law of the Sea
- The Bosphorus is Turkish territorial water. Turkey can legally stop any ship from passing, and indeed does so regularly.
  - The Bosphorus is Turkish territorial water, and Turkey can legally stop any ship from passing. However, Turkey has pledged never to do so except in time of war.
  - The Bosphorus is Turkish territorial water, but Turkey cannot legally stop ships from passing through.
  - The Bosphorus is not Turkish territorial water because it is necessary for international shipping.
22. In the context of the International Law of the Sea, an EEZ is
- an extra-easy way of extracting oil in shallow water.
  - an exclusive economic zone, where all nations have rights to the resources located there.
  - an exclusive economic zone, where a single nation controls the resources located there.
  - an essential economic zone, where a particular resource, like magnesium, needed by all countries is found.

## Chapter 18

23. The overall danger of a pollutant is related to its
- toxicity.
  - persistence in the environment.
  - quantity in the environment.
  - a and b
  - a, b, and c
24. Which of the following is true about oil released into the environment?
- Crude oil is generally less disruptive to marine life than refined oil.
  - Spills of crude oil are generally larger in volume than spills of refined oil.
  - The detergents used to disperse oil sometimes do more damage than the oil itself.
  - a and c
  - a, b, and c
25. Which of the following is true about the fate of oil spilled into a marine environment?
- The oil coats the rocks and seafloor, and never goes away. It continues to kill for centuries until buried beneath sediment.
  - the oil forms a slick on the sea surface which can last for years, shutting out light to the plants beneath the surface.
  - The oil forms tar balls which bob around on the surface of the ocean until decomposed by sunlight.
  - The oil forms tar balls which bob around on the surface of the ocean until decomposed by bacteria.
  - The oil forms tar balls which fall to the seafloor, where they are eventually decomposed by bacteria.
26. *Biological amplification* in the context of pollution refers to
- an increase in growth hormone in some animals, making them much larger than they are naturally.
  - an increase in the loudness of the sounds animals make after exposure to pollutants.
  - an increase in concentration as toxins make their way up the food chain.
  - an increase in the ability of certain animals to reproduce at the expense of others.
27. In her influential book *Silent Spring*, Rachel Carson wrote of the dangers of synthetic pesticides like **dichlorodiphenyltrichloroethane (DDT)**. One problem observed with DDT was the destruction of
- so many insects that bird populations were dying of starvation.
  - so many mosquitoes carrying malaria that human populations exploded in places where DDT was used.
  - brown pelican eggs because the pesticide interfered with the birds' ability to produce calcium.
  - commercially important fish species such as tuna.
28. *Eutrophication* refers to excessively high levels of nutrients like nitrates and phosphates in the water. You would think a high nutrient level would be a good thing, because it would permit greater quantity of plant life, and plants provide food and oxygen for animals. It is not necessarily a good thing, though, in part because
- the overabundance of plant material causes the animals to overeat, causing obesity and greater incidence of heart failure.
  - huge quantities of plant life can produce *too much* oxygen, which causes the metabolic rates of animals to increase to excessive levels.
  - if too many plants grow, the animals can't eat them all. Then at night when the plants don't photosynthesize, they deplete the oxygen in the water, killing the animals.
  - The plants get too big for the animals to eat.
29. Plastics threaten the marine environment in many ways. Among the ways mentioned in the text is that:
- sea turtles often eat plastic bags, thinking they are jellyfish. The plastic jams their digestive systems and kills them.
  - sea lions eat styrofoam cups, which are indigestible.
  - sea birds lay their eggs in 2 liter coke bottles. When the chicks are born they are stuck inside the bottles.
  - great whales eat the little bits of styrofoam from cups and coolers, thinking they are plankton.
  - huge amounts of plastic are being subducted into trenches, throwing off the chemical balance of the mantle.

30. Introduced species can threaten ecological communities by which of the following?
- a) Out-competing native species for resources
  - b) Increasing biodiversity
  - c) Decreasing biodiversity
  - d) a) and b) above
  - e) a) and c) above
31. Estuaries are sometimes called "nurseries" of oceanic life, because so many species have larval forms that live in estuaries. The human-made threats to estuaries include:
- a) oil from oil spills
  - b) high levels of heavy metals.
  - c) development of marinas.
  - d) a and c.
  - e) a, b, and c.
32. Damage to the ozone layer in the atmosphere by chlorofluorocarbons (CFCs) could lead to
- a) an increase in ultraviolet radiation hitting the earth's surface, leading to greater damage to DNA.
  - b) an increase in the global temperature of the earth, with possible melting of polar ice and flooding of low-lying land.
  - c) a decrease in ultraviolet radiation hitting the earth's surface, leading to greater damage to DNA.
  - d) a decrease in the global temperature of the earth, with the onset of a possible ice-age.
  - e) an increase in mercury levels in shellfish.
33. Increase in atmospheric levels of greenhouse gases like CO<sub>2</sub> could lead to
- a) an increase in ultraviolet radiation hitting the earth's surface, leading to greater damage to DNA.
  - b) an increase in the global temperature of the earth, with possible melting of polar ice and flooding of low-lying land.
  - c) a decrease in ultraviolet radiation hitting the earth's surface, leading to greater damage to DNA.
  - d) a decrease in the global temperature of the earth, with the onset of a possible ice-age.
  - e) an increase in mercury levels in shellfish.
34. There is widespread condemnation in the U.S. of Japan, Norway, Iceland, and other traditional whaling nations for their hunting of whales. At the same time, the U.S. permits several native groups, including the Makah tribe in Washington and various Inuit groups in Alaska, to hunt a few whales annually as part of their native traditions. In the case of the Inuit people, the whales involved are the very endangered bowhead whales. Is the U.S justified in this approach, or are we being hypocritical? Also, given that Minke whales (the preferred target of Japanese and Norwegians) are not endangered, how is whaling any different from catching salmon or tuna? Note: if you can think of good answers to these questions, please tell me: I want to know.
35. Describe briefly what happened to the Polynesian inhabitants of Easter Island. Why is this a cautionary tale?