APES Review Sheet One

This APES handout contains information about the APES course of study and examination that is intended to assist you throughout your preparation for the APES exam.

The Official College Board APES Course Outline

I. Interdependence of Earth's Systems: Fundamental Principles and Concepts (25%)
- A. The Flow of Energy
  1. forms and quality of energy
  2. energy units and measurements
  3. sources and sinks, conversions
- B. The Cycling of Matter
  1. water
  2. carbon
  3. major nutrients
     a. nitrogen
     b. phosphorus
  4. differences between cycling of major and trace elements
- C. The Solid Earth
  1. Earth history and the geologic time scale
  2. Earth dynamics: plate tectonics, volcanism, the rock cycle, soil formation
- D. The Atmosphere
  1. atmospheric history: origin, evolution, composition, and structure
  2. atmospheric dynamics: weather, climate
- E. The Biosphere
  1. organisms: adaptations to their environments
  2. populations and communities: exponential growth, carrying capacity
  3. ecosystems and change: biomass, energy transfer, succession
  4. evolution of life: natural selection, extinction

II. Human Population Dynamics (10%)
- A. History and Global Distribution
  1. numbers
  2. demographics, such as birth and death rates
  3. patterns of resource utilization
- B. Carrying Capacity—Local, Regional, Global
- C. Cultural and Economic Influences

III. Renewable and Nonrenewable Resources: Distribution, Ownership, Use, and Degradation (15%)
- A. Water
  1. fresh: agricultural, industrial, domestic
  2. oceans: fisheries, industrial
- B. Minerals
- C. Soils
  1. soil types
  2. erosion and conservation
- D. Biological
  1. natural areas
  2. genetic diversity
  3. food and other agricultural products
- E. Energy
  1. conventional sources
  2. alternative sources
- F. Land
  1. residential and commercial
  2. agricultural and forestry
  3. recreational and wilderness

IV. Environmental Quality (20-25%)
- A. Air/Water/Soil
  1. major pollutants
     a. types, such as SO_2, NO_x, and pesticides
     b. thermal pollution
     c. measurement and units of measure such as ppm, pH, µg/L
     d. point and nonpoint sources (domestic, industrial, agricultural)
  2. effects of pollutants on:
     a. aquatic systems
     b. vegetation
     c. natural features, buildings and structures
     d. wildlife
  3. pollution reduction, remediation, and control
- B. Solid Waste
  1. types, sources, and amounts
  2. current disposal methods and their limitations
  3. alternative practices in solid waste management
- C. Impact on Human Health
  1. agents: chemical and biological
  2. effects: acute and chronic, dose-response relationships
  3. relative risks: evaluation and response

V. Global Changes and Their Consequences (15-20%)
- A. First-order Effects (changes)
  1. atmosphere: CO_2, CH_4, stratospheric O_3
  2. oceans: surface temperatures, currents
  3. biota: habitat destruction, introduced exotics, over harvesting
- B. Higher-order Interactions (consequences)
  1. atmosphere: global warming, increasing ultraviolet radiation
  2. oceans: increasing sea level, long-term climate change, impact on El Niño
  3. biota: loss of biodiversity

VI. Environment and Society: Trade-Offs and Decision Making (10%)
- A. Economic Forces
  1. cost-benefit analysis
  2. marginal costs
  3. ownership and externalized costs
- B. Cultural and Aesthetic Considerations
- C. Environmental Ethics
- D. Environmental Laws and Regulations (International, National, and Regional)
- E. Issues and options (conservation, preservation, restoration, remediation, sustainability, mitigation)

Sample AP Exam Questions

(A) Peat
(B) Bituminous Coal
(C) Anthracite Coal
(D) Lignite
(E) Wood

1. Partially decayed plant material.
2. High carbon content: clean burning.
3. Which is considered a renewable fuel.
   (A) Radon
   (B) Oxygen
   (C) Carbon
   (D) CFC
   (E) Methane
4. Atmospheric concentrations of this gas are increasing primarily due to extensive rice and cattle production.
5. This gas forms from the radioactive decay of uranium and is believed to contribute to increasing rates of lung cancer.
6. This gas has no known natural source; it is completely anthropogenic in origin.
   (A) Nitrous oxide
   (B) Organic nitrogen
   (C) Molecular nitrogen
   (D) Nitrate
   (E) Ammonia
7. The primary form of nitrogen responsible for lake eutrophication.
8. The primary form of nitrogen in plant and animal biomass.
9. The largest pool of nitrogen in the nitrogen cycle.
10. Where is the largest carbon reservoir found?
    (A) CO_2 in the atmosphere
    (B) Dissolved CO_2 in the oceans
    (C) fossil fuels
    (D) marine sediments
    (E) plant biomass
11. A country currently has a population of 100 million and an annual growth rate of 3.5 percent. If the growth rate remains constant, what will be the population of this country in 40 years?
    (A) 150 million
    (B) 200 million
    (C) 300 million
    (D) 400 million
    (E) 800 million
12. The species that characterizes its habitat and helps keep the ecosystem in balance is:
    (A) indicator species
    (B) specialist species
    (C) generalist species
    (D) keystone species
    (E) threatened species
13. The dangers of disposing of toxic chemicals underground came to public attention in which of the following locations?
    (A) Bhopal, India
    (B) Chernobyl, Ukraine
    (C) Love Canal, New York
    (D) Minamata, Japan
    (E) Three Mile Island, Pennsylvania
14. How is population growth determined?
    (A) number of births per 1,000 people
    (B) crude death rate minus crude birth rate
    (C) crude birth rate minus crude death rate
    (D) number of surviving infants per 1,000 women in population
    (E) number of surviving infants per 1,000 people in population
15. What are the six basic elements that make up life?
    (A) carbon, hydrogen, oxygen, nitrogen, phosphorus, sulfur
    (B) carbon, hydrogen, oxygen, nitrogen, magnesium, calcium
    (C) carbon, oxygen, hydrogen, phosphorus, calcium, sulfur
    (D) carbon, hydrogen, nitrogen, calcium, sulfur, magnesium
    (E) carbon, oxygen, nitrogen, phosphorus, magnesium, sulfur
16. Which of the following is true about the demographic transition model?
    (A) birth rates and death rates are high during the industrial stage
    (B) birth rates are low occur during the transitional stage
    (C) population growth speeds up during the industrial stage
    (D) birth and death rates and infant mortality are high during the pre-industrial stage
    (E) birth and death rates are high and infant mortality rates are low during the pre-industrial stage
17. When X Joules of nuclear energy is used to produce Y Joules of electrical energy, which of the following is true?
    (A) In every case, $X > Y$
    (B) In every case, $X = Y$
    (C) In every case, $X < Y$
    (D) Either $X < Y$ or $X > Y$, depending on the efficiency of the generator
    (E) Either $X < Y$ or $X > Y$, depending on the amount of heat produced
18. A sample of water containing a fecal coliform indicates:
    (A) high pH levels
    (B) high phosphorus levels
    (C) eutrophication is occurring
    (D) there are bacteria present
    (E) there are animal or human feces present
19. Which of the following would not be used in integrated pest management?
    (A) natural predation
    (B) introduce a native species
    (C) crop rotation
    (D) increased pesticide use
    (E) sexual attraction traps
20. Which of the following is most abundant in the earth crust?
    (A) silicon
    (B) carbon
    (C) aluminum
    (D) calcium
    (E) iron

Answers: 1-A; 2-C; 3-E; 4-E; 5-A; 6-D; 7-D; 8-B; 9-C; 10-D; 11-D; 12-D; 13-C; 14-C; 15-A; 16-D; 17-C; 18-E; 19-D; 20-A