APES 1st SEMESTER FINAL EXAM COMMON STUDY GUIDE

There are 90 multiple choice questions on the Final Exam.

Unit 1 (Chapters 1, 2, and 3): Introduction to Environmental Science (15 Questions)

- Gross National Product (GDP) vs. Genuine Progress Indicator (GPI)
- Preservation, Conservation, Remediation, Mitigation, Restoration, Reclamation
- Garrett Hardin's "Tragedy of the Commons"
- The Lesson of Easter Island
- Rachel Carson's contributions to Environmental Science (book *Silent Spring)*
- Independent vs. Dependent variables
- Subsidies, Green Tax, Permit Trading (Cap-and-Trade System)
- Cost-Benefit Analysis and external costs
- Ecosystem Services
- Sustainability
- Anthropocentrism vs. Biocentrism vs. Ecocentrism

Unit 2 (Chapters 4 and 7): Chemistry and Energy Concepts (15 Questions)

- Radioactive Decay - What it is? What is half-life?
    - Solve radioactive decay problems
- First and Second Laws of Thermodynamics
- Photosynthesis and Respiration
    - Know the approximate efficiency (in %) of the conversion of light energy to chemical energy in photosynthesis.
- Energy vs. Power
    - Solve math problems using dimensional analysis
    - Power = Energy/Time
    - Incandescent Light Bulbs – 95% of electrical energy is converted to heat (only 5% to light).
- Nitrogen Cycle
    - Nitrogen Fixation, Denitrification, Decomposition
- Hydrologic Cycle (Water Cycle)
    - Evaporation, Infiltration (Percolation), Transpiration, Precipitation, Run-off, Aquifer (groundwater)
- Carbon Cycle
- Phosphorus Cycle
- Positive vs. Negative Feedback Loops
- Dead Zones and Eutrophication
- Gross vs. Net Primary Production
    - Net Primary Production = Gross Primary Production – Respiration

Unit 3 (Chapters 5, 6, and 11): Ecosystems (15 Questions)

- Exponential Growth vs. Logistic Growth
    - Carrying Capacity, Limiting Factors, Biotic Potential
- Generalists vs. Specialists
- Vocabulary associated with food webs (producer, consumer, herbivore, carnivore, omnivore)
- Formula for population growth rate
- K-selected vs. r-selected species
- Unequal distribution of biodiversity (highest at low altitudes near the equator)
- Causes of biodiversity loss (habitat alteration, invasive species, pollution, overharvesting, climate change)
- Equilibrium Theory of Island Biogeography
- General locations of major biomes (tropical rain forest, temperate deciduous forest, desert, taiga/boreal forest, tundra)
- Typical food chain of a tundra ecosystem
- Competition (competitive exclusion), Predation, Parasitism, Herbivory, Mutualism, Coevolution

Unit 4 (Chapters 15 and 16): Water (15 Questions)

- Types of Lakes (oligotrophic vs. eutrophic)
- Eutrophication vs. Cultural Eutrophication
- Sources of water pollution (nutrient pollution, pathogens, toxic chemicals, sediment, thermal pollution)
- Point vs. non-point source pollution
- Water Quality Testing – Types of tests performed – What do they indicate?
    - Turbidity, Biological Oxygen on Demand, fecal coliform
- Drinking water treatment, Waste water treatment
- Over-Fishing – Methods of Fishing (driftnets, long line, bottom-trawling, purse seine), by-catch
- Benefits and costs of damming rivers

Unit 5 (Chapters 17 and 18): Atmosphere and Climate Change (30 Questions)

- Common Air Pollutants (Carbon Monoxide, Sulfur Dioxide, Nitrogen Dioxide, Tropospheric Ozone, Particulate Matter, Lead)
- Composition of Earth's Atmosphere (% Nitrogen, % Oxygen, etc)
- Stratospheric Ozone vs. Tropospheric Ozone
- Depletion of the stratospheric ozone layer – Benefits of the ozone layer
- Industrial vs. Photochemical Smog
- Distribution of Solar Energy – Seasons, Convection
- Temperature Inversions
- Acidic Deposition
- Greenhouse Effect and Greenhouse Gases
- El Niño-Southern Oscillation (ENSO)
- Causes of climate change
- Effects of climate change
- Solutions to climate change
- Intergovernmental Panel on Climate Change (IPCC)
    - Fourth Assessment Report