

PART I

For each of the single choice questions, mark the bullet corresponding to the one best answer to the question.

Salman is an undergraduate student at LAU, majoring in philosophy. He has taken ENV 200 and scored a high grade on the course. He is genuinely interested in the environment, and has volunteered with several non-governmental organizations that work on dealing with environmental problems nationally and regionally. Which of the following statement(s) about Salman is TRUE?

- Salman may not understand how the environment works; however, he is an environmentalist.
- ~~Salman is an environmental scientist though he majored in philosophy.~~
- Salman may understand how the environment works though he does not have the scientific training to work in the field of environmental science; therefore, he is an environmentalist.
- More than one of the above statements apply to Salman.

Answer → Samar wakes up early in the morning, only to realize that her bedroom window is wide open and her purse is stolen from her chest of drawers. She thinks that a thief may have jumped into her bedroom from the window and robbed her while she was sleeping. Which of the following statements are TRUE?

- Samar's realization that her bedroom window is wide open and her purse is stolen is an empirical fact.
- Samar's assumption that a thief may have jumped into her bedroom from the window is an inferred fact.
- Samar's assumption that a thief may have jumped into her bedroom from the window is a hypothesis.
- Samar's realization that her bedroom window is wide open and her purse is stolen is a natural law because it is descriptive.
- More than one of the above statements are true.

Which of the following is an abiotic part of an organism's environment?

- The flow of energy necessary to maintain the organism
- Climate
- All the plants and animals the organism interacts with
- Temperature
- More than one of the above
- All of the above

Evaluate the following statement: The issue of declining salmon stocks in the Pacific Northwest is a good example of how environmental problems are relatively easy to solve once we understand the science behind salmon reproduction.

- The above statement is true.
- The above statement is false; environmental problems are almost always difficult to solve.
- The above statement is false; there is more to be understood than the reproductive biology of salmon before being able to solve this problem.
- The above statement is false; salmon stocks in the Pacific Northwest are declining because of pollution rather than overfishing.

Earthrise, a photograph taken on December 24, 1968 by the astronaut William Anders, is considered to be the most influential environmental photograph ever taken because

- it is the first photograph of Earth taken from outer space.
- it shows that the surface of Earth is predominantly covered with water, which explains why life occurs on Earth but not on the moon for example.
- it shows for a fact that Earth is round.
- it shows that living on Earth is like living on a spaceship because resources on Earth are finite.
- of more than one of the above.

Human population growth

- is geometric, as manifested by the J-shaped plot of the number of people as a function of time.
- is the cause behind all causes of environmental problems.
- has been taking place for the past 200 years; human population size was stable until the industrial revolution.
- is about to stop, as resources available to people cannot sustain a larger number of people than what we already have.

What effect does poverty have on population growth?

- No effect; people reproduce whether they can or cannot afford it.
- Negative effect; poor people cannot afford to raise big families, so they have fewer kids.
- Positive effect; poor people think of kids as a form of social security, so they have more of them.
- Positive effect; poor people have more kids because they perceive kids as labor, and consequently sources of income.
- More than one of the above

Answer

Which of the following is NOT a consequence of poverty?

- Obesity and cardiac diseases
- Pre-mature death due to normally preventable health problems
- Malnutrition
- Limited access to clean drinking water
- Limited access to adequate sanitation facilities

Which of the following is NOT an advantage of affluence?

- Affluence enables a person to buy more and more things, which makes her/him, on the average, happier.
- Affluence enables a person to become more concerned about environmental quality.
- Affluence may provide money for developing environmentally friendly technology.
- Affluence finances improvements in environmental quality by increasing scientific research and technological advances.
- All of the above are disadvantages of affluence.

"God created the plants" is not a good hypothesis because

- it does not explain the observation that plants exist.
- it is not the simplest explanation for the observation that plants exist.
- it is consistent with all available observations about the existence of plants.
- it is not testable and not falsifiable.

In science, cause and effect patterns may be understood through

- careful observation.
- modeling.
- experimentation.
- modeling and experimentation.
- careful observation, modeling and experimentation.

Fishing companies pay the cost of catching fish but not the cost of depletion of fish stocks. This illustrates which of the following concepts?

- Sustainable yield
- Natural capital
- Natural income
- Overconsumption of a normally renewable resource
- Excluding environmental costs from market prices

The biotic components of a forest include

- soil and water.
- microbes and trees.
- animals and microbes.
- soil minerals and microorganisms.
- plants and their insect pollinators.
- more than one of the above.

Populations are best defined as

- all members of a specific species.
- all organisms found in one specific environment.
- communities of individuals.
- groups of interbreeding individuals.

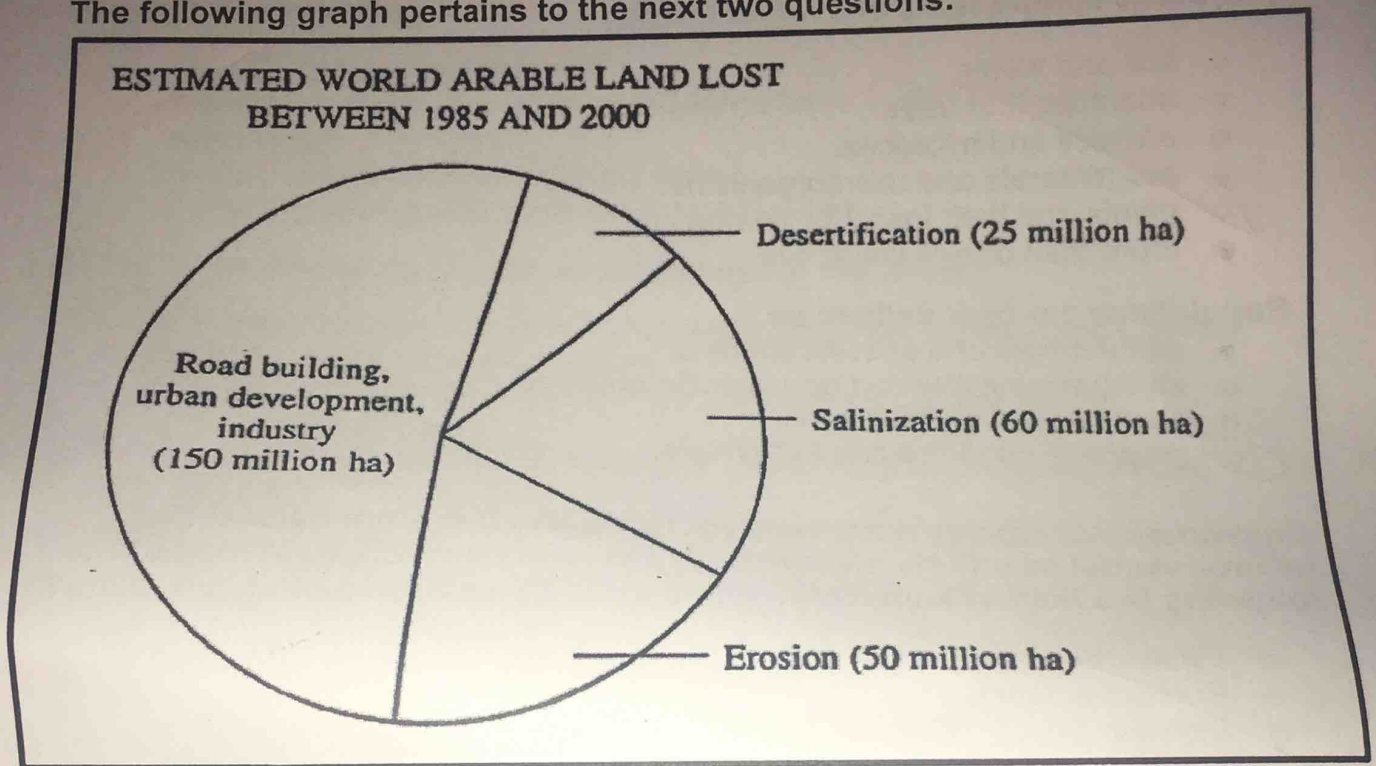
Environmental problems are very complex; it is therefore natural that environmental scientists rely on many fields of knowledge. Which of the following is a field of knowledge relied upon by environmental scientists?

- Philosophy
- Political science
- Biology
- Anthropology
- Being multidisciplinary, environmental scientists rely on all of the above.

What is the difference between genetic diversity and species diversity?

- Species diversity refers to the number of species; genetic diversity refers to the number of genes in each individual of a species.
- Species diversity refers to the number of individuals of each species; genetic diversity refers to the genetic variation among members of each species.
- Species diversity refers to the number of individuals of each species; genetic diversity refers to the number of genes in each individual of a species.
- Species diversity refers to the number of species; genetic diversity refers to the genetic variation among members of each species.

The following graph pertains to the next two questions:



The information provided in the above graph may best be described as

- scientific laws
- empirical facts
- inferred facts
- observations
- hypotheses
- more than one of the above

According to the information in the above graph, which of the following would most effectively slow the loss of arable land?

- Increasing the efficiency of desalination processes
- Reducing urban development
- Increasing the efficiency of erosion control
- Using more extensive irrigation systems
- Discovering cheaper energy sources

A plant ecologist is interested in the interaction between plants and their pollinators. Her research is therefore at which level in the hierarchy of biological organization?

- Individual organisms
- Population
- Community
- Ecosystem
- Biosphere

A group of researchers are assessing the feasibility of removing the Qaraoun Dam. Which of the following should be undertaken first?

- Determine the projected short-term and long-term beneficial and harmful environmental, economic and health effects of using coal to generate electricity
- Conduct scientific research on the advantages and disadvantages of using coal to generate electricity
- Look into the ethical implications of the effect of using coal to generate electricity
- All of the above are equally important and should be undertaken concurrently.

Which of the following five levels in the hierarchy of ecological organization is the least inclusive?

- Population
- Species
- Biosphere
- Community
- Ecosystem

All of the following life supporting systems are needed in their entirety EXCEPT

- the biosphere.
- the hydrosphere.
- the atmosphere.
- the geosphere.

Which of the following are mismatched?

- Troposphere: layer of the atmosphere closest to the surface of the Earth
- Stratopause: separates the stratosphere from the mesosphere
- Stratosphere: includes the ozone layer
- Thermosphere: temperature decreases as distance from the surface of Earth increases
- Mesosphere: bound by the stratopause and the mesopause

Non-renewable metallic resources are often obtained from the Earth's

- core.

- mantle.
- mantle and core.
- lithosphere.
- hydrosphere.
- crust and core.

Which of the following does not consistently decrease as we move away from the surface of Earth?

- The level of oxygen in the air.
- Atmospheric pressure. ✓
- Temperature. ✓
- Air density. ✓
- All of the above consistently decrease as we move away from the surface of the earth.

The troposphere

- includes 75 to 80% of the Earth's air mass.
- is made of the air we breathe.
- is involved in chemical cycling of Earth's nutrients.
- is chemically very much like the stratosphere, except that it is poorer in ozone and richer in water vapor.
- may be described by all of the above statements.

Environmental scientists may address all of the following questions EXCEPT

- What are the environmental requirements necessary for maintaining a healthy fish population off the coast of Beirut, Lebanon?
- What are the long-term costs and benefits of extending the borders of Tyre Coast Nature Reserve to include Naqoura in the south?
- What is the sustainable yield for rabbitfish in the Eastern Mediterranean?
- Do we have an ethical obligation to prevent the pre-mature extinction of sea turtles in the Eastern Mediterranean?
- none of the above; all of the above questions may be addressed by environmental scientists.

On a continuum of renewability, with virtually unlimited and perpetually renewable natural resources on the far left-hand side of the continuum and non-renewable natural resources on the far right-hand side, in which order will the following natural resources fall from left to right on the continuum: salt, wood, geothermal energy, wheat?

Renewable + Non-Renewable

- geothermal energy, wheat, wood, salt
- geothermal energy, wheat, salt, wood
- geothermal energy, salt, wheat, wood
- salt, geothermal energy, wheat, wood

The most abundant gas in Earth's atmosphere is

- oxygen gas.
- nitrogen gas.
- water vapor.
- hydrogen gas.
- ozone.

In the context of Garrett Hardin's "tragedy of the commons," which of the following types of property is the most susceptible to overexploitation?

- Common property
- Open access renewable resource
- Open access non-renewable resource
- Private property
- None of the above; all are equally susceptible to overexploitation.

In a sustainable community, which of the following approaches would be MOST desired?

- Population stabilization
- Protecting species rather than habitats
- Increasing resource use, especially renewable resources
- Pollution clean-up
- Waste disposal

The three Rs of consumption shrinkage stand for

- reduction, refinement and replacement.
- reduction, reuse and replacement.
- reuse, replacement and recycling.
- reduce, reuse and recycle.
- re-buy, reuse and recycle.

In the 1970s, a popular animated character named Woodsy Owl encouraged American children to "Give a hoot. Don't Pollute." His new motto, "Lend a Hand. Care for the Land." encourages everyone to make a positive difference in the world. This strategy used by the United States Department of Agriculture (USDA) Forest Service represents which type of solutions to Hardin's tragedy of the commons process?

- The use of government laws, regulations and incentives
- Education
- Informal non-governmental social processes
- The use of moral, religious and ethical appeals

Which of the following generalizations about developing countries is TRUE?

- They make up about one-tenth of the world's population.
- They have high average per capita GDP.
- They include such Asian countries as India, China and Japan.
- They use a much smaller portion of the world's resources compared to developed countries.
- They are highly industrialized.
- More than one of the above statements is true.

Consider the Beirut Campus of the Lebanese American University. If you decide to consider all the living things on campus in a study, at which level in the hierarchy of ecological organization would you be conducting your study?

- Community
- Population
- Ecosystem
- Species
- Biosphere
- None of the above

The environmental worldview of the Once-ler, the person behind all the problems addressed in "The Lorax", may best be described as

- biocentric.
- ecocentric.
- anthropocentric.
- ecosystem centered.
- self-centered.

If farmers in a village organize themselves in a group and decide to follow certain rules for sustainable farming, this would be an example of which kind of method for promoting pro-environmental individual behavior?

- Religious and ethical appeals
- Government laws and regulations
- Small group/community management
- Programs of education

Which of the following environmental worldviews is the most anthropocentric?

- Stewardship worldview
- Planetary management worldview
- Environmental wisdom worldview
- We cannot answer this question because all of the above worldviews are anthropocentric.

How many species do we share Earth with?

- No more than 1.8 million species
- Around 4 million species
- Around 100 million species
- Between 10 and 100 million species
- We do not know how many species we share Earth with

When you recycle paper, you are

- overexploiting a non-renewable resource.
- overexploiting a renewable resource.
- using a non-renewable resource sustainably.
- using a renewable resource sustainably.

Life on earth depends on interaction of gravity, the cycling of matter, and

- cycling of energy.
- one-way flow of energy.
- one-way flow of matter.
- the destruction of energy.X
- the consumption of matter.X

Which of the following is NOT a solution to the problem of the degradation of a shared common resource?

- Prevent everybody from using the resource, even if that means that half the inhabitants of the area will lose their source of income
- Convert the shared common resource to private ownership
- Use the shared common resource at a rate well below estimated sustainable yields
- Regulate access to the resource
- All of the above are not solutions to the problem of the degradation of a shared common resource.

The “triple bottom line” according to Majora Crater includes the developers, the government and the community. In the context of sustainable development, the developers represent

- the environmental sphere.
- the economic sphere.
- the social sphere.
- none of the above; developers are de facto excluded in sustainable development.

“The Lorax” includes examples of all of the following concepts in environmental science EXCEPT

- tragedy of the commons.
- air and water pollution.
- habitat alteration and degradation as a possible cause of local extinction.
- un-wise environmental decision making.
- none of the above.

The newly discovered insect *Cephalcia tannourinensis*, named after the town of Tannourine,

- is an example of a beneficial insect whose ecological role in cedar forests is yet to be discovered.
- protects cedar trees from being attacked by wood wasps.
- is attacking crops in villages adjacent to the cedar forest of Tannourine, where it was first discovered.
- threatens to wipe out most of Lebanon’s cedar forests and spread to neighboring countries.

PART II

In the space provided next to each term in column A, write the number of the one statement or phrase that best corresponds to it in column B.

Answer	Column A	Column B
11 ✓	Trade-off solution	1. The highest rate at which a renewable resource can be used indefinitely without reducing its available supply
5 ✓	Tragedy of the commons	2. A social movement or concern, but not a science
8 ✓	Natural services	3. Occurs when new discoveries or new ideas overthrow a well-accepted scientific theory or law
9 ✓	Toynbee's law of progressive simplification	4. The addiction to overconsumption of material goods
10 ✓	Conservation	5. Overgrazing of public land by privately owned livestock
6 ✓	Principle of parsimony	6. Among several plausible explanations, the simplest is the most likely to be correct.
7 ✓	Sustainability	7. The capacity to endure
4 ✓	Affluence	8. The different functions of nature
3 ✓	Paradigm shift	9. Transfer of energy and attention to the non-material side of life
2 ✓	Environmentalism	10. Management of natural resources with the goal of minimizing resource waste and sustaining resource supplies for the current and future generation
		11. Sacrifices one quality or aspect at the expense of gaining another quality or aspect