

*Instructions: Bubble your name, student ID, and Recitation # on the scantron, and write the version (A, B or C) in the box marked sex.*

1) This class is organized around three overarching themes in the relationships between nature and human culture, they are:

- a) Environmental determinism, neo-determinism, and environmental domination.
- b) Human perceptions of the environment; human transformation of earth; and human interaction with environment as resource and hazard.
- (c) Exceptionalism, exemptionalism, and bio-centricism.

2) The “levee effect” is:

- (a) the measure of a levee’s ability to hold back floods of a certain height
- (b) a measure of the inevitable leakage through a levee of minor flood waters
- (c) the protection provided by a levee
- (d) the perceived safety behind a levee that then encourages further development.

3) Hazard vulnerability is best defined as:

- (a) the total value of development exposed to natural hazards
- (b) the number of people living in hazard zones
- (c) the total losses from natural hazards
- (d) the proportion of exposed development lost to a hazard.

4) The study of post-Katrina reconstruction in New Orleans indicates that:

- (a) the immediate post-disaster period offers an effective opportunity to reduce future vulnerability
- (b) pressures to ‘return to normal’ make it difficult to reduce vulnerability in the post-disaster period
- (c) right after a disaster people are more aware of their vulnerabilities and willing to adapt to reduce future losses.

5) Overall losses to natural hazards in the US (and globally) are increasing because:

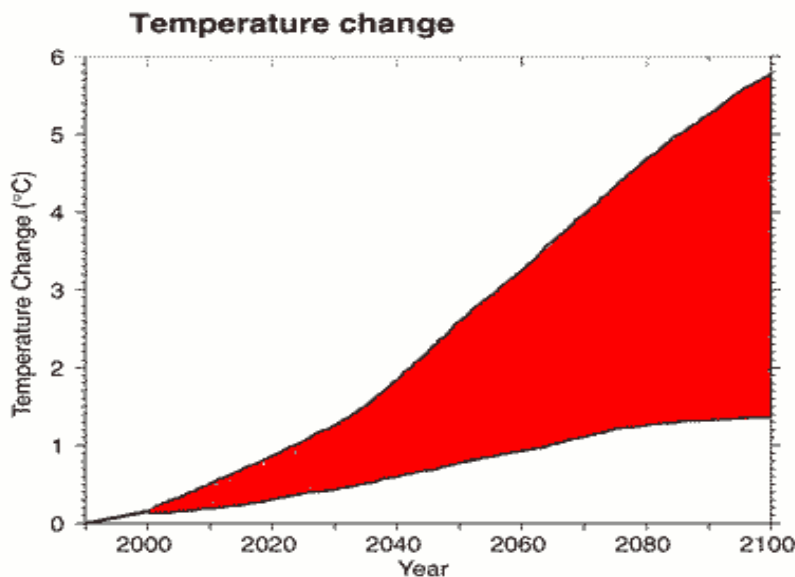
- (a) human occupancy of hazard zones is increasing
- (b) natural events that cause hazards are increasing in magnitude
- (c) warning systems are not working well
- (d) human vulnerability to hazards is declining.

6) T/F: The Bruntland Commission’s definition of “sustainable development” did not recognize any limits on human development.

7) T/F: In their article on “Reasons for Concern” about global warming, Smith et al. concluded that faster change is more difficult to adapt to, so just slowing global warming even by a small amount via an agreement at Copenhagen this week can be a benefit.

- 8) The “Greenhouse Effect” is the interaction of so-called greenhouse gases (GHG) in the earth’s atmosphere with the planet’s radiation balance, such that:
- (a) incoming solar radiation is transmitted through the atmosphere less efficiently than outgoing terrestrial radiation.
  - (b) incoming solar radiation is intensified in the sense that the greenhouse gases act like a magnifying glass.
  - (c) The greenhouse gases are relatively transparent to incoming solar radiation but tend to absorb outgoing terrestrial radiation.
  - (d) Greenhouse gases are relatively opaque to incoming solar radiation and to outgoing terrestrial radiation.
- 9) T/F: Although theory suggests that the earth should be warming due to natural and anthropogenic forces, actual instrumental records over the last century show that average surface temperature has remained stable.
- 10) Human activity appears to be responsible for raising carbon dioxide content of the atmosphere by what percent since the industrial age began?
- (a) 5%
  - (b) 30%
  - (c) 50%
  - (d) 100% (that is, a doubling)
- 11) One of the problems with setting greenhouse gas limits to prevent “dangerous” climate warming is the difficulty of assessing the likelihood of extreme events. Smith et al. suggest that as the climate warms, extreme events are likely to:
- (a) decrease
  - (b) increase, but at a rate slower than the rate of change of average conditions
  - (c) remain about the same.
  - (d) increase at a rate that is higher than the rate of change in average conditions
- 12) The Framework Convention on Climate Change (UNFCCC) set as a basic goal the prevention of:
- (a) any measurable anthropogenic interference in the earth’s climate
  - (b) warming beyond what had been observed in the instrumental record.
  - (c) anthropogenic warming that posed a threat to the most vulnerable societies
  - (d) dangerous anthropogenic interference in the climate
- (13) Which of these standards that could be applied to setting a target for GHG reduction best describes an approach in which the industrialized countries reduce GHG emissions, but can also pay to help people adapt to climate change that is not avoided?
- (a) a target that avoids all climate change risk (zero tolerance)
  - (b) a target that poses risks no larger than other risks that society already accepts as tolerable
  - (c) a reduction target such that the costs of meeting it are roughly the same as the costs of coping (adapting to) the global warming it allows
  - (d) a target that avoids only the most dire outcomes like large-scale, abrupt degradation of ice sheets, ocean circulation changes, and ecosystem loss.

- (14) **T/F**: Despite all the concern over global warming, Smith et al. conclude in their chapter, "Vulnerability to Climate Change," that a modest increment of anthropogenic warming of the Earth's climate could produce a net **positive** economic impact.
- (15) **T/F**: Smith et al. conclude in their chapter, "Vulnerability to Climate Change," that even small anthropogenic warming will have **negative** impacts on at least some societies and places.
- (16) **T/F**: Natural 'ecotones' are transitions in habitat and ecological conditions (like the edges of biomes we discussed earlier this semester). Because they are locations of varied habitat, those areas are **less likely** to exhibit marked ecological changes due to global warming.
- (17) **T/F**: At the Copenhagen climate change conference, the U.S. Environmental Protection Agency announced that it would begin to regulate CO<sub>2</sub> as an air pollutant under the Clean Air Act.
- (18) Which of these is NOT expected as an effect of anthropogenic global warming?
- (a) overall warmer temperatures
  - (b) overall drier climate**
  - (c) rising sea levels
  - (d) especially large warming in high latitudes (arctic and polar regions).



- (19) The wide range of temperature projections illustrated in the above graph from the UN Intergovernmental Panel on Climate Change (IPCC), reflects uncertainties about:
- (a) how much warming will occur with a given GHG concentration
  - (b) the rate of increase in GHG concentration, which depends on development patterns
  - (c) both a and b**
- (20) **T/F**: At the Copenhagen climate change conference, a group of island nations filed a motion asking for greater cuts in GHG emissions so as to limit global warming to 1.5 degrees or less above the pre-industrial average.

(21) Humans appear to be transforming the climate by burning fossil fuels. This is:  
(a) an inadvertent transformation of the climate  
(b) a negative feedback in the climate system  
(c) a purposeful transformation of the climate  
(d) an explicit assessment that the costs of climate change do not exceed the benefits of fossil fuel use

(22) Of these natural systems, which one is NOT identified as a unique and threatened system sensitive to global warming in the Smith et al. article, "Vulnerability to Climate Change"?  
(a) deserts  
(b) glaciers  
(c) biodiversity hot spots  
(d) tropical reefs

(23) In their article entitled "What is Sustainable Development," Kates et al. refer to the "grand compromise" as:  
(a) the necessary collaboration between developed and developing countries on problems like global warming  
(b) the compromise between advocates for environmental protection and those for human development  
(c) the agreement by the current generation to bequeath non-degraded natural resources to future generations  
(d) the agreement in global warming mitigation negotiations whereby developing countries need not adopt binding GHG reduction targets.

(24) The Brundland Commission's definition of "sustainable development" includes the principle that:  
(a) the present generation should forgo meeting some of its needs if doing so makes future development less sustainable  
(b) the needs of the present generation should be met, even if that results in some needs of future generations not being met  
(c) the needs of both present and future generations must be met.

(25) **T/F:** Even if global aggregate impacts of climate change become negative, some regions and nations might experience net positive outcomes, like increases in agricultural production.

**Accepted T or F; (26) T/F:** The Brundtland Commission's description of "sustainable development" requires that current human development must be lessened to save the environment for future generations.

(27) **T/F:** The Brundtland Commission's description of "sustainable development" includes a "limits model," in the sense that they state that humans should limit their development activities to the biosphere's ability to absorb the products and impacts of those activities.

(28) **T/F:** Because economic growth almost always comes at some loss to the environment, most definitions of sustainable development and associated goals and indicators, reject the principle that further economic development is essential to human well being.

(29) **T/F:** In the reading about the recovery of New Orleans following Hurricane Katrina, the authors find that the reconstruction made New Orleans much less vulnerable to future storms.

(30) T/F: The “precautionary principle” suggests that we should wait until the science is more certain before making drastic cuts in GHG.

(31) By making a motion at the Copenhagen negotiations to limit warming to 1.5 degrees (instead of the 2 degree benchmark becoming widely adopted), the island nation of Tuvalu (and other low lying island nations) were arguing for the application of what principle for choosing threshold of dangerous climate change?

- (a) avoid impacts to the most vulnerable social and ecological systems
- (b) avoid large scale discontinuities
- (c) avoid all anthropogenic warming (zero tolerance)
- (d) avoid impacts at some economically efficient balance of mitigation and adaptation
- (e) avoid impacts to public health

(32) By announcing in Copenhagen that the U.S. Environmental Protection Agency (EPA) was going to regulate CO<sub>2</sub> as a pollutant under the Clean Air Act, the EPA was applying what principle for choosing threshold of dangerous climate change.

- (a) avoid impacts to the most vulnerable ecological and social systems
- (b) avoid impacts to public health
- (c) avoid large scale discontinuities
- (d) avoid all anthropogenic warming (zero tolerance)
- (e) avoid impacts at some economically efficient balance of mitigation and adaptation

(33) Compared to previous UN science assessments (the last one utilized data up through 2006), the science up-date offered at the Copenhagen meeting this week concluded that:

- (a) current warming was less than previously expected
- (b) GHG growth rates were higher than projected
- (c) projected sea level rise is about the same as predicted by past studies

(34) T/F: The UNFCCC, and the Kyoto Protocol that called for binding GHG emission reductions, include a wide range of strong and effective and monitoring and enforcement mechanisms.

(35) T/F: One difference between the current Copenhagen climate conference and the negotiations in Kyoto back in 1997, is that at Copenhagen this week there is general agreement that anthropogenic global warming is underway and that some additional warming is inevitable even with additional GHG emission reductions likely to emerge in any treaty.