Import Settings:
Base Settings: Brownstone Default
File: Test bank for Skinner, Blue Planet 3e, Chapter 1

Essay

1. Describe a system that you encounter in everyday life that maintains a dynamic equilibrium with negative feedbacks. Make sure you describe in detail examples of perturbations and how the system responds to maintain balance.

Ans:

2. Why is the peer-review process essential to the scientific method? What does this tell us about scientific "controversies" and advancing scientific understanding?

Fill-in-the-blank

3. _____ is the science that studies the whole planet as a system of innumerable interacting parts and focuses on the changes within and among those parts.

Ans: Earth system science

4. _____ is the continuous or repetitive collection of information about a target—Earth, in this case—from a distance.

Ans: Remote sensing

5. A _____ is any portion of the universe that can be isolated from the rest of the universe for the purpose of observing and measuring changes.

Ans: system

6. The amount of matter (or energy) that is transferred from one reservoir to another, and the rate at which it is transferred, is called a _____ .

Ans: flux

7. The nearest thing to an isolated system in the real world is a _____ in which the boundary permits the exchange of energy, but not matter, with the surroundings.

Ans: closed system

8. A is a simple, convenient graphical representation of a system.

Ans: box model

9. When the flux of matter into a reservoir matches the flux out of that reservoir, we say that the reservoir is at _____ .

Ans: steady state

10. If the flux of some substance into a reservoir is greater than the flux of that substance out of the reservoir, then we refer to the reservoir as a _____ .

Ans: sink

11. The average length of time material spends in a reservoir is called its _____ .

Ans: residence time

12. The place where Earth's four reservoirs interact most intensively is called the _____ its most important characteristic is that it supports life and allows life to exist on this planet.

Ans: life zone because

13. The _____ is the solid Earth, composed principally of rock (by which we mean any naturally formed, nonliving, firm coherent aggregate mass of solid matter that constitutes part of a planet) and regolith (the irregular blanket of loose, uncemented rock particles that covers the solid Earth).

Ans: geosphere

14. The _____ is the totality of Earth's water, including oceans, lakes, streams, underground water, and all the snow and ice.

Ans: hydrosphere

15. The perennially frozen parts of the hydrosphere are collectively referred to as the _____ .

Ans: cryosphere

16. The _____ is the mixture of gases—predominantly nitrogen, oxygen, argon, carbon dioxide, and water vapor—that surrounds Earth.

Ans: atmosphere

17. The _____ includes all of Earth's organisms, as well as any organic matter not yet decomposed.

Ans: biosphere

18. A _____ occurs when the output of the system also serves as an input and leads to changes in the state of the system.

Ans: feedback

19. A system that is self-regulating is said to have the property of homeostasis, which implies a state of _____ , or balance.

Ans: equilibrium

20. A _____ cycle describes the movement of any chemical element or chemical compound that cycles through the biosphere and plays a role in its stability, as well as cycling through other Earth reservoirs.

Ans: biogeochemical

True/False

21. Studying a population of animals in isolation of other units is an example of Earth system science.

Ans: False

22. Satellite observations from space are critical to Earth system science.

Ans: True

23. Graphical Information Systems deal only with data from satellites.

Ans: False

24. Systems can only be defined for processes that are happening currently.

Ans: False

25. Models are also smaller representations of the original object.

Ans: False

26. Models of systems can be physical representations of the original object.

Ans: True

27. It is necessary to know the amount of matter within a reservoir to understand if it's in steady state.

Ans: False

28. All matter within a given reservoir must be physically connected within a system.

Ans: False

29. A reservoir that is a sink is not in steady state.

Ans: True

30. Fossil fuels are considered to be sequestered inside the geosphere.

Ans: True

31. The Earth is considered a closed system.

Ans: True

32. Even though the Earth is a closed system, some mineral resources are unlimited.

Ans: False

33. Water vapor is considered to be part of the hydrosphere.

Ans: False

34. The anthroposphere has only existed for about 250 years.

Ans: False

35. The rock cycle is involved with the formation of soil.

Ans: True

36. Biogeochemical cycles always involve the biosphere.

Ans: True

37. There is no place on Earth that humans have not changed.

Ans: True

38. Hypotheses are based on our prior understanding of the natural world and how it works.

Ans: True

39. Scientific laws can never be disproven.

Ans: False

40. Uncertainty implies a lack of scientific knowledge.

Ans: False

Multiple choice

41. Which of the following studies falls under the category of Earth system science?
a) A single mountain range
b) An isolated population of animals
c) The atmosphere
d) A lake
e) Studying the rain, rivers and ground-water flow of an island

Ans: e

42. Which of the following studies is not an example of remote sensing?
a) Cloud images from geostationary satellites
b) Infrared images of the ocean's surface from satellites
c) Measuring high-altitude ozone concentrations with a balloon
d) Visible light images from a plane

Ans: c

43. A beaker of water with a clear, closed top is an example of a _____ system.
a) isolated
b) open
c) closed
d) geographic information

Ans: c

44. A beaker of water with a closed top and made of insulating material is an example of a _____ system.
a) isolated
b) open

c) closed
d) geographic information

Ans: a

45. A beaker of water with an open top is an example of a _____ system.
a) closed
b) open
c) isolated
d) geographic information

Ans: b

46. All of the following could be used as flux units when describing a system with a box model:
a) Molecules per day
b) Gigatonnes per year
c) Cubic meteres per second
d) Kilometers per hour
e. Moles per hour

Ans: d

47. The boxes in a box model are
a) sinks
b) reservoirs
c) sources
d) fluxes

Ans: b

48. Residence time is
a) the average length of time material spends in a reservoir
b) the average length of time material spends in transit from one reservoir to another
c) the average length of time material spends within the entire closed system
d) the average length of time material spends only in the lithosphere

Ans: a

49. The situation where materials have a very long residence time in a reservoir is called:
a) isolated
b) sink
c) source
d) sequestration
e) closed

Ans: d

50. Because the Earth is a closed system, which of the following statements is most accurate:
a) The mineral resources on this planet are all we have and—for the foreseeable future—all we will ever have.
b) No energy is entering or leaving the system.
c) If changes are made in one part of a system, the results of those changes eventually will never affect other parts of the system.
d) The Earth is constantly increasing in mass.

Ans: a

51. Which of the following places is not in the life zone of the Earth:
a) In the midst of the Sahara desert
b) The tops of the highest mountains
c) The deepest reaches of the ocean
d) On the frozen glaciers of Antarctica
e) The deep (greater than 10 km) interior of the Earth

Ans: e

52. The _____ is the solid Earth, composed principally of rock (by which we mean any naturally formed, nonliving, firm coherent aggregate mass of solid matter that constitutes part of a planet) and regolith (the irregular blanket of loose, uncemented rock particles that covers the solid Earth).
a) biosphere
b) geosphere
c) atmosphere
d) hydrosphere
e) cryosphere

Ans: b

53. The _____ is the totality of Earth's water, including oceans, lakes, streams, underground water, and all the snow and ice.
a) biosphere
b) geosphere
c) hydrosphere
d) atmosphere
e) cryosphere

Ans: c

54. The perennially frozen parts of the hydrosphere are collectively referred to as the _____.
a) biosphere
b) hydrosphere
c) geosphere
d) cryosphere
e) atmosphere

Ans: d

55. The _____ is the mixture of gases—predominantly nitrogen, oxygen, argon, carbon dioxide, and water vapor—that surrounds Earth.
a) biosphere
b) cryosphere
c) hydrosphere
d) geosphere
e) atmosphere

Ans: e

56. The _____ includes all of Earth's organisms, as well as any organic matter not yet decomposed.
a) biosphere
b) cryosphere
c) hydrosphere

d) geosphere
e) atmosphere

Ans: e

57. Which gas has a much lower concentration on Earth compared to Mars and Venus due to the process of photosynthesis?
a) oxygen
b) nitrogen
c) carbon dioxide
d) water vapor
e) argon

Ans: c

58. Which gas in the Earth's atmosphere is a product of life?
a) water vapor
b) nitrogen
c) oxygen
d) carbon dioxide
e) argon

Ans: d

59. Which of the following is an example of a positive feedback?
a) an unpaid credit card balance that accrues interest
b) the heating/cooling system of a house
c) the human body cooling by sweating
d) the level of a lake filled by rain and drained by a stream

Ans: a

60. Which of the following statements best characterizes Earth systems?
a) Earth systems tend toward self-regulation and a state of equilibrium.
b) Earth systems are most often governed by positive feedbacks.
c) Earth systems maintain a state of perfect equilibrium, even on local scales.
d) Earth systems are always open systems.

Ans: a

61. In the hydrological cycle, water moving from the surfaces of land, water, and plants back to the atmosphere is:
a) respiration
b) precipitation
c) surface runoff
d) evaporation

Ans: d

62. In the hydrological cycle, water coalescing into channels and runs off the land surface toward the oceans is:
a) evaporation
b) surface runoff
c) precipitation
d) respiration

Ans: b

63. In the hydrological cycle, water moving from the atmospheric reservoir to the land or ocean is:
a) respiration
b) surface runoff
c) evaporation
d) precipitation

Ans: d

64. Why is the energy cycle different from many other Earth cycles?
a) It describes the movement of energy through the system, rather than the movement of materials.
b) It tends toward self-regulation and a state of equilibrium.
c) It is can be separated in many subsystems.
d) It can be represented by a box model.

Ans: a

65. The processes of weathering, erosion, transport, deposition, metamorphism, melting, crystallization, volcanism, and uplift of mountains are part of which cycle?
a) energy cycle
b) rock cycle
c) hydrologic cycle
d) carbon cycle
e) nitrogen cycle

Ans: b

66. Which of the following are all biogeochemical cycles?
a) Nitrogen, oxygen, rock
b) Carbon, nitrogen, rock
c) Carbon, oxygen, rock
d) Carbon, nitrogen, oxygen

Ans: d

67. Which of the following is the most common cause of human influence on biogeochemical cycles?
a) dumping of waste in landfills
b) atmospheric emissions of pollution
c) Building bridges over rivers
d) Drilling for oil in Alaska

Ans: b

68. In the carbon cycle, carbon moving from the atmosphere to the biosphere is called:
a) evaporation
b) respiration
c) fossil fuel combustion
d) photosynthesis

Ans: d

69. In the carbon cycle, carbon moving from the biosphere to the atmosphere is called:

a) photosynthesis
b) respiration
c) fossil fuel combustion
d) evaporation

Ans: b

70. The term that describes the changes produced in the Earth system as a result of human activities is:
a) negative feedback
b) positive feedback
c) global change
d) equilibrium
e) open system

Ans: c

71. Which of the following is an example of the complete scientific method?
a) Using satellites to map city lights at night
b) Considering past temperature patterns on the Earth and stating the Sun is causing the changes without testing further predictions.
c) Observing that volcanic eruptions are associated with cooler global temperatures.
d) Using knowledge of chemistry to predict the ozone hole, and then making measurements that agree with these predictions.

Ans: d

72. Which of the following methods would not be useful for testing a hypothesis?
a) analyzing the same data used to formulate the hypothesis
b) controlled experiments in a laboratory
c) further observations and measurements
d) development of a mathematical model

Ans: a

73. Which of the following is the correct order of the sequence?
a) law, hypothesis, theory
b) hypothesis, law, theory

c) theory, law, hypothesis
d) law, theory, hypothesis
e) hypothesis, theory, law

Ans: e

74. Peer review is important in which steps of the scientific method
a) Gathering data
b) All steps
c) Formulating a hypothesis
d) Testing the hypothesis
e. Formulating a theory

Ans: b

75. If there are uncertainties in aspects of an Earth system, which of the following statements is most true?
a) The scientific method is not helpful for making any policy decisions.
b) This implies a lack of knowledge, and no conclusions can be drawn from what is known about the system.
c) Policy makers should not accept the findings of scientists until they are absolutely certain about their predictions.
d) It is normal for uncertainty to exist in our knowledge of a highly complex and changing system.

Ans: d

Classroom Response System Questions

Chapter 1: The Earth System

Instructions:

1. Select the question you would like to use.
2. Copy and paste the question slide into the Lecture PowerPoint Presentation.
3. Delete orange box around correct answer.
4. Use with you preferred Classroom Response System software

1. Which term describes a conceptual system that is never actually encountered?
   - An isolated system
   - A closed system
   - An open system
   - A system in dynamic equilibrium

2. Which of the following is NOT an example of a closed system

- The hydrological cycle of North America
- The global carbon cycle
- The global nitrogen cycle
- A box with a moveable lid that could be pushed in or pulled out like a piston

3. Newton not only stated his idea of gravity, but he also formulated a theory.

True

False

4. A polar-orbiting satellite appears stationary in the sky from the Earth.

True

False

5. Which of the following is a trait of a high-altitude, geostationary satellite that is lacked by low-altitude satellites:

- Large field of view (see entire continents)
- The land surface can be blocked by clouds
- Much more detailed spatial resolution
- See different parts of the Earth at different times
- Has sensors that detect in the infrared region

6. Many of the sensors on satellites detect electromagnetic radiation outside the range of the human eye.

True

False