PART I

Reading 1 "The Hydrologic Cycle"

P1 → The hydrologic cycle is the transfer of water from the oceans to the atmosphere to the land and back to the oceans. The processes involved include evaporation of water from the oceans; precipitation on land; evaporation from land; and runoff from streams, rivers, and subsurface groundwater. The hydrologic cycle is driven by solar energy, which evaporates water from oceans, freshwater bodies, soils, and vegetation. Of the total 1.3 billion cubic km water on Earth, about 97% is in oceans, and about 2% is in glaciers and ice caps. The rest is in freshwater on land and in the atmosphere. Although it represents only a small fraction of the water on Earth, the water on land is important in moving chemicals, sculpturing landscape, weathering rocks, transporting sediments, and providing our water resources. The water in the atmosphere—only 0.001% of the total on Earth—cycles quickly to produce rain and runoff for our water resources.

P2 → Especially important from an environmental perspective is that rates of transfer on land are small relative to what's happening in the ocean. For example, most of the water that evaporates from the ocean falls again as precipitation into the ocean. On land, most of the water that falls as precipitation comes from evaporation of water from land. This means that regional land-use changes, such as the building of large dams and reservoirs, can change the amount of water evaporated into the atmosphere and change the location and amount of precipitation on land—water we depend on to raise our crops and supply water for our urban environments. Furthermore, as we pave over large areas of land in cities, storm water runs off quicker and in greater volume, thereby increasing flood hazards. Bringing water into semi-arid cities by pumping groundwater or transporting water from distant mountains through aqueducts may increase evaporation, thereby increasing humidity and precipitation in a region.

P3 Approximately 60% of water that falls by precipitation on land each year evaporates to the atmosphere. A smaller component (about 40%) returns to the ocean surface and subsurface runoff. [A] This small annual transfer of water supplies resources for rivers and urban and agricultural lands. [B] Unfortunately, distribution of water on land is far from uniform. [C] As human population increases, water shortages will become more frequent in arid and semi-arid regions, where water is naturally nonabundant. [D]

P4 → At the regional and local level, the fundamental hydrological unit of the landscape is the drainage basin (also called a watershed or catchment). A drainage basin is the area that contributes surface runoff to a particular stream or river.

The term *drainage basin* is usually used in evaluating the hydrology of an area, such as the stream flow or runoff from hill slopes. Drainage basins vary greatly in size, from less than a hectare (2.5 acres) to millions of square kilometers. A drainage basin is usually named for its main stream or river, such as the Mississippi River drainage basin.

P5 ➔ The main process in the cycle is the global transfer of water from the atmosphere to the land and oceans and back to the atmosphere. Notice that more than 97% of Earth's water is in the oceans; the next largest storage compartment, the ice caps and glaciers, accounts for another 2%. Together, these account for more than 99% of the total water, and both are generally unsuitable for human use because of salinity (seawater) and location (ice caps and glaciers). Only about 0.001% of the total water on Earth is in the atmosphere at any one time. However, this relatively small amount of water in the global water cycle, with an average atmospheric residence time of only about 9 days, produces all our freshwater resources through the process of precipitation.

P6 ➔ Water can be found in either liquid, solid, or gaseous form at a number of locations at or near Earth's surface. Depending on the specific location, the residence time may vary from a few days to many thousands of years. However, as mentioned, more than 99% of Earth's water in its natural state is unavailable or unsuitable for beneficial human use. Thus, the amount of water for which all the people, plants, and animals on Earth compete is much less than 1% of the total.

P7 As the world's population and industrial production of goods increase, the use of water will also accelerate. The world per capita use of water in 1975 was about 185,000 gal/year. And the total human use of water was about 700 m^3/year or 2000 gal/day. Today, world use of water is about 6,000 km^3/year or about 1.58×10^{15} gal/year, which is a significant fraction of the naturally available freshwater.

P8 Compared with other resources, water is used in very large quantities. In recent years, the total mass (or weight) of water used on Earth per year has been approximately 1000 times the world's total production of minerals, including petroleum, coal, metal ores, and nonmetals.

1. Which of the sentences below best expresses the information in the highlighted statement in the passage? The other choices change the meaning or leave out important information.

   Ⓐ It is the hydrologic cycle that causes water to evaporate from plants, soil, and bodies of water inland as well as from the oceans.
   Ⓑ Solar energy is the source of power for the hydrologic cycle, which begins by evaporating water from plants, soil, oceans, and freshwater sources.
   Ⓒ The evaporation of water from the oceans, freshwater sources, plants, and soils is the natural process, which we call the hydrologic cycle.
   Ⓓ Energy from the sun and the hydrologic cycle are power sources for plants that require water from the oceans and freshwater sources.

2. Based on information in paragraph 1, which of the following best explains the term "hydrologic cycle"?

   Ⓐ The movement of water from freshwater bodies into the oceans
   Ⓑ Solar energy in the atmosphere that produces rain over land and oceans
   Ⓒ Water resources from oceans and freshwater sources inland
   Ⓓ Transportation of water from oceans into the atmosphere and onto the land

   Paragraph 1 is marked with an arrow [➔].

3. The phrase The rest in the passage refers to

   Ⓐ oceans
   Ⓑ ice caps
   Ⓒ glaciers
   Ⓓ water

4. According to paragraph 1, why is freshwater considered important?

   Ⓐ It evaporates more quickly than water in the ocean.
   Ⓑ It is the largest source of water on Earth.
   Ⓒ It determines the landscape of rocks and sediment.
   Ⓓ It is the runoff that empties into the oceans.

   Paragraph 1 is marked with an arrow [➔].

5. Based on information in paragraph 2, how do man-made water resources such as reservoirs and lakes affect the water cycle?

   Ⓐ They increase the danger of flooding in the areas surrounding them.
   Ⓑ They cause changes in the patterns of rainfall in the immediate area.
   Ⓒ They provide water sources for agricultural purposes in dry areas.
   Ⓓ They improve the natural flow of water into the oceans.

   Paragraph 2 is marked with an arrow [➔].

6. The word component in the passage is closest in meaning to

   Ⓐ error
   Ⓑ part
   Ⓒ estimate
   Ⓓ source

7. The word fundamental in the passage is closest in meaning to

   Ⓐ diverse
   Ⓑ common
   Ⓒ basic
   Ⓓ attractive

8. Why does the author mention the "Mississippi River" in paragraph 4?

   Ⓐ The Mississippi River is an example of a drainage basin.
   Ⓑ The Mississippi River is one of the largest rivers in the region.
   Ⓒ The Mississippi River is used in evaluating the runoff from hills.
   Ⓓ The Mississippi River is named for the area surrounding it.

   Paragraph 4 is marked with an arrow [➔].

9. According to paragraph 5, which of the following is true about the global transfer of water?

   Ⓐ Most rainwater stays in the atmosphere for less than a week.
   Ⓑ Glaciers are a better source of water than the oceans.
   Ⓒ Most of the water in the world is currently in the water cycle.
   Ⓓ Less than 1 percent of the water can be used for human consumption.

   Paragraph 5 is marked with an arrow [➔].

10. According to paragraph 6, why is water a problem?

    Ⓐ There is not enough water available in liquid form in the world.
    Ⓑ Bringing water to the surface of the Earth can be difficult.
    Ⓒ A comparatively small amount of Earth's water is suitable for human use.
    Ⓓ Most of the naturally accessible water is too old to be used safely.

    Paragraph 6 is marked with an arrow [➔].

11. The word significant in the passage is closest in meaning to

    Ⓐ rare
    Ⓑ small
    Ⓒ important
    Ⓓ regular

12. Look at the four squares [■] that show where the following sentence could be inserted in the passage.

    As a result, water shortages occur in some areas.

    Where could the sentence best be added?

    Click on a square [■] to insert the sentence in the passage.

13. **Directions:** An introduction for a short summary of the passage appears below. Complete the summary by selecting the THREE answer choices that mention the most important points in the passage. Some sentences do not belong in the summary because they express ideas that are not included in the passage or are minor points from the passage. ***This question is worth 2 points.***

The hydrologic cycle transfers water from the oceans to the atmosphere, from the atmosphere to the land, and back to the oceans.

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Answer Choices

A The global problem is the availability of water that is suitable for human use where and when it is needed.

B Only about 0.001% of the total water on Earth is in the atmosphere at a particular point in time.

C Solar energy causes the evaporation of oceans and freshwater lakes and rivers into the atmosphere.

D Water shortages will probably become more common as more people begin to live in desert regions.

E Precipitation in the form of rainfall replenishes the water in the ocean and in drainage basins on land.

F Desalination is a key solution to the problem of adequate water supplies for human use.

PART II

Reading 2 "Piaget's Cognitive Development Theory"

P1 Jean Piaget, the famous Swiss developmental psychologist, changed the way we think about the development of children's minds. **Piaget's theory** *states that children go through four stages as they actively construct their understanding of the world.* Two processes underlie this cognitive construction of the world: organization and adaptation. To make sense of our world, we organize our experiences. For example, we separate important ideas from less important ideas and we connect one idea to another. In addition to organizing our observations and experiences, we *adapt*, adjusting to new environmental demands.

P2 As the infant or child seeks to construct an understanding of the world, said Piaget, the developing brain creates **schemes**. These are actions or mental representations that organize knowledge.

P3 ➔ **Assimilation and Accommodation.** To explain how children use and adapt their schemes, Piaget offered two concepts: assimilation and accommodation. Assimilation occurs when children use their existing schemes to deal with new information or experiences. Accommodation occurs when children adjust their schemes to take new information and experiences into account. Think about a toddler who has learned the word *car* to identify the family's car. The toddler may call all moving vehicles on roads "cars," including motorcycles and trucks; the child has assimilated these objects to his or her existing scheme. But the child soon learns that motorcycles and trucks are not cars and fine-tunes the category to exclude motorcycles and trucks, accommodating the scheme.

P4 Assimilation and accommodation operate even in the very young infant's life. Newborns reflexively suck everything that touches their lips; they assimilate all sorts of objects into their sucking scheme. By sucking different objects, they learn about their taste, texture, shape, and so on. After several months of experience though, they construct their understanding of the world differently. Some objects, such as fingers and the mother's breast, can be sucked, but others, such as fuzzy blankets, should not be sucked. In other words, they accommodate their sucking scheme.

P5 Piaget also held that we go through four stages in understanding the world. Each of the stages is age-related and consists of distinct ways of thinking. Remember, it is the *different* way of understanding the world that makes one stage more advanced than another; knowing *more* information does not make the child's thinking more advanced, in the Piagetian view. This is what Piaget meant when he said the child's cognition is *qualitatively* different in one stage compared to another. A What are Piaget's four stages of cognitive development?

P6 B The *sensorimotor stage,* which lasts from birth to about 2 years of age, is the first Piagetian stage. In this stage, infants construct an understanding of the world by coordinating sensory experiences (such as seeing and hearing) with physical, motoric actions—hence the term *sensorimotor.* C At the end of the stage, 2-year-olds have sophisticated sensorimotor patterns and are beginning to operate with primitive symbols. D

P7 ➔ The *preoperational stage*, which lasts from approximately 2 to 7 years of age, is Piaget's second stage. In this stage, children begin to go beyond simply connecting sensory information with physical action. However, according to Piaget, preschool children still lack the ability to perform what he calls *operations*, which are internalized mental actions that allow children to do mentally what they previously did physically. For example, if you imagine putting two sticks together to see whether they would be as long as another stick without actually moving the sticks, you are performing a concrete action.

P8 ➔ The *concrete operational stage,* which lasts from approximately 7 to 11 years of age, is the third Piagetian stage. In this stage, children can perform operations, and logical reasoning replaces intuitive thought as long as reasoning can be applied to specific or concrete examples. For instance, concrete operational thinkers cannot imagine the steps necessary to complete an algebraic equation, which is too abstract for thinking at this stage of development.

P9 ➔ The *formal operational stage,* which appears between the ages of 11 and 15, is the fourth and final Piagetian stage. In this stage, individuals move beyond concrete experiences and think in abstract and more logical terms. As part of thinking more abstractly, adolescents develop images of ideal circumstances. They might think about what an ideal parent is like and compare their parents to this ideal standard. They begin to entertain possibilities for the future and are fascinated with what they can be. In solving problems, formal operational thinkers are more systematic, developing hypotheses about why something is happening the way it is, then testing these hypotheses in a deductive manner.

14. Which of the sentences below best expresses the information in the highlighted statement in the passage? The other choices change the meaning or leave out important information.

Ⓐ Our new experiences require that we adjust in order to understand information that we have never seen.
Ⓑ Understanding new ideas is easier if we include observations and personal experiences.
Ⓒ We engage in both organization of what we see and experience and adaptation of novel ideas.
Ⓓ Thinking must include direct observation and experiences in order to organize the information.

15. Why does the author mention a "car" in paragraph 3?

Ⓐ To explain the concepts of assimilation and accommodation
Ⓑ To demonstrate how a toddler responds to a new experience
Ⓒ To prove that a young child cannot engage in problem solving
Ⓓ To provide an example of the first stage of cognitive development

Paragraph 3 is marked with an arrow [➔].

16. The word adjust in the passage is closest in meaning to

Ⓐ change
Ⓑ improve
Ⓒ hide
Ⓓ find

17. The word others in the passage refers to

Ⓐ months
Ⓑ objects
Ⓒ fingers
Ⓓ blankets

18. The word distinct in the passage is closest in meaning to

Ⓐ new
Ⓑ simple
Ⓒ different
Ⓓ exact

19. The word sophisticated in the passage is closest in meaning to

Ⓐ limited
Ⓑ complex
Ⓒ useful
Ⓓ necessary

20. Based on the information in paragraph 7, which of the following best explains the term "operations"?

Ⓐ Symbolic thought
Ⓑ Mental actions
Ⓒ Physical activity
Ⓓ Abstract reasoning

Paragraph 7 is marked with an arrow [➔].

21. According to paragraph 8, why would a 10-year-old be unable to solve algebra problems?

Ⓐ Algebra requires concrete operational thinking.
Ⓑ A 10-year-old has not reached the formal operational stage.
Ⓒ A child of 10 does not have logical reasoning abilities.
Ⓓ An algebra problem has too many steps in order to solve it.

Paragraph 8 is marked with an arrow [➔].

22. In paragraph 9, the author mentions parents because

Ⓐ teenagers are already thinking about their roles in the future
Ⓑ parents are very important teachers during the final stage of development
Ⓒ the comparison of real and ideal parents is an example of abstract thinking
Ⓓ adolescents tend to be critical of their parents as part of their development

Paragraph 9 is marked with an arrow [➔].

23. What can be inferred from the passage about people who are older than 15 years of age?

Ⓐ They must have completed all of Piaget's stages of cognitive development.
Ⓑ They are probably in the formal operational state of development.
Ⓒ They have mastered deductive reasoning and are beginning to learn intuitively.
Ⓓ They may still not be able to solve problems systematically.

24. All of the following refer to Piaget's theory EXCEPT

Ⓐ Even very young infants may engage in constructing the way that they understand the world.
Ⓑ Both assimilation and accommodation are processes that we can use to help us adapt to new information.
Ⓒ When children learn more information, then their thinking is at a higher stage of development.
Ⓓ Operations require a more advanced stage of development than symbolic representation.

25. Look at the four squares [■] that show where the following sentence could be inserted in the passage.

At the beginning of this stage, newborns have little more than reflexive patterns with which to work.

Where could the sentence best be added?

Click on a square [■] to insert the sentence in the passage.

26. **Directions:** An introduction for a short summary of the passage appears below. Complete the summary by selecting the THREE answer choices that mention the most important points in the passage. Some sentences do not belong in the summary because they express ideas that are not included in the passage or are minor points from the passage. ***This question is worth 2 points.***

Jean Piaget proposed a theory of cognitive development in children.

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Answer Choices

A Assimilation and accommodation are two processes that allow children to organize schemes.

B Four age-related stages build upon each other to encourage different ways of thinking and developing.

C Logical reasoning is applied to specific or concrete examples, replacing intuition as a mental process.

D A toddler learns that there are different categories for vehicles, including cars, motorcycles, and trucks.

E Children are active participants in cognitively constructing their understanding of the world around them.

F Imagination plays a central role in children during the early stages of their development.

Reading 3 "Conquest by Patents"

P1 → Patents are a form of intellectual property rights often touted as a means to give 'incentive and reward' to inventors. But they're also a cause for massive protests by farmers, numerous lawsuits by transnational corporations and indigenous peoples, and countless rallies and declarations by members of civil society. It is impossible to understand why they can have all these effects unless you first recognize that patents are about the control of technology and the protection of competitive advantage.

Lessons from History

P2 In the 1760s, the Englishman Richard Arkwright invented the water-powered spinning frame, a machine destined to bring cotton-spinning out of the home and into the factory. It was an invention which made Britain a world-class power in the manufacture of cloth. To protect its competitive advantage and ensure the market for manufactured cloth in British colonies, Parliament enacted a series of restrictive measures including the prohibition of the export of Arkwright machinery or the emigration of any workers who had worked in factories using it. From 1774 on, those caught sending Arkwright machines or workers abroad from England were subject to fines and 12 years in jail.