AP Environmental Science Practice

Use this key to check answers and read the explanations.

1. In a marsh food web, cordgrass uses sunlight to make sugars. Grasshoppers eat the cordgrass, and birds eat the grasshoppers. Which organism occupies the producer level?

A. Cordgrass
B. Grasshopper
C. Bird
D. All three organisms

Correct answer: A. Cordgrass
Cordgrass captures energy from sunlight and stores it in organic molecules. The other organisms obtain energy by eating.

2. During a storm, a town’s floodplain stores water that would otherwise rise quickly downstream. Which category of ecosystem service does this illustrate?

A. Cultural
B. Provisioning
C. Regulating
D. Recreational

Correct answer: C. Regulating
The floodplain moderates the flow of water and can reduce flood impacts. Flood regulation is a regulating service.

3. Water from a storm sinks below a garden’s surface into gaps between soil particles. Which process has just occurred?

A. Transpiration
B. Infiltration
C. Condensation
D. Surface runoff

Correct answer: B. Infiltration
Infiltration is the entry of water into the soil. Transpiration moves water from plants to the atmosphere.

4. A town is comparing energy resources. Which option draws directly on a renewable resource?

A. A generator fueled with extracted natural gas
B. A boiler that burns mined coal
C. An engine that burns gasoline made from petroleum
D. A wind turbine driven by moving air

Correct answer: D. A wind turbine driven by moving air
Wind is naturally replenished. Coal, petroleum and natural gas are finite fossil resources on human timescales.

5. Measurements find that ground-level ozone accumulates near a city on sunny afternoons. What process creates ground-level ozone?

A. Vehicles release all the measured ozone directly from their exhausts.
B. Nitrogen oxides and volatile organic compounds react in sunlight.
C. Airborne dust changes to ozone as it settles.
D. Cloud water evaporates and leaves behind ozone.

Correct answer: B. Nitrogen oxides and volatile organic compounds react in sunlight.
Ground-level ozone is a secondary pollutant. Its precursors include nitrogen oxides and volatile organic compounds, which react in sunlight.

6. A fictional grassland fixes 1,100 energy units per square meter per year. Its producers use 420 of those units for respiration. What is the net primary productivity in the same units?

A. 680
B. 420
C. 1,100
D. 1,520

Correct answer: A. 680
Net primary productivity equals gross primary productivity minus producer respiration. That gives 1,100 minus 420, or 680.

7. A preserve starts a year with 240 rabbits. It records 38 births, 26 deaths, 9 arrivals and 15 departures. Assuming no other changes, how many rabbits are present at year’s end?

A. 272
B. 231
C. 252
D. 246

Correct answer: D. 246
The population gains 38 and 9 and loses 26 and 15. The net change is 6, bringing the population to 246.

8. Two identical parcels receive the same rain on equally moist soil. A town leaves one planted and paves most of the other. Both have the same slope and neither has a drainage retrofit. Which change would the town expect on the paved parcel?

A. Less infiltration and less surface runoff
B. More infiltration and less surface runoff
C. Less infiltration and more surface runoff
D. Unchanged infiltration and runoff

Correct answer: C. Less infiltration and more surface runoff
Pavement blocks much of the water from entering soil. More water travels across the surface when storage and drainage are otherwise comparable.

9. A lake receives unusually large nutrient inputs. An algal bloom later collapses, and dissolved oxygen drops near the lake bed. Which process most directly explains the drop?

A. Decomposers consume oxygen while breaking down dead algae.
B. The dead algae immediately consume oxygen for photosynthesis.
C. The nutrients stop oxygen molecules from dissolving anywhere in the lake.
D. Decomposers move oxygen from the lake bed into living algae.

Correct answer: A. Decomposers consume oxygen while breaking down dead algae.
Microbes respire as they break down organic material. If oxygen is consumed more rapidly than it is replaced, dissolved oxygen falls.

10. A wind installation generated 24,000 megawatt-hours over a year. Its theoretical maximum over those hours was 60,000 megawatt-hours. What was its capacity factor?

A. 150%
B. 24%
C. 60%
D. 40%

Correct answer: D. 40%
Capacity factor is actual generation divided by the maximum possible amount over the same period. The ratio 24,000 divided by 60,000 is 0.40.

11. Producers make 80,000 energy units available per square meter per year. Primary consumers receive 10% of that and secondary consumers receive 15% of the primary consumers’ energy. How many units reach the secondary consumers?

A. 8,000
B. 800
C. 1,200
D. 12,000

Correct answer: C. 1,200
The first transfer yields 8,000 units. Taking 15% of 8,000 gives 1,200, so 1.5% of the original amount reaches the secondary consumers.

12. Two fictional plots each contain four plant species and 100 plants. Plot A has 25 plants of each species. Plot B has counts of 85, 5, 5 and 5. Which statement follows from those counts?

A. Plot A has greater species richness, and the plots have equal evenness.
B. The plots have equal species richness, and Plot A has greater evenness.
C. Plot B has greater species richness and greater evenness.
D. The plots have equal species richness and equal evenness.

Correct answer: B. The plots have equal species richness, and Plot A has greater evenness.
Both plots contain four species, so species richness is equal. The abundances are distributed more equally in Plot A, which gives it greater evenness.

13. A district needs 120,000 kilowatt-hours. Its two parts initially supply 50,000 at 0.6 kg of carbon dioxide per kilowatt-hour and 70,000 at 0.2 kg per kilowatt-hour. It moves 20,000 kilowatt-hours from the first source to the second. Using these constant rates, how much does emitted carbon dioxide decrease?

A. 16,000 kg
B. 4,000 kg
C. 12,000 kg
D. 8,000 kg

Correct answer: D. 8,000 kg
Each of the 20,000 kilowatt-hours shifted reduces emissions by 0.6 minus 0.2, or 0.4 kg. The total decrease is 8,000 kg.

14. A town wants to test whether replacing pavement outside one school reduces the amount of runoff leaving that property. Which design best accounts for differences in storms from one year to the next?

A. Measure both the treated school and a similar unchanged school during storms before and after the change.
B. Measure only the treated school during one storm after the change.
C. Compare a light storm after the change with a heavy storm before it at the treated school.
D. Measure only the unchanged school before and after construction at the other school.

Correct answer: A. Measure both the treated school and a similar unchanged school during storms before and after the change.
Before-and-after measurements at both sites help distinguish an effect at the treated school from changes that also occur at an unchanged site. Repeated storms improve the comparison.

15. An ocean parcel’s pH falls from 8.1 to 7.8. Using the approximation 10 to the power of 0.3 is 2, which statement matches that change?

A. Hydrogen ion activity increases by 0.3%.
B. Hydrogen ion activity falls by approximately half.
C. Hydrogen ion activity approximately doubles.
D. Hydrogen ion activity stays constant because both pH values exceed 7.

Correct answer: C. Hydrogen ion activity approximately doubles.
The pH scale is logarithmic. A drop of 0.3 pH units corresponds to an increase in hydrogen ion activity by a factor of about 2.