

PRACTICE TEST 2**Time: 60 Minutes****PART A (Core Questions 1–60—for Both Biology-E and Biology-M)****Directions:** Determine the BEST answer for each question. Then fill in the corresponding oval on the Answer Sheet.**Questions 1–3**

- (A) Krebs cycle
- (B) electron transport chain
- (C) fermentation
- (D) glycolysis
- (E) Calvin cycle

1. Cellular respiration in the absence of oxygen
2. A biochemical pathway that utilizes pyruvate to produce ATP, NADH, and FADH₂
3. A biochemical pathway that breaks down glucose into pyruvate

Questions 4–7

- (A) primary consumers
- (B) secondary consumers
- (C) scavengers
- (D) decomposers
- (E) producers

4. Earthworms eat organic matter and return nutrients to the soil.
5. Cows eat grass.
6. Lions are hunters on the African plains.
7. Buzzards soar in the sky looking for dead animals.

Questions 8–12

- (A) geographical isolation
- (B) mechanical isolation
- (C) temporal isolation
- (D) hybrid sterility
- (E) behavioral isolation

8. Groups are not attracted to each other for mating.
9. Structural differences prevent mating between individuals of different groups.

10. Groups are physically separated.
11. Groups reproduce at different times of the year.
12. Matings between groups do not produce fertile offspring.

Questions 13–15

- (A) dominance
- (B) reflex
- (C) instinct
- (D) imprinting
- (E) habituation

13. Learned behavior that occurs only at a certain, critical time in an animal's life
14. Automatic, unconscious reaction
15. Simple form of learned behavior
16. You are trying to identify a plant. If you look closely at the leaves, you see the veins are all parallel. What does this tell you about the plant?
 - (A) The plant is a dicot.
 - (B) The plant is a monocot.
 - (C) The plant is a gymnosperm.
 - (D) The plant is an angiosperm.
 - (E) The plant is a bryophyte.

17. Populations tend to grow because
 - (A) the large number of individuals reduces the number of predators
 - (B) the more individuals there are, the more likely they will survive
 - (C) random events or natural disturbances are rare
 - (D) there are always plentiful resources in every environment
 - (E) individuals tend to have multiple offspring over their lifetime

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PRACTICE TEST—*Continued*

18. I. jellyfish
II. mollusk
III. earthworm
- Which of the above organisms lacks a complete digestive tract?
- (A) I, II, and III
(B) I only
(C) II only
(D) III only
(E) I and III only
19. The internal need that causes an animal to act and is necessary for learning is called
- (A) trail-and-error
(B) motivation
(C) habituation
(D) conditioning
(E) imprinting
20. The rigid shape of plant cells is due to the
- (A) cell membrane
(B) cell wall
(C) cytoskeleton
(D) chloroplasts
(E) centrioles
21. An invertebrate that displays two distinct body forms, medusa and polyp, at different stages in its lifecycle belong to the phylum
- (A) Porifera
(B) Cnidaria
(C) Nemotoda
(D) Mollusca
(E) Echinodermata
22. The failure of homologous chromosomes to separate during meiosis is called
- (A) nondisjunction
(B) translocation
(C) mutation
(D) crossing over
(E) disjunction
23. Which characteristic of fungi is used to classify them into different phyla?
- (A) the type of food they grow on
(B) the type of hyphae they have
(C) the type of mushroom they produce
(D) the way they produce spores
(E) the material that makes up their cell wall
24. A rancher moved his herd of cattle to a different pasture. Which example below indicates that the carrying capacity of that pasture was exceeded?
- (A) The herd increased in size.
(B) The pasture became overgrazed and barren.
(C) The pasture had more grasses.
(D) The cows gained weight.
(E) The cows had more calves.
25. Some mutations are a source of genetic variation. Which type of cell is mostly likely to cause a genetic variation that could lead to evolution?
- (A) skin cells
(B) body cells
(C) brain cells
(D) sex cells
(E) embryo cells
26. What is the expected phenotypic ratio of a dihybrid cross between two heterozygous individuals?
- (A) 3:1
(B) 1:2:1
(C) 3:3:1
(D) 9:3:3:1
(E) 6:4:4:2
27. Which of the following nucleotide bases is found in RNA but not in DNA?
- (A) uracil
(B) adenine
(C) cytosine
(D) thymine
(E) guanine
28. Some bacteria are able to reproduce with a simple form of sexual reproduction called
- (A) binary fission
(B) fragmentation
(C) meiosis
(D) replication
(E) conjugation

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PRACTICE TEST—Continued

29. Mendel's law of segregation states that
- (A) genes are separated on different chromosomes
 - (B) pairs of alleles separate during mitosis
 - (C) pairs of alleles separate during meiosis
 - (D) pairs of alleles exchange material during crossing over
 - (E) genes are passed from parents to offspring
- Questions 30 and 31**
- This is a segment of DNA.
- CGATGGCTA
30. Which represents the complimentary strand of DNA for the segment?
- (A) CGATGGCTA
 - (B) GCTACCGAT
 - (C) UAGCCAUCG
 - (D) CGTAGGCAT
 - (E) ATCGGTAGC
31. What is the messenger RNA strand for the DNA segment?
- (A) GCUACCGAU
 - (B) UCTACCGUA
 - (C) GUTAUUGAT
 - (D) CGATGGCTA
 - (E) ATCGGTAGC
32. The classification system set forth by Linneaus grouped organisms based on their
- (A) similar coloring
 - (B) similar structures
 - (C) similar habitats
 - (D) genetic similarities
 - (E) evolutionary relationships
33. Which of the following best describes an ecosystem?
- (A) a group of individuals of the same species that live together in the same area at the same time
 - (B) all populations of different species that live and interact in the same area
 - (C) all populations of different species that live and interact in the same area and the abiotic environment
 - (D) all the organisms that depend on the resources in a specific region
 - (E) the part of Earth where life exists
34. The diploid number of a human cell is 23. How many actual chromosomes are in a normal body cell?
- (A) 22
 - (B) 23
 - (C) 44
 - (D) 46
 - (E) n
35. Which tissue transports carbohydrates and water through plants?
- (A) epidermal tissue
 - (B) vascular tissue
 - (C) ground tissue
 - (D) epithelial tissue
 - (E) endodermal tissue
36. According to the cell theory, which of the following statements is correct?
- (A) All organisms are made up of one or more cells.
 - (B) All organisms must be able to reproduce.
 - (C) Cells have organelles to carry on their functions.
 - (D) Cells evolved from a primordial soup on early Earth.
 - (E) Cells are able to regulate their external environment.
37. Which bird uses its beak to probe flowers for nectar?



(A)



(B)



(C)



(D)



(E)

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PRACTICE TEST—Continued

38. Which of the following best describes what will happen if cells are placed in distilled water?
- (A) The cells remain unchanged.
 - (B) Water moves from inside of the cell to the outside.
 - (C) Water moves from outside of the cell to the inside.
 - (D) The cells shrink.
 - (E) The cells dissolve.

Questions 39 and 40

In an experiment in a laboratory, a population of bacteria in a petri dish is exposed to an antibiotic. The antibiotic kills most of the population. However, a few bacteria survive and soon repopulate the Petri dish with antibiotic-resistant bacteria.

39. According to modern evolutionary theory, which of the following explanations is correct for this experiment?
- (A) Some of the bacteria tried and successfully adapted to the new conditions in the petri dish.
 - (B) Some members of the bacteria population developed a resistance to the antibiotic immediately after exposure.
 - (C) Some members of the bacteria population already had a resistance to the antibiotic so they were not killed.
 - (D) Some of the bacteria quickly evolve into a new species that resists the antibiotic.
 - (E) Some of the bacteria protected themselves from the antibiotic long enough to develop a resistance.
40. Which best describes what happened in the petri dish?
- (A) macroevolution
 - (B) microevolution
 - (C) adaptive radiation
 - (D) divergent evolution
 - (E) speciation
41. All of the following are cycled through biogeochemical cycles EXCEPT
- (A) water
 - (B) carbon
 - (C) energy
 - (D) phosphorus
 - (E) nitrogen
42. You cross a red flowered plant with a white flowered plant, and all of the offspring have pink flowers. What is the most probable explanation?
- (A) Red is dominant.
 - (B) White is dominant.
 - (C) Pink is dominant.
 - (D) Red and white exhibit incomplete dominance.
 - (E) Red and white exhibit codominance.
43. If an organism has a haploid number of 24, how many chromosomes does it have?
- (A) 6
 - (B) 12
 - (C) 24
 - (D) 36
 - (E) 48
44. Bats and insects both have wings. The wings of bats and insects are examples of
- (A) homologous structures
 - (B) analogous characters
 - (C) vestigial structures
 - (D) adaptive structures
 - (E) derived traits
- 45.
- I. vitamin synthesis
 - II. absorb water
 - III. absorb nutrients
- In humans, what function does the small intestine serve?
- (A) I and II only
 - (B) II and III only
 - (C) II only
 - (D) I only
 - (E) III only
46. A codon is
- (A) a group of three nucleotide sequences
 - (B) the nucleotide units between the start and stop codes
 - (C) the nucleotide sequence that serves as the instructions for a protein
 - (D) a single nucleotide in an mRNA sequence
 - (E) the sequence of nucleotides that signals the start or stop of protein synthesis

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PRACTICE TEST—Continued

47. Which of the following conditions is necessary for a virus to attack a host cell?

- (A) The virus must have the DNA or RNA key sequence to enter the host cell.
- (B) The virus must have the enzymes to cause the host cell to burst so that the host cell may be used as raw materials.
- (C) The virus must have the proper enzyme to puncture the membrane of the host cell.
- (D) The virus must have a particular shape that will match up with the proteins on the surface of the host cell.
- (E) The viral DNA or RNA must have a sequence that is recognized by the ribosomes of the host cell.

48. Cytochrome-c is a protein that scientists often use to compare the evolutionary relationships among species. There is one difference in the cytochrome-c sequence between humans and rhesus monkeys. There are ten differences between humans and kangaroos. What can you infer about the relationship between these species?

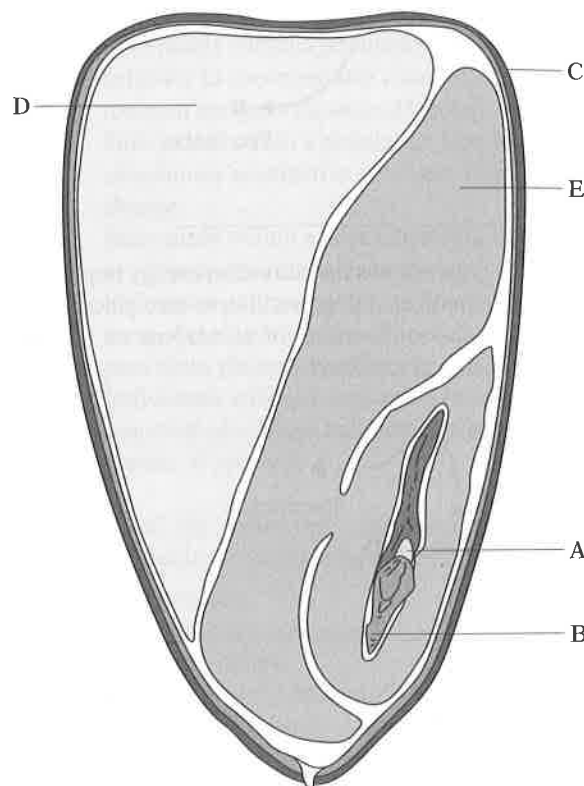
- (A) Humans and kangaroos have the same proteins coded in their genes.
- (B) Humans and kangaroos share a more recent ancestor than humans and rhesus monkeys.
- (C) Humans are not closely related to either kangaroos or rhesus monkeys.
- (D) Humans and rhesus monkeys share a more recent ancestor than humans and kangaroos.
- (E) Rhesus monkeys and kangaroos share a more recent ancestor than humans and rhesus monkeys.

49. A man with type A blood marries a woman with type B blood. Their child is blood type O. What are the genotypes of the parents?

- (A) AO and BO
- (B) OO and AB
- (C) Aa and BO
- (D) AO and Bb
- (E) Aa and Bb

Questions 50 and 51

Each corn kernel in an ear of corn is ready to grow into a new plant.



50. Which part of this seed makes up the plant embryo?

- (A) A, B
- (B) A, D
- (C) B, C
- (D) A, B, E
- (E) B, C, D

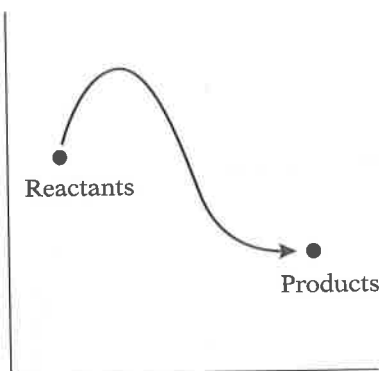
51. Which part of the seed stores the energy for the plant embryo?

- (A) A
- (B) B
- (C) C
- (D) D
- (E) E

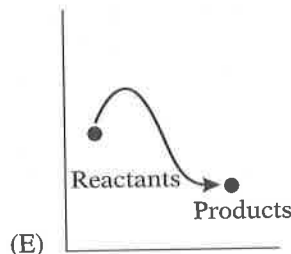
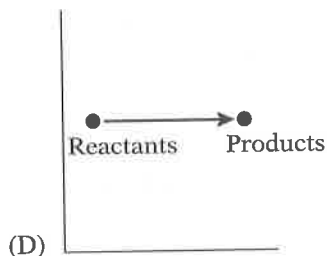
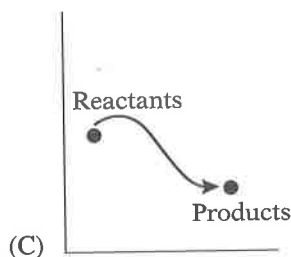
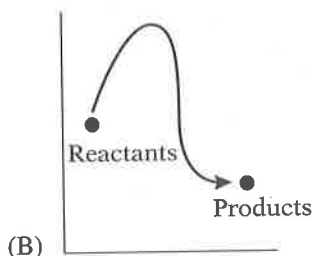
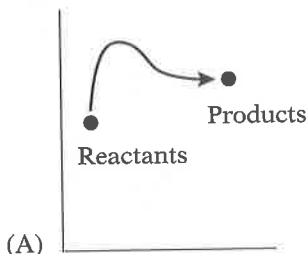
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PRACTICE TEST—Continued

52.



This graph shows the activation energy required for a certain biochemical reaction to take place. Which graph shows the effect of an enzyme on the same biochemical reaction?



53. Which is the correct order of stages for an insect that undergoes incomplete metamorphosis?
- egg→larva→adult
 - egg→nymph→adult
 - egg→nymph→larva→adult
 - egg→larva→pupa→adult
 - egg→nymph→pupa→adult
54. The number of trophic levels that are maintained in an ecosystem is limited by
- the number of species
 - the population size
 - the loss of potential energy
 - the number of individuals
 - the hours of sunshine
55. The law of independent assortment applies to
- two genes on different chromosomes
 - two genes on the same chromosome
 - two alleles on different chromosomes
 - two alleles on the same chromosome
 - two chromosome strands

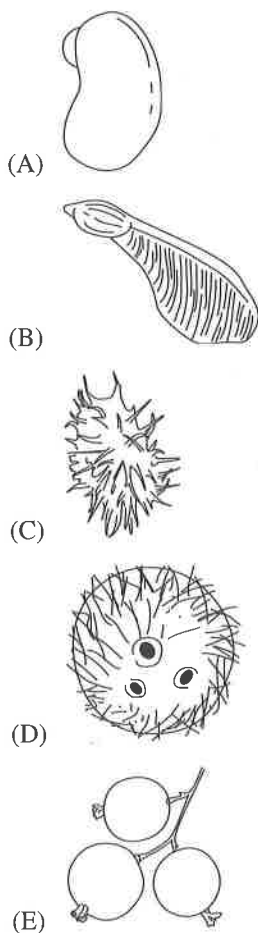
PRACTICE TEST—*Continued*

56. Which is the correct order for the cell cycle beginning with the phase that most cells spend the majority of their time?
- I. G₂ Phase—growth and preparation for mitosis
 - II. Mitosis
 - III. G₁ Phase—cell growth
 - IV. S Phase—DNA copied
 - V. Cytokinesis
- (A) III, IV, I, II, V
 - (B) III, I, IV, V, II
 - (C) II, III, I, IV, V
 - (D) IV, III, I, II, V
 - (E) V, III, IV, I, II
57. For natural selection to occur, which of the following must be true?
- (A) Individuals must evolve.
 - (B) The environment must be constant.
 - (C) Variation among organisms must exist.
 - (D) Traits must be acquired.
 - (E) Many species must be present.
58. What is the phenotypic ratio for a cross between a pea plant with purple flowers (PP) and a pea plant with white flowers (pp)?
- (A) all white
 - (B) all purple
 - (C) half purple, half white
 - (D) 1PP, 2Pp, 1pp
 - (E) all Pp
59. Natural selection is a part of evolution of a species. Which of the following best describes the driving force that leads to evolution within a species?
- (A) Individuals within a population change their behavior to accommodate changes in the environment and pass these to offspring.
 - (B) Individuals within a population develop new adaptations as selective pressures force change.
 - (C) Individuals within a population find new ways to adapt to environmental pressures.
 - (D) Individuals within a population use different parts of their body as conditions change and pass those changes to offspring.
 - (E) Individuals within a population have variations that give those individuals a better chance of survival.
60. Which of the following organisms is INCORRECTLY paired with its trophic level?
- (A) tree—producer
 - (B) hawk—primary consumer
 - (C) fungi—detritivore
 - (D) fox—secondary consumer
 - (E) grasshopper—primary consumer

PRACTICE TEST—*Continued***PART B (Biology-E Questions 61–80)**

61. All of the following could cause a large number of density-dependent deaths in a population EXCEPT
- (A) winter storms
 - (B) disease-carrying insects
 - (C) predators
 - (D) limited resources
 - (E) small forest fire

62. Which of the following seeds depends on wind for dispersal?



63. Which group of animals was the first to have internal fertilization?
- (A) fishes
 - (B) amphibians
 - (C) reptiles
 - (D) birds
 - (E) mammals

64. Where would you most likely find nitrogen-fixing bacteria?

- (A) on the stems of some plants
- (B) in the leaves of trees
- (C) on the roots of some plants
- (D) on atmospheric dust particles
- (E) in blue-green algae

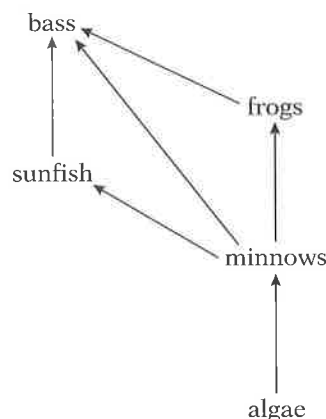
65. Earthworms are hermaphroditic, meaning that they
- (A) reproduce asexually
 - (B) only come up to the surface at night
 - (C) reproduce both sexually and asexually
 - (D) have specialized segments for specialized tasks
 - (E) have both male and female sex organs

66. According to the Hardy–Weinberg principle, allele frequencies change when evolutionary forces act on a population. All of these are possible evolutionary forces EXCEPT

- (A) mutations
- (B) gene flow
- (C) genetic drift
- (D) random mating
- (E) natural selection

Questions 67–69

This is a typical food web in a pond.



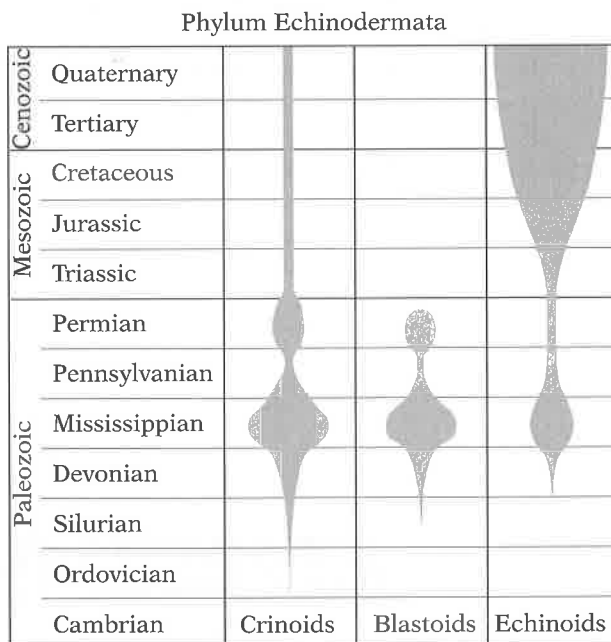
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PRACTICE TEST—Continued

67. Which two organisms in this food web are in direct competition?
- (A) bass and minnows
(B) minnows and sunfish
(C) frogs and sunfish
(D) bass and algae
(E) frogs and algae
68. Which shows one possible direct pathway for energy flow to the bass?
- (A) algae→minnows→frogs→bass
(B) algae→bass
(C) algae→frogs→sunfish→bass
(D) minnows→frogs→bass
(E) bass→frogs→minnows→algae
69. Based on this food web, what would happen if the bass disappeared due to over fishing?
- (A) The algae population would increase.
(B) The frogs and sunfish would disappear.
(C) The minnow population would increase and the sunfish population would decrease.
(D) The frog and sunfish populations would increase.
(E) The minnow population and algae would increase.
70. Which of the following time periods shows a mass extinction of animals?
- (A) end of the Ordovician
(B) end of the Silurian
(C) end of the Devonian
(D) end of the Permian
(E) end of the Triassic
71. Which of the following time periods showed a boom in all echinoderm groups?
- (A) Ordovician
(B) Silurian
(C) Mississippian
(D) Permian
(E) Jurassic
72. All of the following statements are correct EXCEPT
- (A) The Blastoids are extinct.
(B) The Echinodermata will become extinct in the near future.
(C) The Echinoids are a successful group.
(D) The Blastoids were not able to adapt to the same changes as the Crinoids.
(E) The Crinoids have been living in a stable environment since the Triassic.

Questions 70–72

This chart shows the relative abundance of different groups of echinoderms throughout geologic time. The width of the band indicates the number of species for each group.

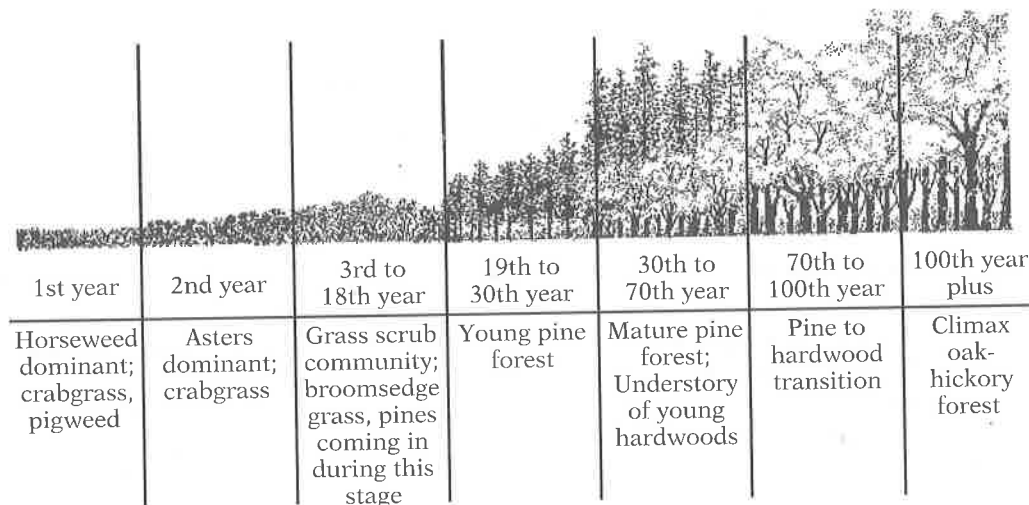


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PRACTICE TEST—Continued

Questions 73–77

Vegetation follows established patterns of regrowth and change after disturbances by farming, timber harvesting, hurricanes, or fire. This process of patterned regrowth and change is called plant succession. The rate of succession and the species present at various stages depend on the type and degrees of disturbance, the environment of the particular sites, and the species available to occupy the site. In the Piedmont of North Carolina, land subjected to disturbances will grow back in a century or two to become mixed hardwood forest.



73. Based on this diagram, after 80 years, which will make up the majority of trees?
- (A) young pines
 - (B) mature pines
 - (C) oak trees
 - (D) oak and hickory trees
 - (E) pine, oak, and hickory trees
74. Which best describes the change that takes place when pines become the dominant vegetation?
- (A) The pine trees increase the amount of nutrients available in the soil.
 - (B) The pine trees increase the soil moisture.
 - (C) The pine trees decrease the amount of sunlight reaching the forest floor.
 - (D) The pine trees change the character of the soil from loam to sandy loam.
 - (E) The pine trees increase the amount of soil erosion.
75. Which of the following factors would be LEAST likely to restart succession?
- (A) forest fire
 - (B) volcanic eruption
 - (C) clear-cut logging
 - (D) glaciation
 - (E) drought
76. Pine beetles are a type of insect that burrow into the bark of mature and over-mature pine trees. The pine trees die as a result of the infestations. If pine beetles attacked a mature pine forest, which of the following events would most likely occur?
- (A) Succession would start over.
 - (B) The rate of transition to a hardwood forest would be increased.
 - (C) The succession will stall at being a young pine forest.
 - (D) The succession will stall at being a mature pine forest while young pines mature.
 - (E) The pine beetles will not affect the rate of succession in the forest.

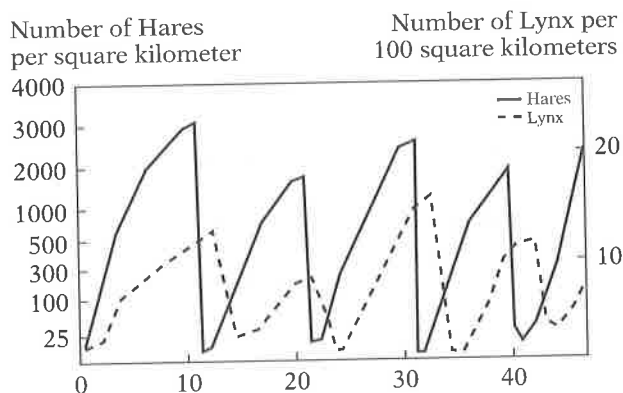
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PRACTICE TEST—Continued

77. Which of the following statements about succession is true?

- (A) Succession is a natural progression that takes place at a constant rate.
- (B) Succession only takes place on freshly cleared or new land such as islands.
- (C) The rate of succession can be changed by factors such as fire, clear cutting, and lava flows.
- (D) Succession is a natural progression of plant types that cannot be reversed.
- (E) Succession always occurs over a short period of time.

Questions 78–80



78. If lynxes depend mainly on hares for food, which best describes the relationship between hares and lynxes?

- (A) As the hare population decreases, the lynx population increases.
- (B) As the hare population decreases, the lynx population stays the same.
- (C) As the hare population increases, the lynx population increases.
- (D) As the hare population increases, the lynx population stays the same.
- (E) There is no relationship between the populations of lynxes and hares.

79. Based on this chart, which of the following statements is true?

- (A) Lynxes and hares depend on each other for survival.
- (B) Hares become better at hiding from lynxes over time.
- (C) Hares are capable of reproducing quickly.
- (D) Lynxes only prey on hares in certain seasons.
- (E) Lynxes migrate into and out of areas on a regular basis.

80. What would happen to the hare population if the lynxes were removed from the habitat?

- (A) The hare population would continue on a boom and bust cycle.
- (B) The hare population would dwindle.
- (C) The hare population would grow exponentially and not stop.
- (D) The hare population would quickly reach the carrying capacity and stabilize.
- (E) The hare population would slowly increase over time.

S T O P

IF YOU FINISH BEFORE TIME RUNS OUT, GO BACK AND CHECK YOUR WORK.