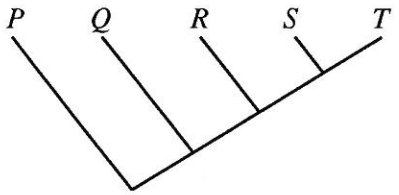
Blizzard Bag #2
AP Biology

44. Which of the following occurs in response to a rise in the blood sugar level?

(A) The gall bladder releases glucagon.
(B) Glycogen is catabolized.
(C) Alpha cells in the pancreas secrete glucagon.
(D) Beta cells in the pancreas release amylase.
(E) Beta cells in the pancreas release insulin.

45. In evolutionary terms, which of the following organisms is the most successful?

(A) The one that lives the longest
(B) The one that grows the most rapidly
(C) The one that leaves the greatest number of offspring that survive to reproduce
(D) The one that has the best characteristics for the current environment
(E) The one that has the biggest territory



46. Which of the following conclusions is best supported by the cladogram above?

(A) Species *Q* and *R* make up a monophyletic group.
(B) Species *P* and *Q* are equally related to species *T*.
(C) Species *P* and *T* do not share a common ancestor.
(D) Species *S* evolved from species *R*.
(E) Species *S* is more closely related to species *T* than to species *R*.

47. Which of the following statements about the process of excretion in animals is correct?

(A) Animals with closed circulatory systems usually have capillary beds associated with their excretory organs.
(B) Aquatic animals usually secrete their nitrogenous wastes in the form of uric acid.
(C) The contractile vacuole of a freshwater protozoan will become more active if the protozoan is placed in seawater.
(D) Nephridia are found only in vertebrate animals.
(E) In humans and other mammals, urea is produced in the kidneys.

48. Which of the following is true about a specialized companion cell of the phloem that is connected to the palisade mesophyll cell by plasmodesmata?

(A) The specialized companion cell and the palisade mesophyll cell have highly specialized unrelated functions.
(B) The companion cell lacks a nucleus, and the palisade mesophyll cell has a nucleus at maturity.
(C) Sieve plates would be found in the companion cell but not in the palisade mesophyll cell.
(D) The companion cell would have a thicker secondary cell wall than the palisade mesophyll cell.
(E) Materials synthesized in photosynthesis could be sent from the mesophyll cell to the companion cell.

49. The flow of which of the following into the mitochondrial matrix provides the chemiosmotic energy for the synthesis of ATP?

(A) Inorganic phosphate
(B) ADP
(C) Glucose
(D) Protons
(E) Electrons

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50. Fire has which of the following effects on a community?

(A) It causes all of the plants and animals in the community to become dormant.
(B) It recycles dead plant material, thus nutrients become available.
(C) It prevents reestablishment of the prefire community.
(D) It allows for increased mutation rates in the surviving species.
(E) It forces predators to become omnivores.

51. As plants evolved from simple to more complex forms, which of the following occurred?

(A) The sporophyte generation became more dominant than the gametophyte generation.
(B) The haploid generation was lost.
(C) The haploid generation became dominant.
(D) The gametophyte generation became dominant over the sporophyte generation.
(E) The gametophyte and the sporophyte generations gained equal prominence.

52. If a population is at Hardy-Weinberg equilibrium, which of the following can be predicted for the recessive alleles in the population?

(A) They will eventually disappear.
(B) They will be selected against.
(C) They will be maintained at the same frequency.
(D) They will be expressed in the heterozygous condition.
(E) They will become dominant.

53. All of the following adaptations prevent dehydration in land plants EXCEPT

(A) many guard cells in the flaccid condition
(B) many stomates on the top leaf surface
(C) water-resistant cuticle
(D) the presence of many epidermal hairs
(E) recessed stomates

54. A large assemblage of land snails is subdivided into two populations (*A* and *B*) by a river that effectively isolates the two populations for an indefinitely long period. From an evolutionary standpoint, which of the following is the LEAST likely to occur in the two populations?

(A) Populations *A* and *B* will eventually differ in their ecological requirements.
(B) Population *A* may ultimately breed at a different time of the year than population *B* does.
(C) Population *A* may undergo instantaneous speciation by the doubling of its chromosome numbers (polyploidy).
(D) Under laboratory conditions, cross-fertilizations between members of the two populations may be successful even after a long period of geographical separation.
(E) The two populations may become morphologically very dissimilar.

55. Which of the following is TRUE of C_4 plants such as corn?

(A) The Calvin cycle is confined to the bundle sheath cells.
(B) The plants are classified as cacti.
(C) The stomates open at night rather than during the day.
(D) They will not grow in climates where the temperature exceeds 70°F.
(E) They have an anatomy that is found only in gymnosperms.

56. Which of the following causes the rapid change of membrane polarity during an action potential?

(A) Diffusion of neurotransmitters such as acetylcholine
(B) Diffusion of positively charged ions across the cell membrane
(C) Release of electrons from inside the cell
(D) Release of protons from inside the cell
(E) Active transport of cations by the sodium-potassium pump

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Directions: Each group of questions below consists of five lettered headings followed by a list of numbered phrases or sentences. For each numbered phrase or sentence, select the one heading to which it is most closely related and place the letter of your choice in the corresponding box on the student answer sheet. Each heading may be used once, more than once, or not at all in each group.

Questions 57-60 refer to the following.

(A) Pancreas
(B) Kidney
(C) Liver
(D) Gall bladder
(E) Stomach

57. Structure that stores lipid-emulsifying salts

58. Structure where pepsin hydrolyses proteins

59. Structure that produces most of the hydrolytic enzymes that are active in the small intestine

60. Structure where glycogen typically occurs in large quantities as a storage product

Questions 61-64 refer to the following.

(A) Phytochrome
(B) Chlorophyll
(C) Ethylene
(D) Auxin
(E) Abscisic acid

61. Molecule contains a porphyrin ring with a central magnesium atom

62. Causes plant shoots to bend toward light by stimulating cell elongation

63. Regulates flowering in plants that are sensitive to the length of the photoperiod

64. Molecule that can absorb photons of light and release electrons to the primary electron acceptor

Questions 65-68 refer to the following.

(A) Nonsense codon
(B) Anticodon
(C) Ribosome
(D) Exon
(E) Poly-A tail

65. Protein synthesis termination triplet

66. Site of protein synthesis

67. Base sequence on messenger RNA that aids its transport across the nuclear envelope

68. Triplet on tRNA

Questions 69-72 refer to the following types of hereditary material.

(A) Unpaired unreplicated linear chromosomes
(B) Unpaired replicated linear chromosomes
(C) Paired replicated linear chromosomes
(D) Circular chromosomes
(E) Extra-chromosomal circular DNA

69. Typical of prokaryotic cells after fission

70. Eukaryotic cells at prophase of mitosis

71. Eukaryotic cells at metaphase I

72. Plasmid exchanged by conjugating bacteria

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Questions 73-76 refer to the following functional groups.

(A) $-OH$

(B) $-\underset{\underset{O}{\|}}{C}-H$

(C) $-\underset{\underset{O}{\|}}{C}-\overset{\overset{H}{|}}{N}-$

(D) $-N\begin{matrix}H\\H\end{matrix}$

(E) $-\underset{\underset{O}{\|}}{C}-CH_3$

73. Acetone contains this functional group.

74. Dopamine contains this functional group.

75. Formaldehyde contains this functional group.

76. Ethanol contains this functional group.

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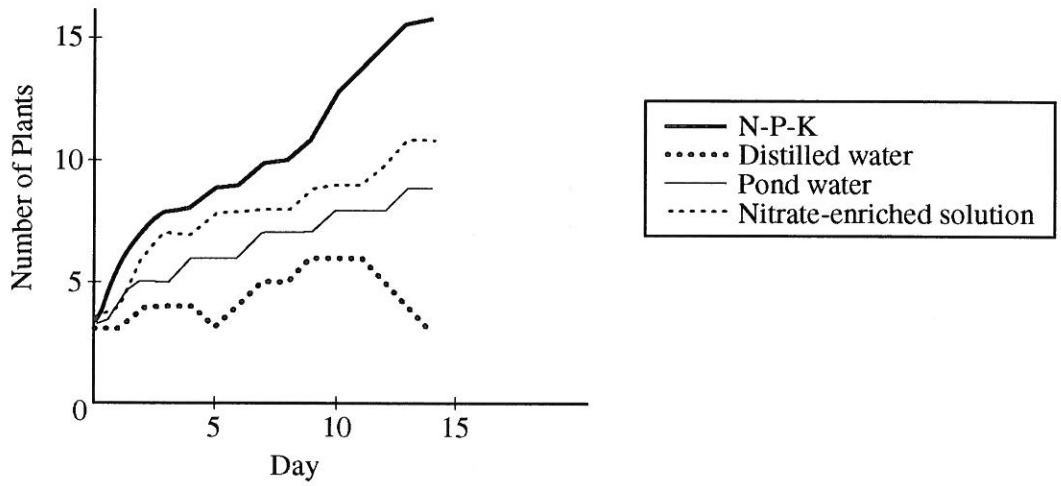
Directions: Each group of questions below concerns an experimental or laboratory situation or data. In each case, first study the description of the situation or data. Then choose the one best answer to each question following it and fill in the corresponding box on the student answer sheet.

Questions 77-80

An experiment was performed to test the conditions in which duckweed, a small aquatic plant, can reproduce efficiently. Three duckweed plants were placed in each of four culture dishes at room temperature with the following solutions: 1) distilled water, 2) pond water, 3) an N-P-K fertilizer solution, and 4) a nitrate-enriched solution. The following graph summarizes the growth in numbers of duckweed plants over a two-week period.

GROWTH OF DUCKWEED PLANTS
IN VARIOUS CONDITIONS



77. After 10 days, the distilled water culture dish has approximately how many duckweed plants?

(A) 3
(B) 6
(C) 9
(D) 12
(E) 15

78. In pond water, the duckweed population grows at an average rate of

(A) 1 plant per day
(B) 2 plants per day
(C) 1 plant per 3 days
(D) 3 plants per day
(E) 9 plants per 15 days

79. Duckweed vegetatively reproduced at the fastest rate in

(A) pond water
(B) nitrate-enriched distilled water
(C) pond water with added chlorophyll
(D) distilled water
(E) N-P-K fertilizer solution

80. Under which of the following additional conditions would the duckweed population be most likely to grow faster?

(A) Oxygen gas bubbled through the culture dishes
(B) The addition of an organism that eats duckweed
(C) The addition of distilled water to every culture dish
(D) An increase in light intensity
(E) The addition of glucose to the culture medium

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