

BIOLOGY E/M TEST

FOR BOTH BIOLOGY-E AND BIOLOGY-M, ANSWER QUESTIONS 1-60

Directions: Each set of lettered choices below refers to the numbered questions or statements immediately following it. Select the one lettered choice that best answers each question or best fits each statement, and then fill in the corresponding oval on the answer sheet. A choice may be used once, more than once, or not at all in each set.

Questions 1-3 refer to the following components of the circulatory system.

- (A) Protons
- (B) Ions
- (C) Elements
- (D) Electrons
- (E) Isotopes

1. Atoms that contain an unequal number of protons and neutrons
2. Orbit the nucleus of an atom
3. Atoms that either lack or have extra electrons

Questions 4-6 refer to concepts used in ecology.

- (A) Biodiversity
- (B) Carrying capacity
- (C) Pioneer species
- (D) K-strategists
- (E) Biotic factors

4. The living components of an ecosystem
5. The number and types of different species in a given area
6. Organisms that mature slowly, reproduce later in life, and produce few young

Questions 7-9 refer to terms used in Mendelian genetics.

- (A) Phenotype
- (B) Gamete
- (C) Allele
- (D) Homozygous
- (E) Chromosomes

7. Refers to situations in which an organism's two alleles for a specific trait are identical
8. A haploid sex cell
9. The physical expression of a certain trait

Questions 10-12 refer to the skeletal system.

- (A) Ligaments
- (B) Hydrostatic skeleton
- (C) Exoskeleton
- (D) Tendons
- (E) Bones

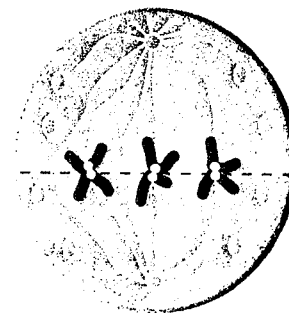
10. Found in invertebrates such as earthworms and jellyfish
11. Tissue that holds together adjacent bones
12. Rigid structures composed of living cells rooted in a matrix of calcium, phosphate salts, and collagen fibers

GO ON TO THE NEXT PAGE 

BIOLOGY E/M TEST—Continued

Directions: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Some questions pertain to a set that refers to a laboratory or experimental situation. Select the one choice that best answers the question and fill in the corresponding oval on the answer sheet.

13. The weather on Earth suddenly changes and the temperatures in the western U.S. get much hotter. Some rabbits in the region are more adaptive to the conservation of water than others. These rabbits survive and reproduce more effectively than the rabbits that do not have these adaptations. This is an example of
- (A) speciation
 - (B) adaptive radiation
 - (C) mutation
 - (D) natural selection
 - (E) Lamarckian evolution
14. Which organelle in the cell is involved in gene expression?
- (A) Vacuole
 - (B) Lysosome
 - (C) Cell wall
 - (D) Ribosomes
 - (E) Mitochondria
15. In a food web, a primary consumer is always a(n)
- (A) detritivore
 - (B) carnivore
 - (C) herbivore
 - (D) saprophyte
 - (E) autotroph
16. Which of the following is NOT true regarding xylem?
- (A) Carries water and minerals up from the root
 - (B) Composed of dead cells
 - (C) Provides structural support
 - (D) Is responsible for distributing carbohydrates
 - (E) Is sometimes called "wood"
17. A new animal has been discovered in Australia. This animal is warm-blooded, has hair, and gives birth to young just days after fertilization. The young finish developing in a pouch on the mother's body where they gain nourishment from milk stored in her mammary glands. To what group does this animal belong?
- (A) Placental mammals
 - (B) Arthropods
 - (C) Monotremes
 - (D) Marsupials
 - (E) Birds
18. In order for germination to occur, the seed of the *Calvaria major* tree had to pass through the digestive system of a Dodo bird. When the Dodo bird became extinct, so too did the tree. This is an example of
- (A) coevolution
 - (B) competition
 - (C) parasitism
 - (D) niche separation
 - (E) gene flow
19. What do proteins, carbohydrates, lipids, and nucleic acids all have in common?
- (A) All are building blocks of DNA.
 - (B) All can become enzymes.
 - (C) All contain carbon.
 - (D) All can become hormones.
 - (E) All contain nitrogen.



20. The cell in the diagram above is in the stage of mitosis called
- (A) anaphase
 - (B) metaphase
 - (C) prophase
 - (D) telophase
 - (E) interphase
21. A pregnant woman has just arrived at the hospital and is having contractions. She has elevated levels of what hormone?
- (A) Glucagon
 - (B) Oxytocin
 - (C) Testosterone
 - (D) Thyroxin
 - (E) Luteinizing hormone

GO ON TO THE NEXT PAGE 

BIOLOGY E/M TEST—Continued

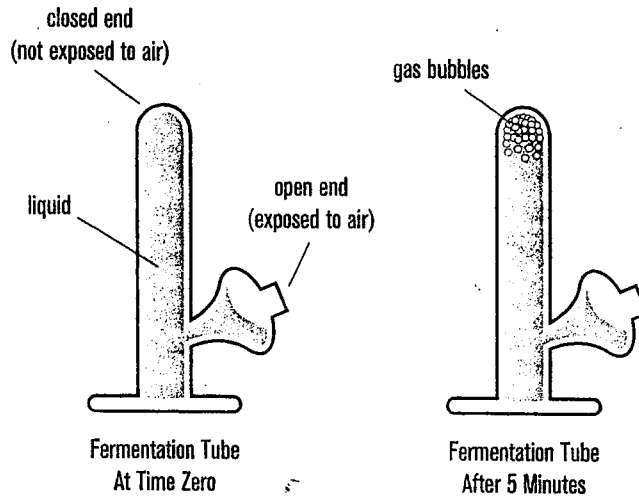
22. Which of the following is NOT a condition for Hardy-Weinberg equilibrium?
- (A) Large population size
 - (B) Non-random mating
 - (C) Absence of immigration or emigration
 - (D) Random reproductive success
 - (E) No mutation
23. Which of the following are true statements about cell size?
- I. As cells grow larger, surface area increases more slowly than volume.
 - II. As cells grow larger, surface area increases more rapidly than volume.
 - III. Cells are small because their surface area and volume must be balanced.
- (A) I only
 - (B) II only
 - (C) III only
 - (D) II and III only
 - (E) I and III only
24. By what process does water cycle from the oceans to the atmosphere?
- (A) Runoff
 - (B) Evaporation
 - (C) Precipitation
 - (D) Combustion
 - (E) Photosynthesis
25. Members of the phylum Arthropoda possess all of the following characteristics except a(n)
- (A) open circulatory system
 - (B) hard exoskeleton made of chitin
 - (C) full digestive tract
 - (D) 4-chambered heart
 - (E) Malpighian tubules
26. A woman plants seeds in her garden. What type of plants could grow from those seeds?
- (A) Angiosperms
 - (B) Fungi
 - (C) Bryophytes
 - (D) Ferns
 - (E) Non-vascular plants
27. What is the correct pathway of food through the digestive system?
- (A) Esophagus, stomach, small intestine, large intestine, rectum
 - (B) Stomach, esophagus, small intestine, rectum, large intestine
 - (C) Esophagus, stomach, large intestine, small intestine, rectum
 - (D) Rectum, esophagus, stomach, small intestines, large intestine
 - (E) Stomach, small intestine, large intestine, esophagus, rectum
28. Which of the following is the best example of an ecological community?
- (A) A group of prairie dogs that live in the same area and interbreed
 - (B) The abiotic environment in a prairie dog town
 - (C) All of the plant and animal populations that live and interact in a prairie dog town
 - (D) All of the prairie dogs in North America
 - (E) A group of prairie dogs and the plant species that they eat
29. Just after a cell completes mitosis, it is cleaved into two cells, each with a full genetic complement. What is this process called?
- (A) Meiosis
 - (B) Cytokinesis
 - (C) Interphase
 - (D) Prophase
 - (E) Telophase
30. The dark reaction of photosynthesis occurs in the
- (A) grana
 - (B) thylakoid spaces
 - (C) intermembrane space
 - (D) stroma
 - (E) chlorophyll

GO ON TO THE NEXT PAGE 

BIOLOGY E/M TEST—Continued

Questions 31–32 refer to the experiment and diagrams below.

Students conducted an experiment by putting sugar into a fermentation tube (see diagram below) that contained a yeast solution. After five minutes, bubbles formed in the vertical segment of the tube. As time passed, more bubbles collected.



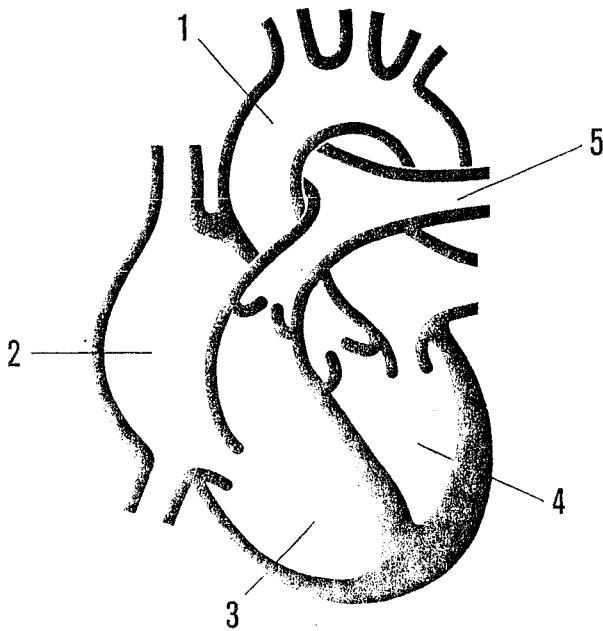
31. What process occurred in the vertical segment of the tube?
- (A) Aerobic respiration
 - (B) Photosynthesis
 - (C) Anaerobic respiration
 - (D) Protein synthesis
 - (E) The Krebs cycle
32. The bubbles produced in the tube were
- (A) carbon dioxide
 - (B) oxygen
 - (C) carbon monoxide
 - (D) nitrous oxide
 - (E) methane

GO ON TO THE NEXT PAGE 

BIOLOGY E/M TEST—Continued

33. Yeast is a(n)
- (A) plant
 - (B) fungus
 - (C) lichen
 - (D) animal
 - (E) protist
34. After a runner has completed a marathon, she experiences some soreness in her legs. This is the result of
- I. lactic acid fermentation
 - II. alcoholic fermentation
 - III. anaerobic respiration
 - IV. muscles running out of oxygen
- (A) I only
 - (B) II only
 - (C) I and III only
 - (D) I, II, and IV only
 - (E) I, III, and IV only
35. During glycolysis, ATP is used to split glucose into two
- (A) pyruvate molecules
 - (B) fructose molecules
 - (C) sucrose molecules
 - (D) acetyl-CoA molecules
 - (E) NADH molecules
36. The area labeled 3 is which structure?
- (A) Right atrium
 - (B) Left atrium
 - (C) Right ventricle
 - (D) Left ventricle
 - (E) Aorta
37. Oxygen-poor blood can be found in the
- I. aorta
 - II. right atrium
 - III. pulmonary artery
 - IV. left atrium
- (A) I and II only
 - (B) II and III only
 - (C) I only
 - (D) III and IV only
 - (E) I, II, III, and IV
38. The function of the sinoatrial node is to
- (A) create red blood cells
 - (B) stimulate cardiac muscles to contract in a regular and controlled rhythm
 - (C) remove carbon dioxide from the blood
 - (D) separate the atria from the ventricles
 - (E) manufacture antigens
39. A heart with three chambers could belong to a
- (A) bird
 - (B) reptile
 - (C) mammal
 - (D) jawless fish
 - (E) human

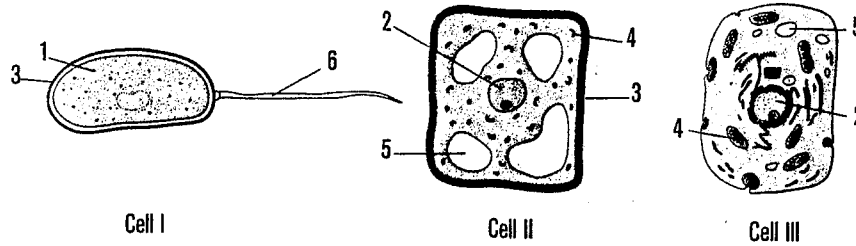
Questions 36–39 refer to the illustration of the human heart below.



GO ON TO THE NEXT PAGE

BIOLOGY E/M TEST—Continued

Questions 40–44 refer to the cell diagrams below.

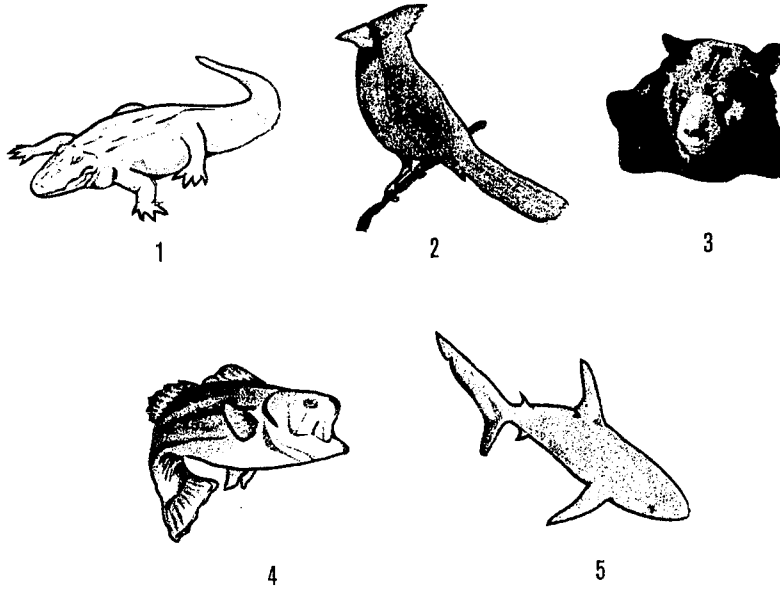


40. Which of the above cells is eukaryotic?
- (A) I only
(B) II only
(C) I and II only
(D) II and III only
(E) III only
41. The area labeled 2 is called a
- (A) nucleus
(B) vacuole
(C) mitochondria
(D) ribosome
(E) cell wall
42. The cell wall of cell I is composed of
- (A) chitin
(B) peptidoglycan
(C) cellulose
(D) a phospholipid bilayer
(E) keratin
43. Cellular respiration takes place in the structure labeled
- (A) 1
(B) 2
(C) 3
(D) 4
(E) 5
44. The structure labeled 6 is used for
- (A) reproduction
(B) movement
(C) predator avoidance
(D) thermoregulation
(E) protein synthesis

ON TO THE NEXT PAGE 

BIOLOGY E/M TEST—Continued

Questions 45–48 refer to the animals depicted below.



45. Which of the above organisms have young that develop in amniotic eggs?

- (A) 1, 2
- (B) 1, 2, 4
- (C) 1, 2, 5
- (D) 1, 2, 4, 5
- (E) 2, 4, 5

46. Which of the above organisms has a flexible skeleton made of cartilage?

- (A) 1
- (B) 2
- (C) 3
- (D) 4
- (E) 5

47. Organism 1 belongs to

- (A) the class Amphibia
- (B) the class Mammalia
- (C) the class Aves
- (D) the class Reptilia
- (E) the phylum Animalia

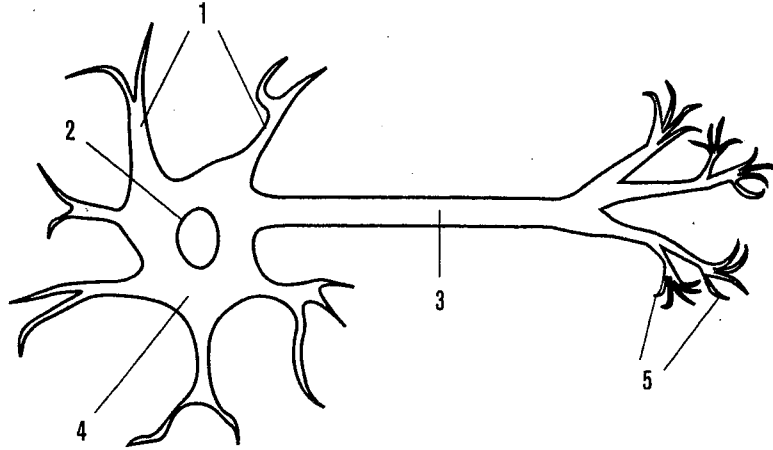
48. Which of the above organisms are ectothermic?

- (A) 1, 4, 5
- (B) 1, 2, 4, 5
- (C) 1, 5
- (D) 2, 3
- (E) 2, 3, 4

GO ON TO THE NEXT PAGE

BIOLOGY E/M TEST—Continued

Questions 49–52 refer to the diagram of neuron.

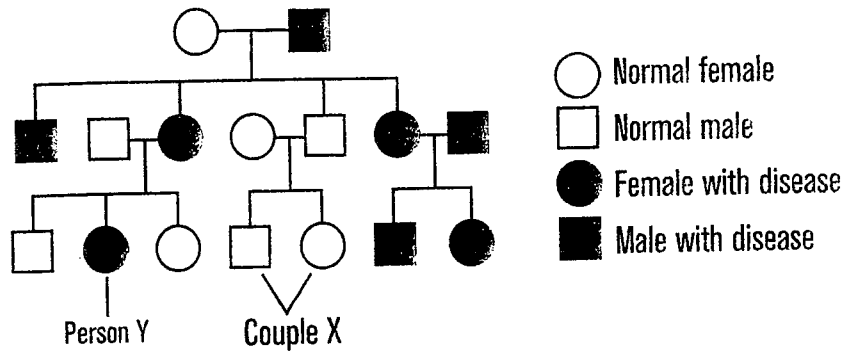


49. The structure labeled 1 is a(n)
- (A) axon
 - (B) terminal branch
 - (C) cell body
 - (D) dendrite
 - (E) nucleus
50. The correct path of an electrical impulse through a neuron is
- (A) axon, dendrite, cell body
 - (B) dendrite, axon, cell body
 - (C) cell body, dendrite, axon
 - (D) dendrite, cell body, axon
 - (E) axon, cell body, dendrite
51. The gap between one neuron and an adjacent neuron is called a
- (A) synapse
 - (B) node of Ranvier
 - (C) voltage-gate
 - (D) threshold
 - (E) ganglia
52. The myelin sheath wraps around the structure labeled
- (A) 1
 - (B) 2
 - (C) 3
 - (D) 4
 - (E) 5

GO ON TO THE NEXT PAGE 

BIOLOGY E/M TEST—Continued

Questions 53–56 refer to the following case of a genetic disease.

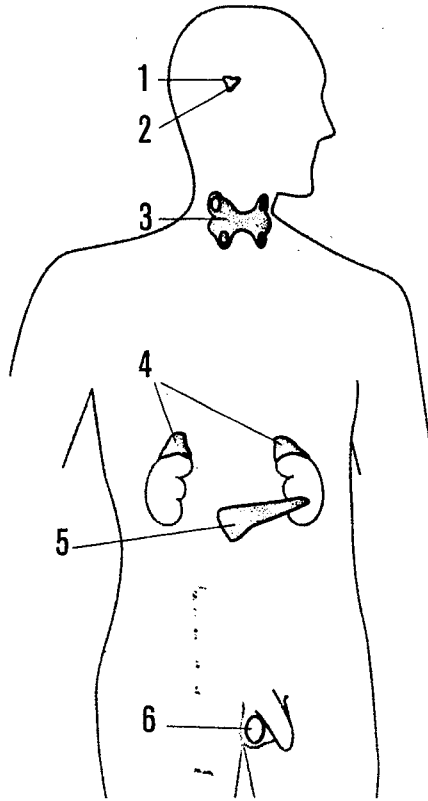


53. The above pedigree shows inheritance patterns that suggest that the genetic disease is
- simple dominant
 - sex-linked dominant
 - simple recessive
 - sex-linked recessive
 - none of the above
54. What is the likelihood that person Y is homozygous for the disease?
- 0%
 - 25%
 - 50%
 - 75%
 - 100%
55. If couple X has a child, what is the probability that the child will have the disease?
- 0 %
 - 25 %
 - 50 %
 - 75 %
 - 100 %
56. Which of the following statements is NOT true?
- Humans have 44 autosomes and 2 sex chromosomes.
 - Humans have 46 chromosomes.
 - If the fertilizing sperm carries an X chromosome, the child will be male.
 - Sex-linked traits are controlled by genes located on sex chromosomes.
 - Monosomy is the absence of one copy of a chromosome.

GO ON TO THE NEXT PAGE

BIOLOGY E/M TEST—Continued

Questions 57–60 refer to the diagram of the human endocrine system.



57. The structure labeled 6 is the
- (A) pituitary gland
 - (B) adrenal gland
 - (C) pancreas
 - (D) thyroid
 - (E) testis
58. The structure that releases the hormone insulin is
- (A) 1
 - (B) 2
 - (C) 3
 - (D) 4
 - (E) 5
59. A patient with low iodine intake and low levels of thyroxine is experiencing symptoms of low metabolic rate, obesity, and sluggishness. She likely has a problem with her
- (A) pituitary gland
 - (B) thyroid gland
 - (C) adrenal glands
 - (D) testes
 - (E) ovaries
60. Which of the following is NOT true regarding steroid hormones?
- (A) They are made of cholesterol.
 - (B) They are hydrophilic.
 - (C) They are lipids.
 - (D) They react more slowly than peptide hormones.
 - (E) Examples of steroid hormones are testosterone and estrogen.

GO ON TO THE NEXT PAGE 

BIOLOGY-E SECTION

If you are taking the Biology-E test, continue with questions 61-80.
If you are taking the Biology-M test, go to question 81 now.

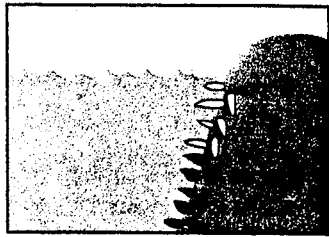
Directions: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Some questions pertain to a set that refers to a laboratory or experimental situation. For each question, select the one choice that is the best answer to the question and then fill in the corresponding oval on the answer sheet.

61. The part of the brain that regulates temperature and controls hunger and thirst is the
- (A) cerebrum
 - (B) medulla oblongata
 - (C) hypothalamus
 - (D) cerebellum
 - (E) brainstem
62. Which organelle(s) would you find in a plant cell but not in an animal cell?
- (A) Mitochondria
 - (B) Ribosomes
 - (C) Golgi body
 - (D) Chloroplasts
 - (E) Nucleus
63. Which of the following is NOT true of viruses?
- (A) Viruses are extremely small.
 - (B) Viruses can only reproduce by using another cell's machinery.
 - (C) The genetic material of a virus is never DNA.
 - (D) Viruses do not fit well into the taxonomic system.
 - (E) The life cycle of a virus includes attachment, penetration, replication, and release.
64. The maximum number of individuals that can be maintained in a given environment is called the
- (A) community
 - (B) population
 - (C) niche
 - (D) climax community
 - (E) carrying capacity
65. The diaphragm is part of the
- (A) digestive system
 - (B) endocrine system
 - (C) nervous system
 - (D) respiratory system
 - (E) skeletal system
66. If a farmer wants to increase the amount of nitrogen available to his plants, what should he do?
- I. Add nitrogen-fixing legumes to his field.
 - II. Add fertilizer to his field.
 - III. Add denitrifying bacteria.
- (A) I only
 - (B) II only
 - (C) III only
 - (D) I and II only
 - (E) I, II, and III

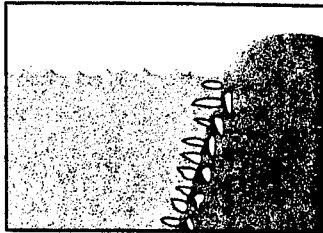
GO ON TO THE NEXT PAGE 

BIOLOGY E SECTION—Continued

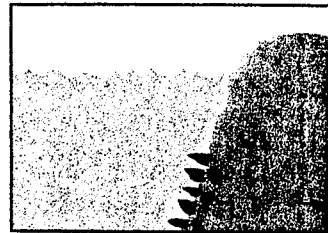
Questions 67–69 refer to a classic experiment with barnacles, as conducted by Joseph Cornell.



Both Barnacle Species are Present



Semibalanus is removed.
Chthamalus remains.



Chthamalus is removed.
Semibalanus remains.

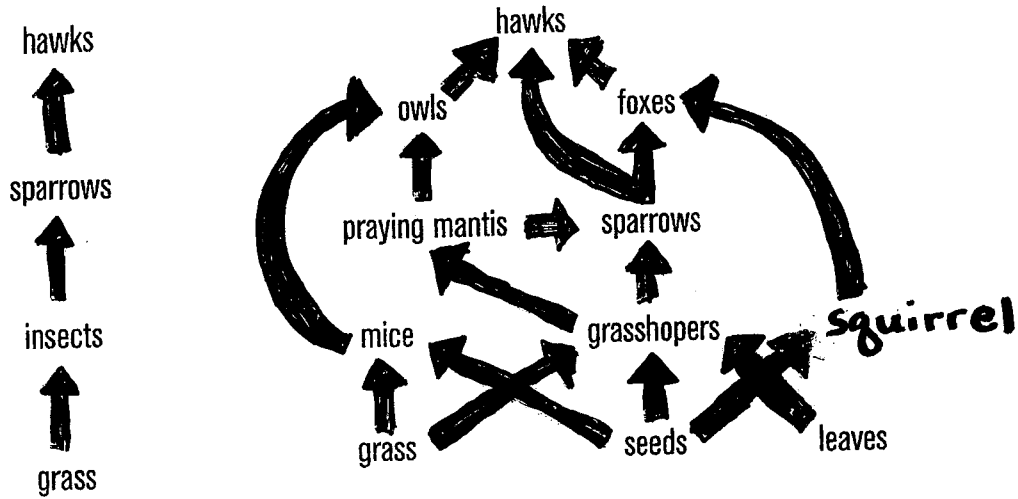


67. The force keeping *Chthamalus* from occupying deeper water is
- (A) competition
 - (B) predation
 - (C) intolerance of deeper water
 - (D) parasitism
 - (E) coevolution
68. The force keeping *Semibalanus* from occupying shallower water is
- (A) competition
 - (B) predation
 - (C) intolerance of shallow water
 - (D) parasitism
 - (E) coevolution
69. Which of the following is NOT an accurate statement?
- (A) When both *Semibalanus* and *Chthamalus* are present, the niche *Chthamalus* occupies is smaller than the niche it would occupy if *Semibalanus* were absent.
 - (B) Elimination of competing species is called "competitive exclusion."
 - (C) A niche is simply where an organism lives.
 - (D) When both *Semibalanus* and *Chthamalus* are present, the niche *Semibalanus* occupies is equal to the niche it would occupy if *Chthamalus* were absent.
 - (E) Common use of scarce resources often leads to competition.

GO ON TO THE NEXT PAGE 

BIOLOGY M SECTION—Continued

Questions 70–73 refer to the diagrams of the food web and food chain below.



70. Which of the following is / are true regarding grasses?

- I. They are autotrophs.
- II. They are primary producers.
- III. They cannot produce the energy and organic molecules necessary for life.
- IV. They are consumers.

- (A) I only
- (B) IV only
- (C) I and III only
- (D) I and II only
- (E) III and IV only

71. An example of a tertiary consumer is a

- (A) hawk
- (B) grasshopper
- (C) deer
- (D) sparrow
- (E) grass

72. Which of the following is NOT a true statement?

- (A) When a hawk eats a fox, not all energy is transferred from the fox to the hawk.
- (B) Food chains are a more accurate representation of trophic dynamics than food webs because they are more complex.
- (C) Grasshoppers consume seeds, so grasshoppers are considered primary consumers.
- (D) Most organisms in a community hunt for more than one kind of prey and are hunted by more than one predator.
- (E) The diagrams of the food chain and food web contain examples of producers and consumers but not of decomposers.

73. Approximately how much energy would be available to organisms in the second trophic level if there were 10,000 kcal available in the first trophic level?

- (A) 100,000 kcal
- (B) 10,000 kcal
- (C) 1,000 kcal
- (D) 100 kcal
- (E) 10 kcal

GO ON TO THE NEXT PAGE

BIOLOGY M SECTION—Continued

Questions 74–76 refer to the following scenario.

An island is created by a volcanic eruption. Over the next 10,000 years, the island becomes populated by plants and animals from a nearby continent.

74. The process described is called

- (A) evolution
- (B) natural selection
- (C) primary succession
- (D) secondary succession
- (E) fixation

75. Compared with later successional stages, early successional stages have

- (A) more heterotrophic species
- (B) more biomass
- (C) higher productivity
- (D) more pioneer species
- (E) more soil nutrients

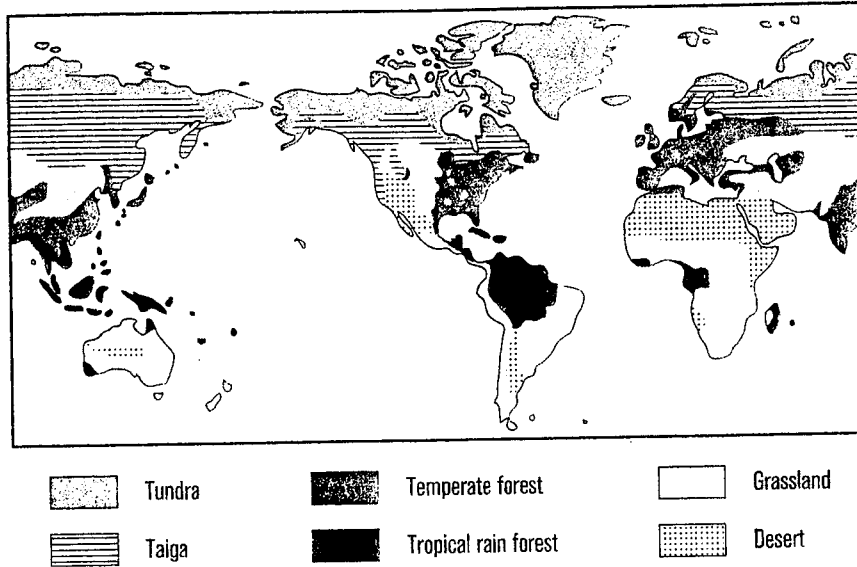
76. Which of the following is most similar to the volcanic island?

- (A) An old agricultural field that is no longer being cultivated
- (B) A forest that has been cleared of trees
- (C) An island that has been devastated by a hurricane
- (D) An area where a glacier has recently receded and exposed bare rock
- (E) A grassland that has recently caught on fire

GO ON TO THE NEXT PAGE 

BIOLOGY M SECTION—Continued

Questions 77–80 refer to the following map of the world.



77. Which of the regions has the greatest species diversity?

- (A) Tundra
- (B) Grassland
- (C) Taiga
- (D) Rainforest
- (E) Temperate deciduous forest

78. A biome that is characterized by spruce trees and moose is

- (A) tundra
- (B) grassland
- (C) taiga
- (D) desert
- (E) temperate deciduous forest

79. Which of the following biomes is INCORRECTLY matched with a representative organism?

- (A) Tundra – caribou
- (B) Grassland – bison
- (C) Temperate deciduous forest – squirrel
- (D) Rainforest – jaguar
- (E) Desert – bear

80. Rank the biomes in order from lowest to highest latitude.

- (A) Tundra, taiga, temperate deciduous forest, rainforest
- (B) Taiga, tundra, temperate deciduous forest, rainforest
- (C) Rainforest, temperate deciduous forest, tundra, taiga
- (D) Rainforest, temperate deciduous forest, taiga, tundra
- (E) Rainforest, taiga, tundra, temperate deciduous forest

GO ON TO THE NEXT PAGE

BIOLOGY-M SECTION

If you are taking the Biology-M test, continue with questions 81-100.
Be sure to start this section of the test by filling in oval 81 on your answer sheet.

Directions: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Some questions pertain to a set that refers to a laboratory or experimental situation. For each question, select the one choice that is the best answer to the question and then fill in the corresponding oval on the answer sheet.

81. If the sequence of nucleotides in a DNA strand is CGTAAGC, the sequence of the complementary strand is
- (A) GCATTCG
 - (B) CGTAAGC
 - (C) CGAATGC
 - (D) GCTTACG
 - (E) GCAUUCG
82. If one parent is homozygous dominant for a trait, and the other parent is heterozygous, what percentage of their offspring will be heterozygous?
- (A) 0 %
 - (B) 25 %
 - (C) 50 %
 - (D) 75 %
 - (E) 100 %
83. Which of the following was NOT found in the early atmosphere of the Earth?
- (A) Hydrogen
 - (B) Water
 - (C) Ammonia
 - (D) Methane
 - (E) Oxygen
84. A solution with a pH of 8 is
- (A) acidic
 - (B) basic
 - (C) neutral
 - (D) similar in pH to stomach fluid
 - (E) similar in pH to hydrochloric acid
85. The appendix of a human and the wings of an ostrich are both examples of
- (A) vestigial structures
 - (B) analogous structures
 - (C) frequently used structures
 - (D) homologous structures
 - (E) budding
86. During the process of cellular respiration, which stage results in the greatest production of ATP?
- (A) Glycolysis
 - (B) The Krebs cycle
 - (C) The electron transport chain
 - (D) The light reactions
 - (E) The dark reactions

GO ON TO THE NEXT PAGE 

BIOLOGY M SECTION—Continued

Questions 87–90 refer to the genetic disease described below.

Hemophilia is a disease caused by a mutation on a sex chromosome. Hemophilia affects the blood's ability to clot.

87. Not all female individuals who carry the allele for hemophilia are affected by the disease, but all male individuals who carry the allele for hemophilia are affected by it. The disorder is

- (A) simple dominant
- (B) simple recessive
- (C) sex-linked dominant
- (D) sex-linked recessive
- (E) complex dominant

88. In order for a mutation to be inherited from one generation to another, it must

- (A) occur on a sex cell
- (B) occur on a somatic cell
- (C) occur on a protein
- (D) be disease-causing
- (E) be sex-linked

89. If a woman who is heterozygous for hemophilia marries a man who has hemophilia, what is the probability that their male child will have the disease?

- (A) 0 %
- (B) 25 %
- (C) 50 %
- (D) 75 %
- (E) 100 %

90. A photograph of the chromosomes of an individual cell is called a

- (A) pedigree
- (B) Punnett square
- (C) gene map
- (D) karyotype
- (E) test cross

GO ON TO THE NEXT PAGE 

BIOLOGY M SECTION—Continued

Questions 91–93 refer to the following experiment and its outcome.

In an experiment, students investigated the influence of temperature on the activity of an enzyme called amylase. Amylase breaks down starch (a polysaccharide composed of glucose monomers). Students filled four standard test tubes with amylase and starch solutions. Tube 1 was placed in an 80°C water bath, tube 2 in a 37°C water bath, tube 3 in a test-tube rack at room temperature, and tube 4 in a beaker of crushed ice. At 10-minute intervals, students tested samples from each test tube for the presence of starch.

The results are depicted in the following table.

Test Tube	Temperature (°C)	Time Until Starch Disappearance (min)
1	80	28
2	37	12
3	22	16
4	4	Over 30 minutes

91. Which of the following ranks the temperatures in order of fastest starch disappearance to slowest?

- (A) 37, 80, 22, 4
- (B) 4, 22, 80, 37
- (C) 37, 22, 80, 4
- (D) 80, 22, 37, 4
- (E) 4, 80, 22, 37

92. At what temperature was the enzyme optimally active?

- (A) 30°C
- (B) 37°C
- (C) 22°C
- (D) 4°C
- (E) A temperature higher than 80°C

93. Which of the following explains why starch was not broken down by the amylase when the solution was placed in an ice bath?

- I. Amylase was denatured by high temperatures.
- II. At freezing temperatures, the velocity of the enzymatic reaction is exceedingly slow because substrate molecules are not colliding with active sites.
- III. An inhibitor molecule occupied all of the active sites on the amylase enzyme.

- (A) I only
- (B) II only
- (C) III only
- (D) I and III only
- (E) I, II, and III

GO ON TO THE NEXT PAGE 

BIOLOGY M SECTION—Continued

Questions 94–96 refer to the following figures of molecules.

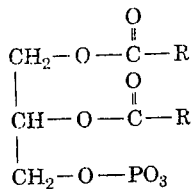


Figure 1

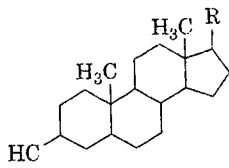


Figure 2

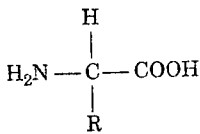


Figure 3

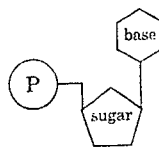


Figure 4

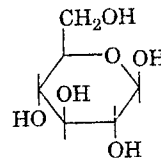


Figure 5

94. Which of the depicted molecules is found in DNA?

- (A) 1
- (B) 2
- (C) 3
- (D) 4
- (E) 5

95. Molecule 5 is a

- (A) protein
- (B) monosaccharide
- (C) starch
- (D) lipid
- (E) nucleic acid

96. Molecule 1 would most likely be found in

- (A) an amino acid
- (B) a cell membrane
- (C) DNA
- (D) a disaccharide
- (E) RNA

GO ON TO THE NEXT PAGE

BIOLOGY M SECTION—Continued

Questions 97–100

A biologist visiting the Galápagos Islands encounters 10 similar species of finches. The different species all have different beak widths, which seem to be related to food choice.

Beak Width	Food Choice	Species
13 mm – 15 mm	Bud eaters	<i>Platypiza crassirostris</i>
7 mm – 9 mm	Insect eaters	<i>Camarhynchus pallidus</i> , <i>Camarhynchus parvulus</i> , <i>Camarhynchus psittacula</i>
17 mm – 19 mm	Seed eaters	<i>Geospiza difficilis</i> , <i>Geospiza fuliginosa</i> , <i>Geospiza fortis</i> , <i>Geospiza magnirostris</i>
11 mm – 13 mm	Cactus eaters	<i>Geospiza conirostris</i> , <i>Geospiza scandens</i>

97. It is hypothesized that one common ancestor came from the mainland to the Galápagos Islands. The 10 species are thought to have evolved from that one common ancestor. This is an example of

- (A) Lamarckian evolution
- (B) convergent evolution
- (C) genetic drift
- (D) adaptive radiation
- (E) artificial selection

98. How is it that the 10 species can all coexist on the islands?

- (A) They all came from a common ancestor.
- (B) They all occupy different niches.
- (C) There is fierce competition among individuals of different species.
- (D) They all eat the same food.
- (E) They all occupy different biomes.

99. Based on the given data, if an unknown genetic disease were to wipe out most of the insects on the islands, which of the following would shape the beak width of the birds on the Galápagos?

- (A) Stabilizing selection
- (B) Directional selection
- (C) Disruptive selection
- (D) Speciation
- (E) Hardy-Weinberg equilibrium

100. Which of the following proves that *Platypiza crassirostris* and *Geospiza scandens*, which both can have a beak width of 13 mm, are separate species?

- (A) They do not eat the same food.
- (B) They occupy different niches.
- (C) They cannot interbreed.
- (D) *Platypiza crassirostris* are brightly colored, while *Geospiza scandens* are duller.
- (E) *Platypiza crassirostris* live in trees, while *Geospiza scandens* make their home in cacti.

S T O P

IF YOU FINISH BEFORE TIME IS CALLED, YOU MAY CHECK YOUR WORK ON THIS TEST ONLY.
DO NOT TURN TO ANY OTHER TEST IN THIS BOOK.