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 tissues:

(A) xylem
(B) stamen
(C) monocot
(D) phloem
(E) chloroplast

1. Site of photosynthesis
2. Male reproductive organ of a flower
3. Living vascular tissue

Questions 4–6 refer to the following organisms:

(A) hawk
(B) salamander
(C) snake
(D) amoeba
(E) salmon

4. Breathes through simple lungs or skin
5. Has a powerful four-chambered heart
6. The oldest in evolutionary terms

Questions 7–9 refer to the following chemicals:

(A) water
(B) carbon dioxide
(C) glucose
(D) nitrogen
(E) carbon monoxide

7. Returned to the atmosphere by living organisms through evaporation and transpiration
8. Converted by bacteria from an atmospheric gas to a form usable by organisms
9. A product of photosynthesis

Questions 10–12 refer to the following cell components:

(A) DNA
(B) mitochondria
(C) cytoplasm
(D) RNA polymerase
(E) RNA

10. Active in the translation of proteins
11. An enzyme used in transcription
12. Cellular location of protein synthesis

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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.

13. Which of the following is a possible path of blood flow?

(A) Right atrium, right ventricle, lungs
(B) Left atrium, right atrium, lungs
(C) Left ventricle, left atrium, body
(D) Left ventricle, left atrium, lungs
(E) Right ventricle, right atrium, lungs

14. Which of the following is the best example of an ecological population?

(A) A group of field mice living on a small island
(B) All of the field mice found on a small island, the plants they eat, and the animals that prey on them
(C) All of the field mice in North America
(D) A single nest of field mice, including the mother and her young
(E) All of the rodents on a small island, including many species of mice, rats, and squirrels

15. Which of the following are characteristics of every organic molecule?

I. Very simple structure
II. Contains carbon
III. Contains nitrogen

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

16. Viruses reproduce themselves by

(A) binary fission
(B) mitosis
(C) budding
(D) producing and dispersing spores
(E) injecting their genetic material into a living cell

17. The mechanism responsible for evolution is called

(A) eugenics
(B) artificial selection
(C) natural selection
(D) Lamarckism
(E) succession

18. If one species of bird hunts insects in the canopy of the rain forest during the day and a second hunts only at night, and closer to the ground, these two species can be said to

(A) inhabit separate communities
(B) have found distinct ecological niches
(C) live in different biomes
(D) possess the same biological cycles
(E) have reached their carrying capacities

19. The number of chromosomes found in a human germ cell is

(A) 46
(B) 23
(C) 48
(D) 20
(E) 44

20. If a single-celled protist that is used to living in a saltwater environment is suddenly placed into freshwater, which of the following is likely to happen?

(A) The cell membrane, which is soluble in freshwater, will disintegrate, destroying the cell.
(B) Due to osmosis, water will flow out of the cell into the surrounding environment, causing the cell to shrivel and die.
(C) Due to osmosis, water will flow into the cell and cause it to swell and possibly burst.
(D) Nothing will happen; the cell will pump water in from its surrounding environment to maintain its fluid content.
(E) Nothing will happen; the cell membrane does not allow water to flow into or out of the cell.

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21. The function of the myelin sheath is to

(A) strengthen the action potential of a neuron
(B) speed up the conduction of an action potential along a neuron
(C) regulate the frequency of action potentials fired along a neuron
(D) prevent the neuron from firing if the action potential is too weak
(E) make sure the action potential is traveling in the correct direction along the neuron

22. Physical structures in an organism that no longer serve a function in its current environment but that were once developed and functional are called

(A) adaptations
(B) homologous structures
(C) forelimbs
(D) vestigial structures
(E) analogous structures

23. Which structures compose the stamen?

I. Anther
II. Filament
III. Stigma

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

24. DNA and RNA are both nucleic acids that are essential to life. However, they differ in several ways. Which of the following is NOT true about the differences between DNA and RNA?

(A) DNA is double stranded, while RNA is single stranded.
(B) DNA is found in the nucleus of the cell, while RNA is mainly found in the cytoplasm.
(C) DNA contains the nitrogenous base thymine, while RNA uses uracil in its place.
(D) DNA and RNA have different sugars in their sugar-phosphate backbones.
(E) DNA is found in eukaryotes, while RNA is found only in prokaryotes and viruses.

25. The majority of food digestion and absorption takes place in the

(A) stomach
(B) liver
(C) pancreas
(D) small intestine
(E) large intestine

26. An individual's genotype has the all of the following characteristics EXCEPT

(A) determines the phenotype
(B) is an organism's genetic composition
(C) depends on the phenotype
(D) can be homozygous
(E) can be heterozygous

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27. Members of the same phylum are also members of the same

(A) kingdom
(B) species
(C) class
(D) order
(E) family

28. Which of the following proportions of nitrogenous bases describes a valid DNA molecule?

(A) Adenine 35%, cytosine 15%, guanine 15%, thymine 35%
(B) Adenine 35%, cytosine 15%, guanine 15%, uracil 35%
(C) Adenine 35%, cytosine 15%, guanine 35%, thymine 15%
(D) Adenine 20%, cytosine 20%, guanine 40%, thymine 20%
(E) Adenine 35%, cytosine 35%, guanine 15%, thymine 15%

29. All of the following describe the electron transport chain EXCEPT

(A) the reactions occur on the inner membrane of mitochondria
(B) the reactions occur on the outer membrane of mitochondria
(C) the reactions are an aerobic process
(D) hydrogen ions and electrons recombine and are then used to reduce oxygen to form water
(E) NADH is oxidized

30. All of the following cause changes in the gene pool of a population from generation to generation EXCEPT

(A) cloning
(B) migration
(C) mutation
(D) disruptive selection
(E) stabilizing selection

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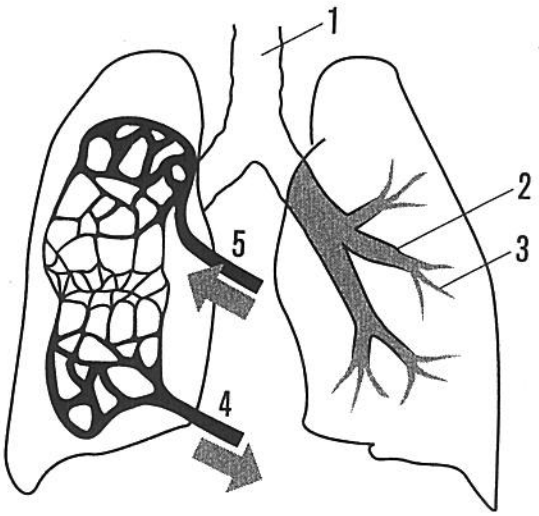
Questions 31–34 refer to the following illustration of structures in the human body.



31. The structure labeled 5 is classified as a/n

(A) artery
(B) vein
(C) arteriole
(D) bronchiole
(E) capillary

32. Gas exchange occurs in structure/s

(A) 1 only
(B) 2 only
(C) 3 only
(D) 2 and 3 only
(E) 1, 2, and 3

33. Oxygenated blood from 4 is headed directly for the heart. Which structure does it enter first?

(A) Right atrium
(B) Vena cava
(C) Right ventricle
(D) Left atrium
(E) Aorta

34. The body regulates respiration rate based on blood pH and the concentration of

(A) CO_2 in the blood
(B) O_2 in the blood
(C) CO_2 in alveolar sacs
(D) O_2 in the brain
(E) lactic acid in the muscles

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Over time, a small pond in a field becomes muddy and filled with vegetation and is eventually filled in completely with land and trees.

35. This process is called

(A) succession
(B) dispersion
(C) adaptation
(D) degradation
(E) mutation

36. In comparison to evolution, this process is

(A) slower
(B) faster
(C) similar in rate
(D) temporary
(E) chaotic

37. The resulting forest is called a climax community. Why?

(A) There is no room left for any new organisms.
(B) It continually undergoes dynamic changes.
(C) The trees create a high canopy of leaves.
(D) Its ecological characteristics remain essentially stable.
(E) It exhibits the most biological diversity of any biome.

38. Compared to the pond, the forest will exhibit all of the following EXCEPT

(A) greater biomass
(B) more species
(C) more heterotrophic species
(D) fewer pioneer organisms
(E) no change in resident species

39. Which of the following is a pioneer organism?

(A) Fern
(B) Kelp
(C) Pine tree
(D) Maple
(E) Lichen

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Blood typing is frequently used to determine biological fatherhood. Two men—candidates X and Y, both possible fathers—are tested for blood type in relation to a child who has blood type B.

40. If the mother has blood type AB, what blood types could the father potentially have?

(A) A
(B) B
(C) AB
(D) O
(E) All of the above

41. What blood type would a candidate have to exhibit to determine with certainty that he is NOT the father?

(A) Homozygous A
(B) Heterozygous B
(C) AB
(D) O
(E) Heterozygous A

42. If the child required a transfusion, what scenario best describes the concerns of getting a donor?

(A) He can only receive blood from a direct relative.
(B) His antibodies would attack any other blood type besides B.
(C) If he receives the wrong type, anti-A antibodies in his plasma could cause clotting.
(D) Adding a different antigen, such as A, would change his blood type.
(E) He would require blood from a person of his approximate age.

43. For a couple who both have blood type AB, what is the percent chance will their offspring exhibit type A?

(A) 0%
(B) 25%
(C) 33%
(D) 50%
(E) 75%

44. The alleles for A and B blood types are

(A) mutations
(B) haploid
(C) recessive
(D) commensalistic
(E) codominant

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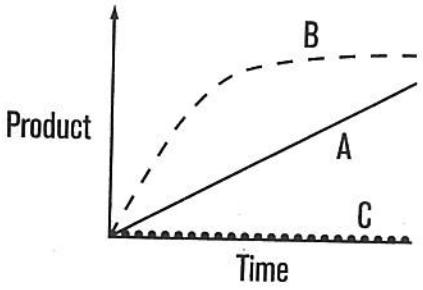
An experimenter runs a simple combination reaction and charts the results as line A. She then reruns the reaction with the original solution plus substance B and again after adding substance C to the new solution.



45. For the initial reaction A, which best describes the relationship of product to time?

(A) Directly proportional
(B) Inverse square
(C) Exponential growth
(D) Inversely proportional
(E) Limited growth

46. Substance B most likely contains

(A) more reactants
(B) an enzyme
(C) hormones
(D) a strong acid
(E) extra product

47. The addition of substance C failed to produce any product. Which of the following is the LEAST LIKELY explanation for what might have occurred?

(A) A pH change decreased the efficiency of the catalyst.
(B) Substance C reacted separately with the substrate.
(C) It catalyzed a different reaction.
(D) Simple reactions cannot run with more than two reactants.
(E) It contained multiple unknowns that interfered with the reaction.

48. The addition of a catalyst can affect the reaction in the following ways EXCEPT

(A) decreases the activation energy
(B) temporarily binds substrates to its active sites
(C) speeds up the reaction rate
(D) increases reaction temperature
(E) produces an unlimited amount of product

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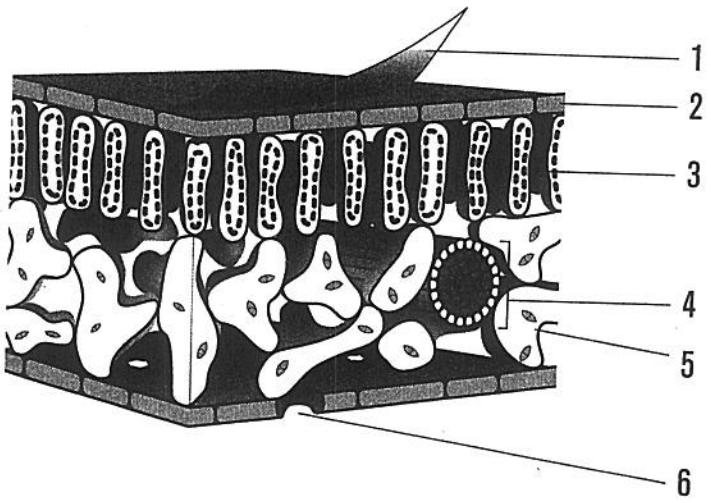
Questions 49–52 refer to the diagram below, which represents a cross section of a leaf.



49. Where does the majority of photosynthesis occur?

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

50. The opening in the lower epidermis layer is termed the

(A) xylem
(B) cuticle
(C) phloem
(D) stoma
(E) leak channel

51. The release of water vapor through structure 6 is called

(A) transpiration
(B) transduction
(C) exhalation
(D) photosynthesis
(E) capillary effect

52. This leaf could represent any of the following EXCEPT

(A) dicot
(B) monocot
(C) fern
(D) moss
(E) angiosperm

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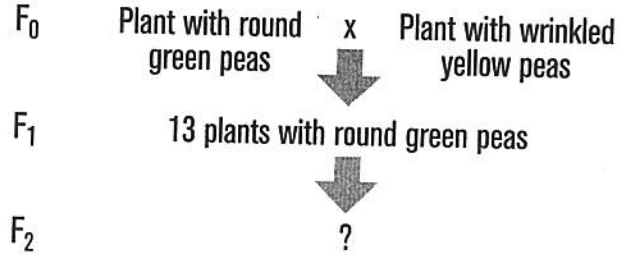
In pea plants, two separate alleles code for the shape and color of peas. Round shape is dominant over wrinkled, and green color is dominant over yellow. In a controlled experiment, a plant with round green peas is crossed with a plant with wrinkled yellow peas.



53. If a cross of F_1 plants produces 31 plants in the F_2 generation, approximately how many should have wrinkled green peas?

(A) 0
(B) 3
(C) 6
(D) 10
(E) 15

54. What is the expected ratio of phenotypes for the F_2 generation?

(A) 1:3:3:1
(B) 1:9:9:1
(C) 1:3:1
(D) 9:3:3:1
(E) 1:1:1:1

55. An experimenter wanted to determine whether a plant with wrinkled green peas from the F_2 generation was homozygous for color. In a test cross with a plant with wrinkled yellow peas, what ratio of offspring would confirm that the test subject was homozygous green?

(A) 1 wrinkled green to 1 wrinkled yellow
(B) All wrinkled green
(C) All wrinkled yellow
(D) 1 wrinkled green to 1 round green
(E) 1 wrinkled yellow to 1 round green

56. If a randomly selected plant from F_2 is crossed with the original F_0 plant with round green peas, what is the probability that their offspring will have round green peas?

(A) 6%
(B) 19%
(C) 56%
(D) 94%
(E) 100%

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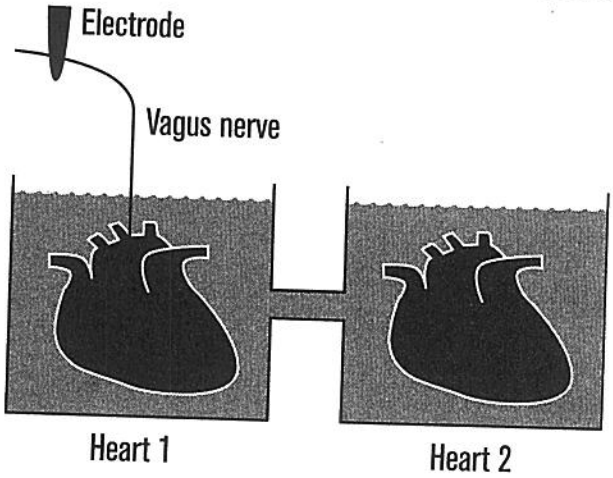
An experimenter attempted to determine how nerves operate on muscles. Two frog hearts were placed in isotonic solutions in adjoining containers; the fluid was allowed to flow between the containers. The first heart was still connected to the vagus nerve, which serves in the body as the heart's pacemaker by slowing the heart rate. Using an electrode, the experimenter stimulated the vagus nerve and observed that the rate of heart 1 slowed down. A few seconds later, heart 2 also slowed down.



57. The scientist, an Austrian named Otto Loewi, hypothesized that heart 2 received stimulation from something in the fluid and named it "Vagusstoff." It has since become known to be

(A) an action potential of 70 mV
(B) the neurotransmitter acetylcholine
(C) sodium cations
(D) potassium cations
(E) the depolarizing threshold

58. The vagus nerve is part of the nervous system called the

(A) autonomic nervous system
(B) medulla oblongata
(C) central nervous system
(D) somatic nervous system
(E) hypothalamus

59. Arrange in order the following events in the neuron when it is stimulated with an electrode:

I. sodium channels open
II. the depolarizing current reaches a threshold voltage
III. potassium channels open

(A) I, II, III
(B) II, I, III
(C) II, III, I
(D) III, II, I
(E) III, I, II

60. The vagus nerve does not actually "touch" the heart. The microscopic gap is called a(n)

(A) axon
(B) resting potential
(C) node of Ranvier
(D) dendrite
(E) synapse

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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. Which of the following is probably better developed in an intelligent animal species than in a more primitive species?

(A) Cerebrum
(B) Cerebellum
(C) Medulla
(D) Hypothalamus
(E) Brainstem

62. Of the following, all are vertebrates EXCEPT

(A) frog
(B) trout
(C) shark
(D) lizard
(E) crab

63. Of the following, what best explains how animals obtain the nitrogen and amino acids they require to survive?

(A) By eating plants that have obtained nitrogen from bacteria or other animals that have eaten these plants
(B) By ingesting nitrogen-fixing bacteria from the soil
(C) Through simple respiration of nitrogen in the atmosphere, absorbed either through skin or lungs
(D) By providing nitrogen-fixing bacteria a habitat within their own bodies
(E) By drinking water that contains dissolved nitrogen

64. What results if overlap between the niches of two organisms decreases?

(A) Competition between the organisms is unaffected
(B) Competition between the organisms decreases
(C) Competition between the organisms increases
(D) Coevolution occurs in both organisms
(E) Biomagnification

65. Of the following, evolutionary fitness is best characterized by

(A) changes in the gene pool of a population
(B) an organism's ability to contribute to the next generation's gene pool
(C) increasing complexities in the features of a species
(D) the formation of a new species
(E) the development of more humanlike traits

66. The hormone epinephrine, or adrenaline, produced in the adrenal medulla

(A) regulates the level of glucose in the blood
(B) regulates the level of calcium in the blood
(C) regulates the body's pH balance
(D) operates in stressful situations with the sympathetic nervous system
(E) stimulates other glands to produce their respective hormones

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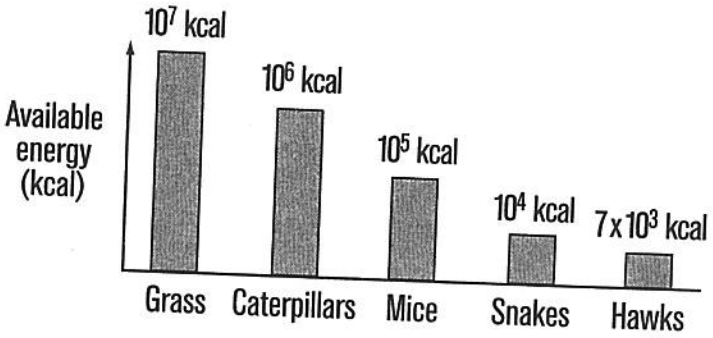
Questions 67–71 refer to the following bar chart of available energy (kilocalories) based on a food web of organisms within a given community. (The chart is not drawn to scale.)



67. Who is the primary consumer in this community?

(A) Grass
(B) Caterpillars
(C) Mice
(D) Snakes
(E) Hawks

68. What happens to the energy that is NOT transferred to consumers?

(A) Used in respiration
(B) Lost in the nitrogen cycle
(C) Used for temperature control in endotherms
(D) Taken up by decomposers
(E) Lost to entropy

69. Which of the following would a decomposer be?

(A) Primary producer
(B) Autotroph
(C) Primary consumer
(D) Heterotroph
(E) Tertiary consumer

70. What is the lowest trophic level that can include a carnivore?

(A) Primary producer
(B) Primary consumer
(C) Secondary consumer
(D) Tertiary consumer
(E) Decomposer

71. Energy transfer between trophic levels typically runs at 10% efficiency. What is the most likely explanation for the 30% energy loss between snakes and hawks?

(A) Hawks eat both snakes and mice.
(B) Hawks are efficient at catching snakes.
(C) Snakes provide more nutrition than mice.
(D) Hawks span all of the trophic levels.
(E) Some snakes eat hawks.

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After fertilization of the egg in humans, the ball of rapidly dividing cells arrives and lodges itself in the nutrient-rich lining of the female uterus.

72. From fertilization, the correct sequence of development of the embryo-to-be is

(A) gamete—blastula—gastrula—morula
(B) zygote—blastula—gastrula—morula
(C) zygote—morula—blastula—gastrula
(D) gastrula—blastula—zygote—morula
(E) morula—zygote—gastrula—blastula

73. The buildup of the uterine lining is facilitated by the corpus luteum and its production of

(A) progesterone
(B) estrogen
(C) luteinizing hormone (LH)
(D) oxytonin
(E) prolactin

74. If the egg is not fertilized, which of the following occurs?

(A) Ovulation
(B) Menstruation
(C) Spike in estrogen levels
(D) Buildup of uterine wall
(E) Spike in progesterone levels

75. Which of these structures will the human embryo NOT form at some point before birth?

(A) Notochord
(B) Gills
(C) Tail
(D) Eyelids
(E) Scales

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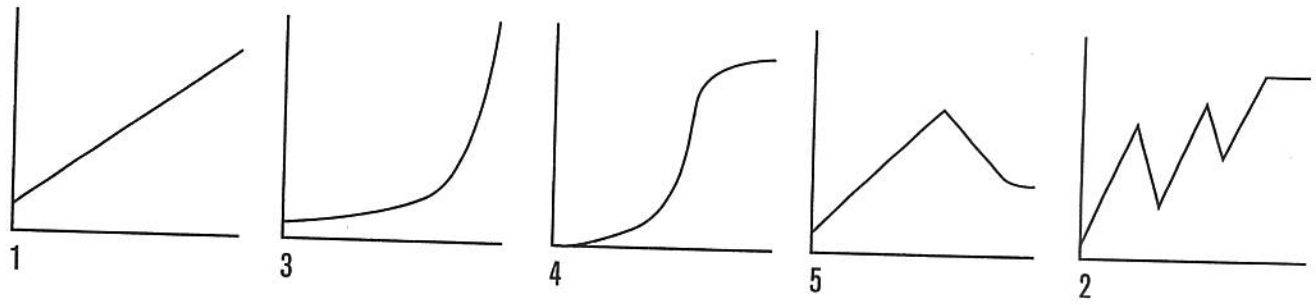
Questions 76–80 refer to the following diagrams charting to the growth of a rabbit population over time.



76. Which of the charts shows exponential growth to carrying capacity?

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

77. The introduction of natural predators could affect the population according to which curve?

I. 1
II. 4
III. 5

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

78. The shape of the curve in chart 4 is "sigmoidal." All of the following factors can be responsible for this population curve EXCEPT

(A) food scarcity
(B) disease
(C) waste accumulation
(D) niche competition
(E) individual mutations

79. Rabbits use what reproductive strategy?

(A) Vast numbers of offspring with no parental care
(B) Large, fast-developing litters with some parental care
(C) One or two offspring with delayed sexual maturity
(D) Offspring only under nonpredatory conditions
(E) Parthenogenesis

80. A population of squirrels is introduced to the rabbits' environment. The two groups could share all of the following EXCEPT

(A) niche
(B) biome
(C) community
(D) water
(E) trophic level

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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. Which of the following molecules is NOT considered a basic building block of larger, more complex organic molecules?

(A) Ribose, a monosaccharide
(B) Guanine, a nitrogenous base
(C) Lysine, an amino acid
(D) Sucrose, a disaccharide
(E) Amylase, an enzyme

82. Which of the following statements are true?

I. All chemical reactions of life occur in or in association with cells.
II. All cells carry genetic information in the form of DNA, which is passed from parent cell to daughter cell.
III. All cells contain a nucleus that coordinates the basic functions of the cell.

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

83. The correct chronology of the evolution of the five kingdoms is

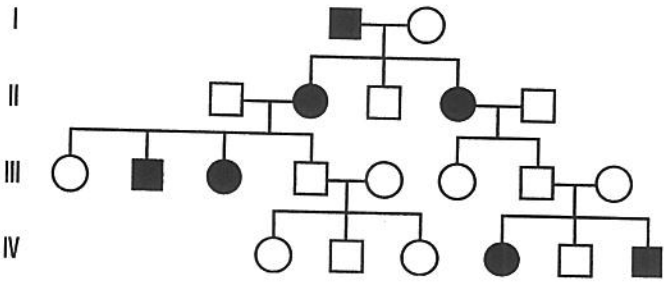
(A) Monera, Fungi, Plantae, Protista, Animalia
(B) Protista, Monera, Fungi, Plantae, Animalia
(C) Protista, Monera, Plantae, Animalia, Fungi
(D) Fungi, Monera, Protista, Animalia, Plantae
(E) Monera, Protista, Plantae, Fungi, Animalia

84. Transcription involves which two types of nucleic acids?

(A) DNA and tRNA
(B) DNA and mRNA
(C) mRNA and tRNA
(D) mRNA and rRNA
(E) rRNA and tRNA

85. Which of the following organisms is classified in phylum Chordata?

(A) Lobster
(B) Minnow
(C) Earthworm
(D) Clam
(E) Hydra



86. In the above pedigree, males are indicated by squares, and females by circles. The shaded individuals have a disorder caused by a recessive allele. Which of the following can therefore be true?

(A) All the unaffected individuals on the chart are heterozygous.
(B) The allele appears on the X chromosome.
(C) All the males in generation II are heterozygous.
(D) The disorder will not appear in any subsequent generations.
(E) In generation IV, individuals 1, 2, and 3 must be homozygous.

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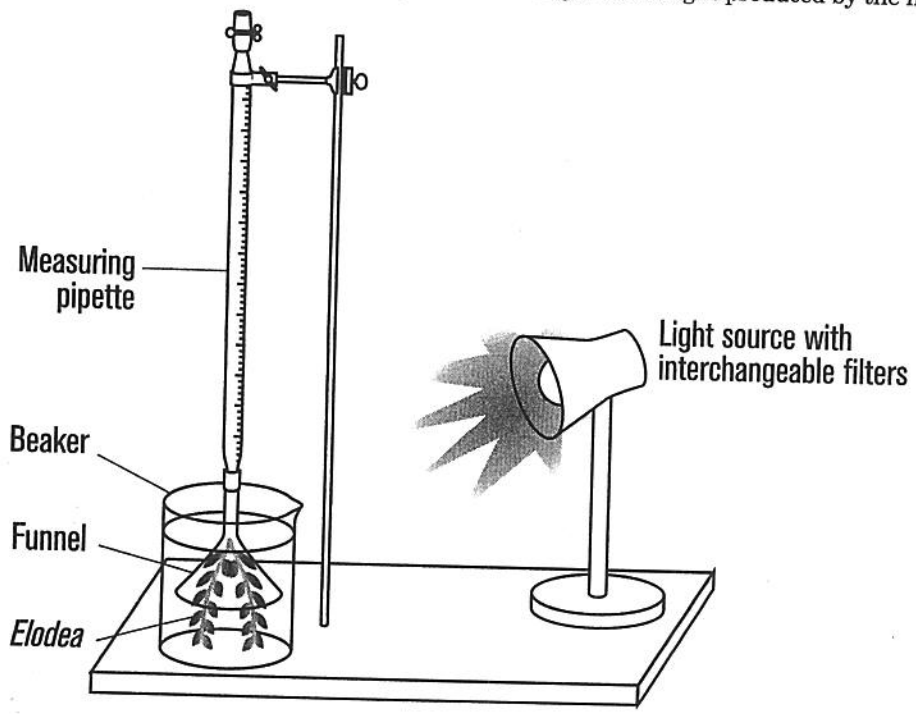
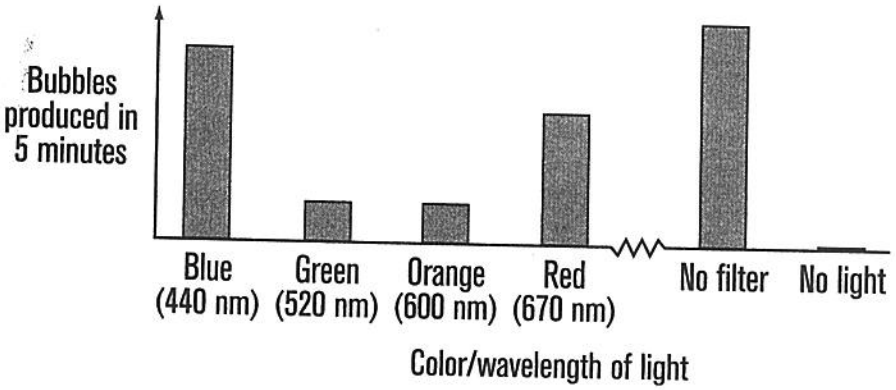
A student conducted an experiment to determine how different wavelengths of light affect photosynthesis in the common green pondweed, *Elodea*. A sample of the aquatic plant was submerged in distilled water under a measuring pipette filled with water. Several colored filters were used to change the wavelength of the light produced by the light source.



The experimenter counted bubbles the *Elodea* sprig produced during a 5-minute period of exposure to each filter, including without a filter and without light, and recorded the results in a graph.



87. The gas being produced as bubbles in this experiment is

(A) oxygen
(B) carbon dioxide
(C) water vapor
(D) hydrogen
(E) chlorine

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88. Which of the following act(s) as a control for this experiment?

I. No filter
II. No light
III. Using the same plant

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

89. Green light produced few bubbles. Which of the following statements explains why?

(A) Light with wavelengths near 520 nm is reflected off the water.
(B) Chlorophyll reflects all the light near 520 nm, making plants appear green.
(C) Green light is totally absorbed, exciting electrons and driving photosynthesis.
(D) Green light doesn't penetrate *Elodea* leaves.
(E) *Elodea* has no chlorophyll.

90. How much gas would the *Elodea* produce when exposed to a yellow filter (~580 nm)?

(A) More than blue
(B) More than green, less than blue
(C) About the same as green or orange
(D) More than orange, less than red
(E) More than red

91. What could the student conclude from this experiment?

(A) The rate of photosynthesis is variable with wavelength of light.
(B) The shorter the wavelength of light, the faster the rate of photosynthesis.
(C) Photosynthesis has different rates in different plants.
(D) The rate of photosynthesis increases with temperature.
(E) Plants cannot survive in filtered light.

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Bacteriophage viruses replicate by latching onto bacteria and programming them to make more viruses. In an experiment, two groups of bacteriophage viruses were labeled with radioactive isotopes: group I had sulfur-labeled protein coats, and group II had phosphorus-labeled genetic cores. The groups were introduced to separate colonies of bacteria. After ten minutes, each culture was vigorously stirred to detach the viruses from the bacteria, then spun in a centrifuge to separate the components: bacteria at the bottom and the remaining solution (called the "supernatant") at the top. The components were then tested for radioactivity.

Group I: viruses with sulfur-protein coats	Radioactivity?
Bacteria	No
Supernatant	Yes

Group II: viruses with phosphorus-DNA coats	Radioactivity?
Bacteria	Yes
Supernatant	No

92. Why does the supernatant liquid show radioactivity in group I?

(A) It contains the viruses' radioactive protein coats.
(B) It contains radioactive genetic material.
(C) Bacteria synthesized radioactive sulfur.
(D) The bacteria exploded with new viruses.
(E) Bacteria expelled the isotopes by active transport.

93. The bacteriophage virus is classified in

(A) kingdom Monera
(B) kingdom Protista
(C) kingdom Fungi
(D) kingdom Animalia
(E) none of the above

94. This experiment, called the Hershey-Chase experiment and conducted in 1952, was a milestone in genetics. What was its breakthrough?

(A) It demonstrated that the viruses' DNA is the key to their replication.
(B) It detailed the makeup of bacteriophages.
(C) It showed how bacteria replicate.
(D) It used radioactive isotopes to track molecules.
(E) Bacteria were able to synthesize new radioactive viruses.

95. If this virus reproduces using the lytic cycle, all of the following will occur in the host bacteria EXCEPT

(A) rupture of cell membrane
(B) viral DNA replication
(C) new protein synthesis
(D) manufacture of virus coats
(E) exponential growth of bacteria

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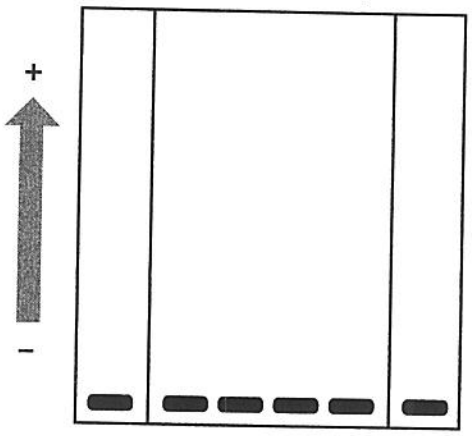
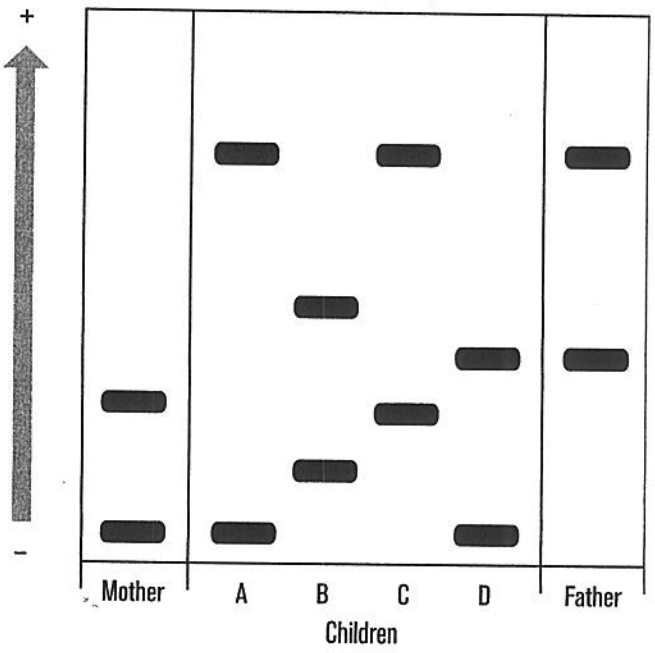
A standard process in genetic testing is to replicate individual segments of DNA over and over into quantities large enough for tests. One such test is electrophoresis, where the replicated DNA segments are lined up at the base of a regular, stable magnetic field.

Figure 1 (before)



Due to its polarity, the clumps of DNA migrate across the electrophoresis plate; the distance of migration relates to the size of the DNA segments. In the following test, two specific genes from two adults and four children were tested using electrophoresis. Each column represents the replicated DNA segments from one individual.

Figure 2 (after)



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96. Which column represents the child who is not a genetic offspring of these parents?

(A) A
(B) B
(C) C
(D) D
(E) They could all belong

97. What explains why some segments would move farther toward the positive end of the electrophoresis plate?

(A) The magnetic field increases toward one end.
(B) Those DNA segments are more polar.
(C) The segments closer to the positive end are smaller.
(D) The farther segments are RNA.
(E) There are more copies of the gene.

98. After the test is run, what is an experimenter likely to find in an analysis of one of the bands?

(A) High levels of uracil
(B) Many copies of DNA code for a single gene
(C) DNA from both the father and mother
(D) A complete chromosome
(E) A high pH level

99. In the body, the replication of DNA segments is carried out by a(n)

(A) enzyme
(B) ribosome
(C) chance association of nucleotides
(D) hormone
(E) sugar phosphate backbone

100. The copying of DNA segments in the beginning of the experiment most resembles

(A) conjugation
(B) translation
(C) transduction
(D) gene mapping
(E) transcription

S T O P

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