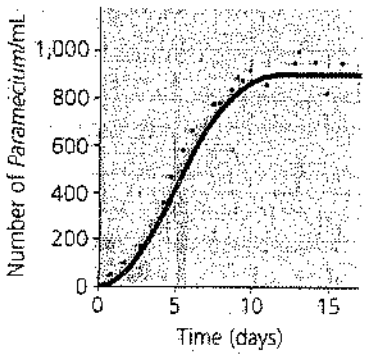
Practice Test 1

Biology
Section 1

Time—1 hour and 20 minutes

Directions: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the one that is best in each case, and then fill in the corresponding oval on the answer sheet.



***Paramecium* Population in Lab**

1. In the diagram above, what number of paramecia best represents the carrying capacity of the environment for the population shown?
   (A) 200
   (B) 500
   (C) 600
   (D) 900

Gene	Probability of Appearing in Gamete
P	1/4
Q	1/4
R	1/4

2. Three genes—*P*, *Q*, and *R*—are not linked. The probability of each gene appearing in a gamete is shown in the table above. Which of the equations below represents the probability that all three genes will appear in the same gamete?
   (A) ¼ × ¼ × ¼
   (B) ¼ + ¼ + ¼
   (C) ¼ ÷ ¼ × ¼
   (D) (¼)⅓
   (E) 0

3. Which cellular organelle is the site of cellular respiration?
   (A) Golgi apparatus
   (B) Chloroplast
   (C) Mitochondria
   (D) Endoplasmic reticulum
   (E) Ribosomes

4. Which term best describes how goslings recognize their mothers after they are born?
   (A) Habituation
   (B) Imprinting
   (C) Reasoning
   (D) Instinct
   (E) Maturation

5. A student using a light microscope observes a relatively small, rod-shaped cell that has no observable nucleus or other membrane-bounded organelle. What type of cell is this most likely to be?
   (A) Viral
   (B) Eukaryote
   (C) Gamete
   (D) Prokaryote
   (E) Plant

6. In a testcross, which of the following must be true?
   (A) One of the individuals is homozygous dominant.
   (B) One of the individuals is homozygous recessive.
   (C) Both individuals are heterozygous.
   (D) Both individuals are homozygous.
   (E) Both individuals have an unknown phenotype.

7. Diatoms are the major primary producers in which of the following ecosystems?
   (A) Marine
   (B) Desert
   (C) Temperate broadleaf forest
   (D) Chaparral
   (E) Tropical rain forest

8. In deer, fur length is controlled by a single gene with two alleles. When a homozygous deer with long fur is crossed with a homozygous deer with short fur, the offspring all have fur of medium length. If these offspring with medium-length fur mate, what percentage of their offspring will have long fur?
   (A) 100%
   (B) 75%
   (C) 50%
   (D) 25%
   (E) 0%

9. All of the following are types of wastes excreted by animals EXCEPT
   (A) ammonia
   (B) urea
   (C) uric acid
   (D) carbon dioxide
   (E) nitrate

10. Which of the following statements best supports the idea that certain cell organelles are evolutionarily derived from symbiotic prokaryotes living in host cells?
   (A) The process of cellular respiration in certain prokaryotes is similar to that occurring in mitochondria and chloroplasts.
   (B) Mitochondria and chloroplasts have DNA and proteins that are very similar to those in eukaryotes.
   (C) Mitochondria and eukaryotes have similar cell wall structures.
   (D) Like prokaryotes, mitochondria have a double membrane.
   (E) Mitochondria and chloroplasts have DNA and ribosomes that are similar to those of prokaryotes.

11. During the course of which type of reaction is energy consumed?
   (A) Hydrolysis
   (B) Catabolic
   (C) Oxidation-reduction
   (D) Endergonic
   (E) Exergonic

12. Consumption of CO_2 can be used as a measure of photosynthetic rate because carbon dioxide is
    (A) consumed during the light reactions of photosynthesis.
    (B) consumed during the dark reactions of photosynthesis.
    (C) used to trap photons, the form of energy in sunlight.
    (D) necessary for the production of ATP in oxidative phosphorylation.
    (E) produced when fermentation takes place.

13. Which of the following cell organelles is not bound by a membrane?
    (A) Centrosome
    (B) Golgi apparatus
    (C) Cell nucleus
    (D) Mitochondrion
    (E) Peroxisome

14. Which of the following statements is NOT part of Darwin's theory of natural selection?
    (A) Individuals survive and reproduce with varying degrees of success.
    (B) Because there are more individuals than the environment can support, this leads to a struggle for existence in which only some of the offspring survive in each generation.
    (C) The unequal ability of individuals to survive and reproduce leads to a gradual change in the population.
    (D) Members of the population that are physically weaker than others will be eliminated first by forces in the environment.
    (E) Individuals in a population vary in their characteristics, and no two individuals are exactly alike.

15. In animal development, all of the following occur EXCEPT
    (A) cleavage, a succession of rapid cell divisions, occurs just after fertilization
    (B) the zygote develops polarity
    (C) the zygote eventually develops into a hollow ball of cells called a blastula
    (D) as cleavage continues a solid ball of cells called a morula is produced
    (E) all of the genes in the zygote are activated

16. Which of the following describes a protein capable of converting related proteins to an infectious form?
    (A) Virus
    (B) Retrovirus
    (C) Prion
    (D) Spirochete
    (E) Prokaryote

17. A difference between prokaryotic and eukaryotic cells is the presence of
    (A) a membrane-bounded nucleus
    (B) genetic material in the form of DNA
    (C) cytoplasm
    (D) ribosomes
    (E) a cell membrane

18. Which plant hormone is responsible for root growth and differentiation, cell division, germination, and delaying senescence?
    (A) Auxin
    (B) Cytokinins
    (C) Gibberellins
    (D) Abscisic acid
    (E) Ethylene

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19. A farmer selects one green pepper plant that has all of the most desirable traits of the species. The farmer then produces a group of offspring plants using only genetic material from this ideal parent plant. The resulting plants are genetically identical to the parent and are said to be
(A) a community
(B) a family
(C) clones
(D) a phylum
(E) a genus

20. The domain Archaea contains prokaryotic organisms that
(A) possess a nuclear envelope
(B) have plantlike features
(C) are capable of nitrogen fixation
(D) live in extreme heat or acid environments
(E) reproduce sexually

21. Which statement best describes the action of the hormone oxytocin in humans?
(A) it stimulates growth
(B) it stimulates the secretion of epinephrine
(C) it raises blood glucose levels
(D) it lowers blood glucose levels
(E) it stimulates contraction of the uterus

22. In dogs, the trait for long tail is dominant (*L*), and the trait for short tail is recessive (*l*). The trait for yellow coat is dominant (*Y*), and the trait for white coat is recessive (*y*). Mating two dogs gives a litter of 3 long-tailed, yellow dogs and 1 long-tailed, white dog. Which of the following is most likely to be the genotype of the parent dogs?
(A) *LLYY* × *LLYY*
(B) *LLyy* × *LLYy*
(C) *LlYy* × *LlYy*
(D) *LlYy* × *LLYy*
(E) *LlYY* × *Llyy*

23. Which of the following can be viewed with a light microscope?
(A) Ribosomes
(B) Golgi apparatus
(C) Nucleus
(D) Lipids
(E) Proteins

24. Which of the following areas is a site of active cell division at the tips of plant roots and shoots?
(A) Lateral meristems
(B) Apical meristems
(C) Sclerenchyma cells
(D) Cortex
(E) Pericycle

25. Which substances are components of the plasma membrane of a cell?
(A) Glycoproteins
(B) Cytochromes
(C) Nucleic acids
(D) Phosphatidic acid
(E) Lipoproteins

26. Mitosis in vertebrate cells occurs just after which of the following phases of the cell cycle?
(A) G_1
(B) S
(C) DNA synthesis
(D) G_2
(E) M phase

27. Certain cells of all of the following organisms undergo meiosis EXCEPT
(A) ferns
(B) sponges
(C) fungi
(D) bacteria
(E) nematodes

28. Water and minerals flow up through a plant through the
(A) sieve tubes of phloem
(B) sieve tubes of xylem
(C) tracheids and vessel elements of phloem
(D) tracheids and vessel elements of xylem
(E) only vessel elements of xylem

29. In plants, change in the level of which of the following substances causes the stomata to close and conserve water during drought?
(A) Brassinosteroids
(B) Abscisic acid
(C) Auxin
(D) Cytokinins
(E) Ethylene

30. O_2 and CO_2 diffuse from regions where their partial pressures
(A) are higher to regions where they are lower
(B) are lower to regions where they are higher
(C) are zero to regions of higher partial pressure
(D) are zero to regions of lower partial pressure
(E) are influenced by external atmosphere changes into the cell

31. A DNA molecule that can carry foreign DNA into a cell and then replicate is called a
(A) probe
(B) restriction fragment
(C) restriction enzyme
(D) vector
(E) transcriptase

32. It is theorized that when organisms that were capable of self-replicating originated, Earth's atmosphere contained a low concentration of
(A) gaseous oxygen.
(B) water.
(C) carbon dioxide.
(D) nitrogen.
(E) hydrogen.

33. The composition of lymph in lymph vessels is roughly the same as which of the following?
(A) Blood
(B) Interstitial fluid
(C) Glomerular filtrate
(D) Bile
(E) Chyme

34. In photosynthesis, most ATP is produced as a result of which of the following processes?
(A) The light reactions
(B) Carbon fixation
(C) Noncyclic photophosphorylation
(D) The dark reactions
(E) The Calvin cycle

35. Which of the following organisms is not usually considered alive because of its dependence on other organisms for reproduction?
(A) Nematode
(B) Tapeworm
(C) Mold
(D) Virus
(E) Lichen

36. In guinea pigs, black fur (*B*) is dominant to brown fur (*b*). No tail (*T*) is dominant over tail (*t*). What fraction of the progeny of the cross *BbTt* × *BbTt* will have black fur and tails?
(A) 1/16
(B) 3/16
(C) 3/8
(D) 9/16
(E) 1/4

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37. A migrating flock of Canadian geese is nearly decimated by a severe storm. Only four members of the flock, which constitute the entire population of a specific region, survive and return north the next spring. These four start a new colony. This phenomenon is known as
(A) the founder effect
(B) natural selection
(C) migration
(D) polymorphism
(E) the bottleneck effect

38. Which of the following describes a drawing showing the evolutionary history among a particular species or a group of related species?
(A) Food web
(B) Punnett square
(C) Pedigree
(D) Phylogenetic tree
(E) Graph

39. Which of the following characteristics is common to all bryophytes?
(A) Large, independent gametophytes
(B) Monoecious plants
(C) Haploid spores
(D) Seed production
(E) Vascular tissue

40. The rate of flow of sugar and nutrients through the phloem is regulated by
(A) diffusion from source to sink
(B) hydrostatic pressure in the sieve tube
(C) the force of transpirational pull
(D) active transport by tracheid and vessel cells
(E) passive transport by the pith

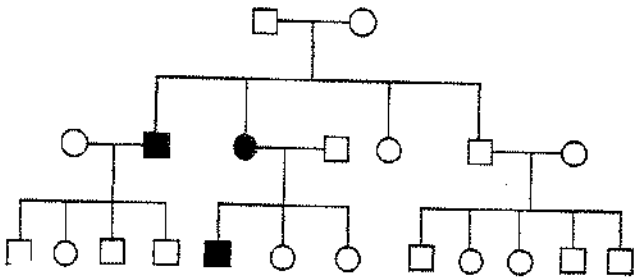
41. Allolactose stimulates the cells of the human body to produce mRNAs that code for the enzyme β-galactosidase, which breaks down lactose into glucose and galactose. In this case, the role of allolactose can best be described as that of a
(A) DNA replication stimulator
(B) translation inhibitor
(C) stimulator of β-galactosidase secretion
(D) regulator of gene activity
(E) translation activator

42. Which of the following types of data can be used to map the locations of genes on chromosomes?
(A) Segregation frequency
(B) Rate of gene regulation
(C) Dominance patterns
(D) Rate of gene recombination
(E) Rate of gene expression

43. When the stomata of a plant leaf open, which of the following occurs?
(A) There is a decrease in CO_2 intake by the leaf.
(B) The plant shifts from C_3 photosynthesis to C_4 photosynthesis.
(C) The rate of transpiration decreases.
(D) There is an increase in the concentration of CO_2 in mesophyll cells.
(E) There is an increase in the rate of production of nucleic acids.

44. All of the following are evidence for evolution EXCEPT
(A) the presence of anatomical homologies
(B) vestigial organs
(C) the existence of molecular homologies
(D) the fossil record
(E) the existence of homologies in diet among species

45. In a certain group of iguanas, the presence of brown skin is the result of a homozygous recessive condition in the biochemical pathway producing skin pigment. If the frequency of the allele for this condition is 0.35, which of the following is closest to the frequency of the dominant allele in this population? (Assume that the population is in Hardy-Weinberg equilibrium.)
(A) 0.15
(B) 0.45
(C) 0.55
(D) 0.65
(E) 0.85



46. In the pedigree above, squares represent males, and circles represent females. Shaded figures represent individuals who possess a particular trait. Which of the following patterns of inheritance best explains how this trait is transmitted?
(A) Partially dominant
(B) Autosomal dominant
(C) Autosomal recessive
(D) Sex-linked recessive
(E) Sex-linked dominant

47. The movement of H^+ across the inner mitochondrial membrane during chemiosmosis of cellular respiration, is an example of what type of movement across a membrane?
(A) Active transport
(B) Facilitated diffusion
(C) The work of a symport
(D) The work of an antiport
(E) Cotransport

48. Which of the following is the most direct result of the presence of protein in the small intestine?
(A) The secretion of bile by the gallbladder
(B) The secretion of pepsin by the lining of the small intestine
(C) The activation of the inactive form of trypsin and chymotrypsin
(D) The activation of the inactive form of lipase
(E) Peristalsis along the walls of the small intestine

49. During part of its life cycle, a tapeworm lives as an adult in a human's intestine. The tapeworm attaches to the intestinal lining, absorbs nutrients digested by the host, and releases eggs that are excreted in the human's feces. The feces happen to contaminate the food given to a pig, and larvae encyst in the muscles of the pig. The pig is later consumed by humans. The tapeworm is an example of
(A) mutualistic symbiotic partner to humans
(B) commensalistic symbiotic partner to humans
(C) parasitic symbiotic partner to humans
(D) mutualistic symbiotic partner to pigs
(E) commensalistic symbiotic partner to pigs

50. Which of the following is a major food source for organisms that live in the benthic zone?
(A) Floating aquatic plants
(B) Phytoplankton
(C) Zooplankton
(D) Detritus
(E) Cyanobacteria

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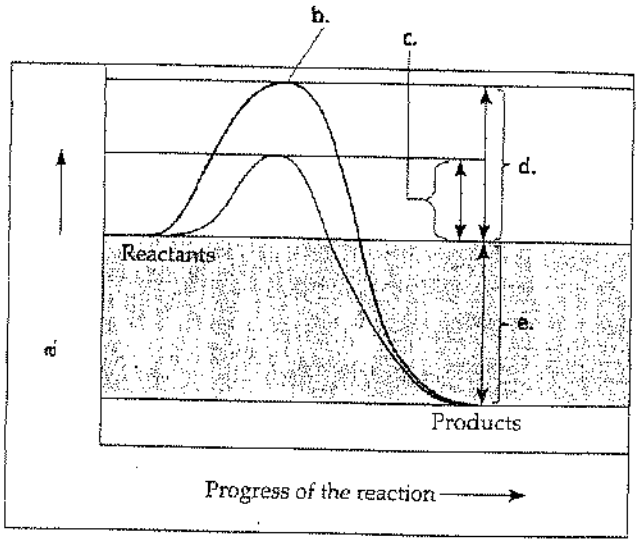
51. Which of the following cellular processes is most closely coupled with active transport?
(A) The addition of H^+ to H_2O to produce a hydronium ion
(B) The hydrolysis of ATP
(C) The phosphorylation of ADP
(D) The synthesis of G3P
(E) The formation of peptide bonds between amino acids

52. Which of the following cells would most likely have the greatest concentration of mitochondria in its cytoplasm?
(A) A cell lining the digestive tract
(B) An active skeletal muscle cell
(C) A cell in the liver
(D) A cell in the lung
(E) A cell in the epidermis

53. In which of the following pairs are the organisms most closely related taxonomically?
(A) Mushroom; tulip
(B) *E. coli*; euglenid
(C) Lobster; spider
(D) Shark; crayfish
(E) Dolphin; sea star

Directions: Each group of questions below consists of five lettered choices (or five lettered items in a graph) followed by a list of numbered phrases or sentences. For each numbered phrase or sentence, select the one choice (or item) that is most closely related to it. Each choice may be used once, more than once, or not at all in each group.

Questions 54–56 refer to the following graph. Each of the curves represents one pathway for the same reaction, but one pathway is catalyzed by an enzyme.

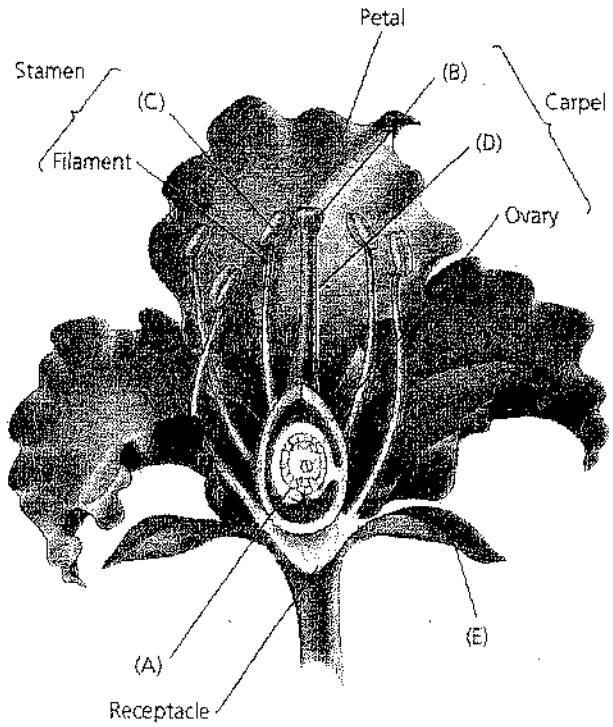


54. Represents the activation energy of the uncatalyzed reaction

55. Represents the activation energy of the catalyzed reaction

56. Represents the transition state of the uncatalyzed reaction

Questions 57–61 refer to the following diagram of the structure of a flower.



Structure of a Flower

57. Develop into seeds after fertilization

58. The site of pollen production

59. Receives pollen

60. Enclose the flower prior to its opening

61. Connects the stigma to the ovary

Questions 62–65

(A) Follicle-stimulating hormone (FSH)
(B) Growth hormone (GH)
(C) Melatonin
(D) Androgens
(E) Endorphins

62. Secreted by the anterior pituitary gland, stimulates growth and metabolism

63. Secreted by the anterior pituitary gland, stimulates the production of ova and sperm

64. Secreted by the testes, promotes the development of secondary sex characteristics

65. Secreted by the pineal gland, involved in regulating biological rhythms

Questions 66–69

(A) Savannah
(B) Temperate broadleaf forest
(C) Tundra
(D) Chaparral
(E) Coniferous forest

66. Possesses permafrost and is dominated by short shrubs and grasses; endures long, dark winters

67. Dominated by dense evergreen shrubs and other plants adapted to periodic fires

68. Has long, cold winters and short summers; a biome that is dominated by gymnosperms

69. Home to large herbivores and their predators, marked by grasses and scattered trees

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Questions 70–73

(A) Inner mitochondrial membrane
(B) The cytosol
(C) Thylakoid membranes
(D) Ribosome
(E) Nucleus

70. Where mRNA is translated into proteins

71. Where DNA is replicated prior to cell division

72. Where chlorophyll is located

73. The location of glycolysis

Questions 74–78

(A) Rotifera
(B) Porifera
(C) Nematoda
(D) Platyhelminthes
(E) Chordata

74. Possess a notochord, a dorsal hollow nerve cord, and bilateral symmetry

75. Possess a tough exoskeleton called a cuticle, are not segmented, have a complete digestive tract but no circulatory system

76. Possess a complete digestive tract, are pseudocoelomates with a crown of cilia surrounding their mouths

77. Are hermaphrodites and suspension feeders, have no nerves or muscles, have a sac-like body

78. Possess a gastrovascular cavity with only one opening, are acoelomates, and include many parasitic species

Questions 79–82

(A) Telomere
(B) DNA polymerase
(C) Helicase
(D) Primer
(E) DNA ligase

79. DNA not made up of genes, but of multiple repetitions of short nucleotide sequences

80. Joins the sugar-phosphate backbones of the Okazaki fragments to make a complete DNA strand

81. Catalyzes elongation of new DNA at a replication fork

82. Catalyzes the unwinding of double-stranded DNA prior to transcription

Questions 83–84 A scientist is studying the cell cycles of various organisms to learn about their metabolic activities and division patterns. She kept track of the amount of time each type of cell spent in the cell cycles and collected them in the table below.

TOTAL MINUTES SPENT IN EACH CELL CYCLE PHASE

Cell Type	G_1	S	G_2	M
Monkey liver	20	23	10	18
Plant stem	98	0	0	0

83. From the data in the table above, which of the following is the most likely conclusion about the cell from the plant stem?
(A) It is dead.
(B) This cell contains no DNA.
(C) This cell contains no mRNA.
(D) This cell has entered the G_0 phase.
(E) This cell is continually growing.

84. How long did the entire process of mitosis in the monkey liver cell last?
(A) 70 minutes
(B) 23 minutes
(C) 18 minutes
(D) 10 minutes
(E) 0 minutes

Questions 85–86

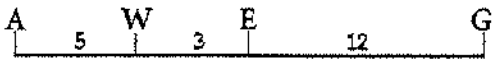
In a study of the development of chicken embryos, groups of cells in the early germ layers were stained with five different-colored dyes. After the organs of the chick developed, the location of the dyes were marked down as shown below.

Tissue	*Color*
Brain	Blue
Liver	Red
Mucous membranes	Green
Nerve cord	Yellow
Heart	Orange

85. Mesoderm would eventually give rise to tissues containing which of the following colors?
(A) Yellow and purple
(B) Red and blue
(C) Orange and yellow
(D) Orange and green
(E) Red and green

86. Tissues that were stained blue were derived from
(A) mesoderm.
(B) ectoderm.
(C) mesoderm and ectoderm.
(D) ectoderm and endoderm.
(E) mesoderm and endoderm.

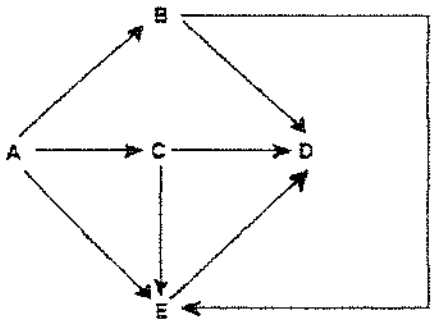
Questions 87–88 refer to the following chromosome map. Letters represent gene loci and numbers represent map units.



87. Considering the possibilities of recombination, which two genes on this chromosome are most likely to segregate together into a daughter cell?
(A) A and W
(B) A and E
(C) A and G
(D) W and E
(E) W and G

88. If the rate of recombination between gene A and W is 5%, what is the rate of recombination between gene W and gene G?
(A) 0%
(B) 5%
(C) 10%
(D) 15%
(E) 20%

Questions 89–91 refer to the following figure, which shows a food web in a particular ecosystem. Each letter represents a species in this ecosystem, and the arrows show the flow of energy.



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89. Which of the species in the food web is the primary producer?
(A) A
(B) B
(C) C
(D) D
(E) E

90. Species B and C represent which of the following?
(A) Primary producers
(B) Primary consumers
(C) Secondary consumers
(D) Tertiary consumers
(E) Omnivores

91. Which of the following most accurately describes species E?
(A) An herbivore, and a secondary consumer
(B) An omnivore, and a secondary consumer
(C) An omnivore, and both a primary and secondary consumer
(D) An herbivore, and both a primary and secondary consumer
(E) A cannibal

Questions 92–94 refer to the information about five organisms shown in the table below.

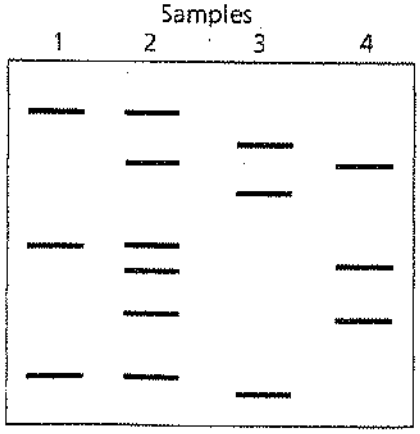
	Environment Inhabited by Animal	Body Length	Features of Gas Exchange System	Features of Gas Exchange Surface	Percentage of Oxygen Extracted from Air
1	Terrestrial	0.01 m	Branching air tubes, large tracheae that open to the outside	Moist epithelium lining the terminal ends of the tracheal system	53%
2	Terrestrial	0.02 m	Branching air tubes, large tracheae, ventilates with rhythmic body movements	Moist epithelium lining the terminal ends of the tracheal system	48%
3	Aquatic	0.5 m	Outfoldings in the body surface suspended in water	Uses countercurrent exchange and ventilation	73%
4	Terrestrial	1.0 m	Lungs that work in conjunction with circulatory system	Gas exchange occurs across epithelium of alveoli	67%
5	Terrestrial	2.0 m	Lungs that work in conjunction with circulatory system	Gas exchange occurs across epithelium of alveoli	78%

92. Which of the above organisms is most likely to have hemolymph as its main circulatory fluid?
(A) 1 and 2
(B) 2 or 3
(C) 3 or 4
(D) 4 and 5
(E) None of these organisms

93. In which of these organisms is hemoglobin used to transport oxygen through the blood?
(A) 5
(B) 4 and 5
(C) 3, 4, and 5
(D) 2, 3, 4, and 5
(E) All of them

94. In which of these animals can the process of gas exchange occur without physical movement of some part of the animal?
(A) 1 and 2 only
(B) 1 and 3 only
(C) 1, 2, and 3 only
(D) 3, 4, and 5 only
(E) All of them

Questions 95–97 refer to the following gel, which was produced from four samples of a radioactively labeled single strand of DNA that were cut with one type of restriction enzyme. The samples were separated by gel electrophoresis. Answer the questions on the basis of the bands you can visualize below.

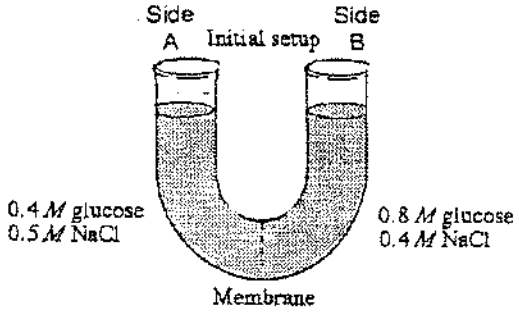


95. The DNA fragments in the gel were separated when an electric field was applied across the gel and they migrated at different speeds. The differential migration speed of the different DNA fragments was due to the
(A) amount of radioactivity in the samples
(B) degree to which the samples were negatively charged
(C) degree to which the samples were positively charged
(D) size of the fragments within the samples
(E) polarity of the samples

96. Which of the following is true about the DNA samples that were loaded onto the gel?
(A) The DNA strand of sample 2 was originally the longest.
(B) The DNA strand of sample 4 was originally the shortest.
(C) Samples 2 and 4 are the same DNA sample.
(D) Sample 2 was cut at more restriction sites than was sample 4.
(E) Sample 4 was cut at more restriction sites than was sample 2.

97. What was the purpose in radioactively labeling the DNA fragments in this experiment?
(A) To visualize them
(B) To make them travel through the gel
(C) To hydrolyze them into fragments
(D) To get rid of contaminants
(E) To destroy their polarity

Questions 98–100 refer to an experiment in which there is an initial setup of a U-tube with its two sides separated by a membrane that permits the passage of water and NaCl but not molecules of glucose. The U-tube is filled on one side with a solution of 0.4 M glucose and 0.5 M NaCl, and on the other, 0.8 M glucose and 0.4 M NaCl.



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98. When this U-tube was set up, at time = 0 in the experiment, which of the following was true?
    (A) The solution on side A was more concentrated than the solution on side B.
    (B) The solution on side B was more concentrated than the solution on side A.
    (C) The two solutions had equal concentration.
    (D) There was more salt on side B than on side A.
    (E) There was more glucose on side A than on side B.

99. Which of the following is most likely to occur after two hours of the U-tube being undisturbed? (Assume that both sides are at atmospheric pressure.)
    (A) The water levels of sides A and B will remain the same.
    (B) The amount of NaCl on side B will have increased.
    (C) The amount of NaCl on side A will have increased.
    (D) The amount of glucose on side B will have increased.
    (E) The amount of glucose on side A will have increased.

100. After two hours, which of the following would probably be true of the level of water on each side of the U-tube?
    (A) There would be no change in the water levels on either side of the U-tube.
    (B) The water column in side A would be slightly higher.
    (C) The water column in side B would be slightly higher.
    (D) The water columns on both sides would be slightly lower.
    (E) The water columns on both sides would be slightly higher.

Biology
Section II

Time—10 minutes to plan responses; 1 hour and 30 minutes for writing

Answer all questions. Number your answer as the question is numbered below.

Answers must be in essay form. Outline form is NOT acceptable. Labeled diagrams may be used to supplement discussion, but in no case will a diagram alone suffice. It is important that you read each question completely before you begin to write. After reading the questions thoroughly, allow yourself 10 minutes to organize your thoughts and plan your responses.

1. Birth control pills are chemical contraceptives that are made up of estrogen and progestin (which is a progesterone-like substance). They act through a negative feedback loop to stop the secretion of GnRH by the hypothalamus, and of FSH and LH by the pituitary.
   (a) **Explain** how a negative feedback loop works.
   (b) **Explain** how the effects of the birth control pill described above make pregnancy highly unlikely when taken as prescribed.

2. Gene expression in a cell is influenced by a variety of factors. Not all genes on the eukaryotic chromosome are expressed, and in fact, only a small fraction of the genes are transcribed into working proteins.
   (a) **Discuss** three ways in which gene control works in the cell.
   (b) **Describe** three laboratory procedures you could employ in order to determine how much transcription and translation is going on in a cell at a given time.

3. It has been determined that, evolutionarily, the closest relative of humans is the chimpanzee. Other somewhat close relatives are the gibbon and the orangutan.
   (a) **Describe** the relationships among these four species—taxonomically and through phylogeny.
   (b) **Describe** three kinds of evidence that were used to determine the relationship among these four species.
   (c) **Describe** the general structure of the ancestor of *Homo sapiens*, relative to that of other anthropoids.

4. A flowering plant in a ceramic pot is placed in a window that has light shining through most of the day, and it is given adequate water and soil nutrients.
   (a) **Describe** the daily and nightly events in the plant's metabolism.
   (b) **Describe** the changes in the plant that would be induced by rotating the plant 180°.

END OF EXAMINATION

KEY – AP PRACTICE TEST #1 – Multiple Choice

1) D	26) D	51) B	76) A
2) A	27) D	52) B	77) B
3) C	28) D	53) C	78) D
4) B	29) B	54) D	79) A
5) D	30) A	55) C	80) E
6) B	31) D	56) B	81) B
7) A	32) A	57) A	82) C
8) D	33) B	58) C	83) D
9) E	34) C	59) B	84) C
10) E	35) D	60) E	85) D
11) D	36) B	61) D	86) B
12) B	37) E	62) B	87) D
13) A	38) D	63) A	88) D
14) D	39) A	64) D	89) A
15) E	40) B	65) C	90) B
16) C	41) D	66) C	91) C
17) A	42) D	67) D	92) A
18) B	43) D	68) E	93) C
19) C	44) E	69) A	94) B
20) D	45) D	70) D	95) D
21) E	46) C	71) E	96) D
22) D	47) B	72) C	97) A
23) C	48) C	73) B	98) B
24) B	49) C	74) E	99) B
25) A	50) D	75) C	100) C