

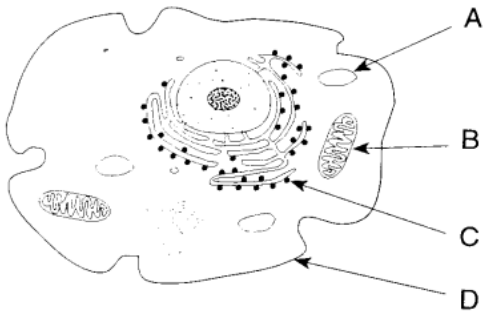
**Biology Review**

Biology Review

1) Which structure is most directly responsible for maintaining homeostasis in all cells?

- (a) chloroplast
- (b) cell membrane
- (c) centriole
- (d) cell wall

2) Which letter in the diagram below indicates the structure that is most closely associated with excretion?



- (a) A
- (b) B
- (c) C
- (d) D

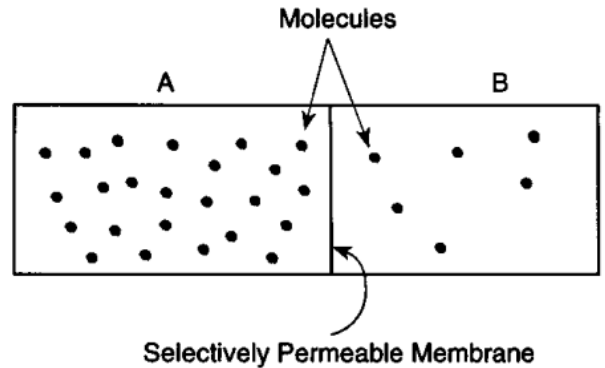
3) The diagram below represents a unicellular organism



This organism is able to survive without a specialized respiratory system because

- (a) it possesses a nucleus that controls the synthesis of respiratory enzymes
- (b) its vacuoles release oxygen from stored nutrients
- (c) its respiratory surface is in direct contact with a watery environment
- (d) it possesses chloroplasts that produce oxygen when exposed to sunlight

4) The diagram below shows the same type of molecules in area A and area B. With the passage of time, some molecules move from area A to area B.



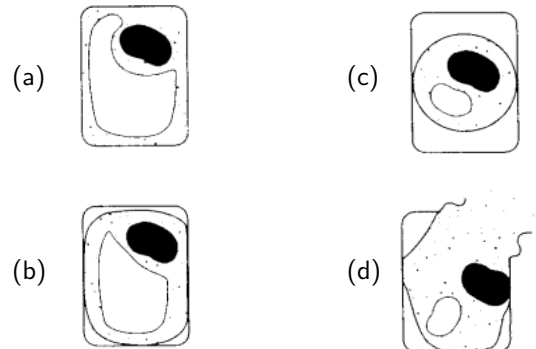
This movement is the result of the process of

- (a) phagocytosis
- (b) pinocytosis
- (c) diffusion
- (d) cyclosis

5) A student using a compound light microscope to study plant cells observed that most of the cells resembled the diagram shown below.



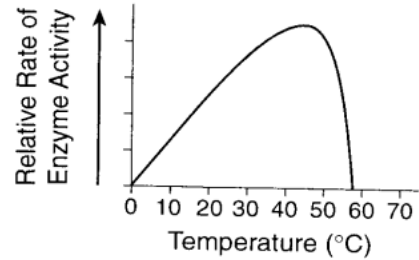
Which diagram best illustrates how these plant cells will appear after they are placed in a solution having a lower water concentration than the cells have?



6) Which statement about enzymes is *not* correct?

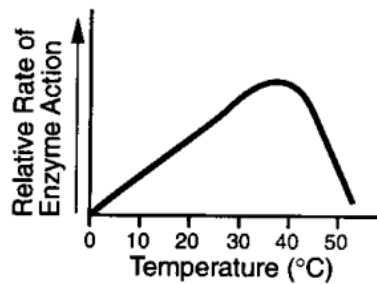
- (a) Enzymes are composed of polypeptide chains.
- (b) Enzymes form a temporary association with a reactant.
- (c) Enzymes are destroyed when they are used and must be synthesized for each reaction.
- (d) Enzymes are specific because of their shape and catalyze only certain reactions.

7) Which statement is a valid conclusion based on the information in the graph below?

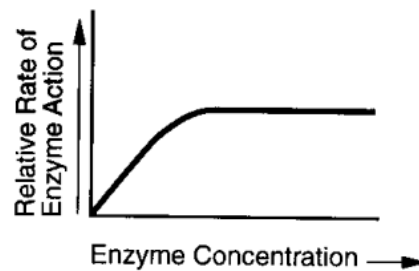


- (a) The maximum rate of human digestion occurs at about 45°C.
- (b) The maximum rate of human respiration occurs at about 57°C.
- (c) Temperature can influence the action of an enzyme.
- (d) Growth can be controlled by enzyme action.

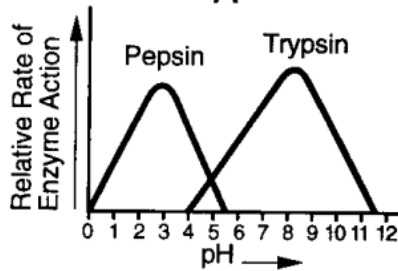
For questions 8-9



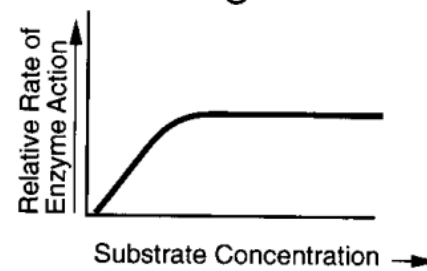
A



C



B



D

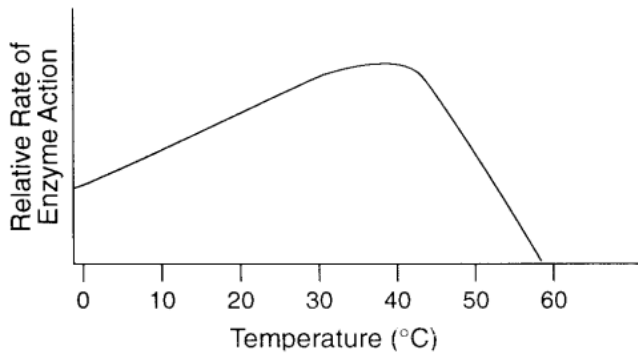
8) Human enzymes would most likely begin to denature at a

- (a) temperature of 40°C
- (b) temperature of 23°C
- (c) pH of 3
- (d) pH of 2

9) Certain enzymes work best within an acidic or a basic environment. This concept is illustrated in graph

- (a) A
- (b) B
- (c) C
- (d) D

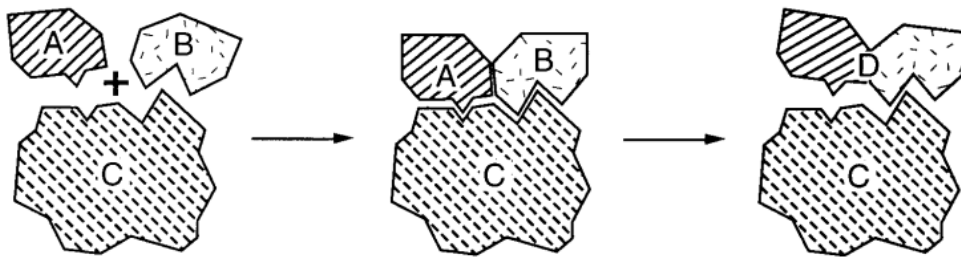
10) The effect of temperature on the relative rate of action of an enzyme is represented in the graph below.



The optimum temperature for the action of this enzyme is approximately

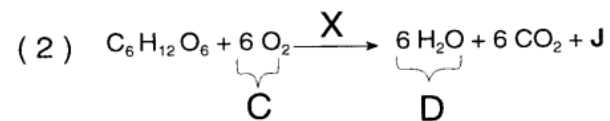
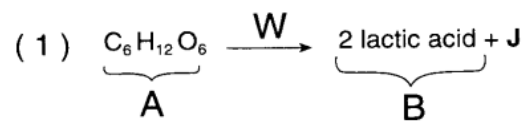
- (a) 15°C                      (c) 37°C  
 (b) 22°C                      (d) 50°C

11) Which concept is illustrated by the reaction shown in the diagram below?



- (a) protein hydrolysis                      (c) active transport  
 (b) enzyme specificity                      (d) polypeptide ingestion

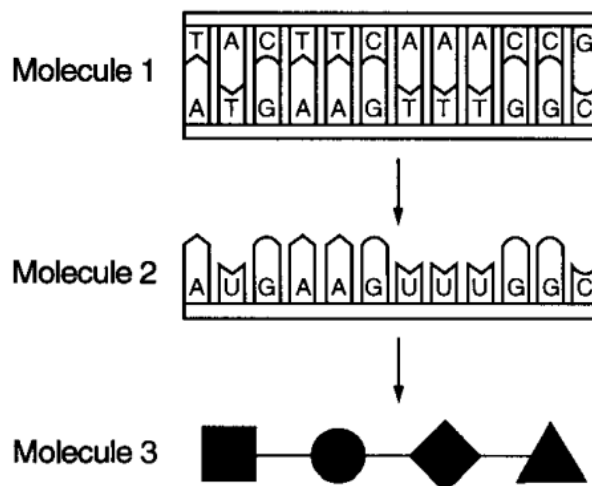
For question 12



12) The enzymes needed for these chemical reactions are indicated by letters

- (a) W and X                      (c) B and D  
 (b) A and C                      (d) B and C

For questions 13-15



13) In plant cells, molecule 1 is found in the

- (a) centriole
- (b) nucleus
- (c) cell wall
- (d) lysosome

14) Where do the chemical reactions that are coded for by molecule 2 take place?

- (a) in the vacuole
- (b) on the plasma membrane
- (c) in the lysosome
- (d) at ribosomes

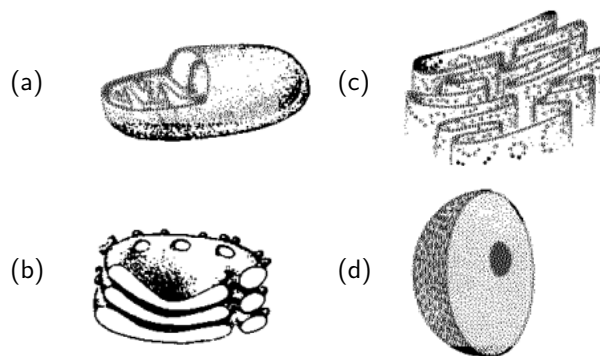
15) The building blocks of molecule 3 are known as

- (a) amino acids
- (b) DNA molecules
- (c) fatty acids
- (d) RNA molecules

16) Transport of molecules within animal cells is assisted by a system of internal membranes that make up the

- (a) endoplasmic reticulum
- (b) mitochondria
- (c) ribosomes
- (d) chloroplast

17) Which diagram represents an organelle that contains the enzymes needed to synthesize ATP in the presence of oxygen?



18) What are the end products of the hydrolysis of a polysaccharide?

- (a) simple sugars
- (b) amino acids
- (c) fatty acids
- (d) nucleotides

19) In which process are simple materials chemically combined to form more complex materials?

- (a) synthesis
- (b) pinocytosis
- (c) hydrolysis
- (d) cyclosis

**20)** Glucose molecules that are produced by green plants can be

- (a) converted into starch by dehydration synthesis and stored in roots
- (b) converted into cellulose by hydrolysis and stored in leaves
- (c) used as catalysts for metabolic activity
- (d) used as a raw material for photosynthesis

**21)** Which organic compound is produced when three fatty acid molecules bond to one glycerol molecule?

- (a) glycogen
- (b) ATP
- (c) PGAL
- (d) a lipid

**22)** In plants, a storage product that results from the dehydration synthesis of many glucose molecules is

- (a) protein
- (b) a phosphate
- (c) an oil
- (d) starch

**23)** Which molecule is correctly paired with its building blocks?

- (a) cellulose – polypeptides
- (b) DNA – nucleotides
- (c) protein – monosaccharides
- (d) fat – disaccharides

**24)** Hemoglobin, insulin, albumin, and maltase, which are composed of chains of amino acids, are examples of

- (a) proteins
- (b) carbohydrates
- (c) lipids
- (d) nucleic acids

**25)** In a human, what is the ratio of the normal chromosome number in a nucleus produced by mitosis to the normal chromosome number in a nucleus produced by meiosis?

- (a) 1:1
- (b) 2:1
- (c) 3:1
- (d) 4:1

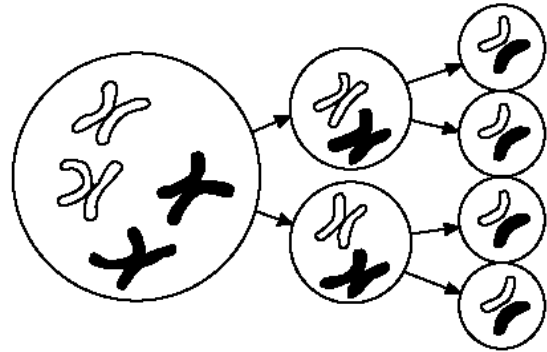
**26)** In which process is the pairing of homologous chromosomes followed by the disjunction of these chromosome pairs?

- (a) binary fission
- (b) budding
- (c) meiosis
- (d) fertilization

**27)** The process of meiotic cell division in a human male usually forms

- (a) one diploid cell, only
- (b) four diploid cells
- (c) one monoploid cell, only
- (d) four monoploid cells

**28)** The distribution of chromosomes in one type of cell division is shown in the diagram below.



Which process is represented in the diagram?

- (a) asexual reproduction
- (b) meiosis
- (c) mitosis
- (d) vegetative propagation

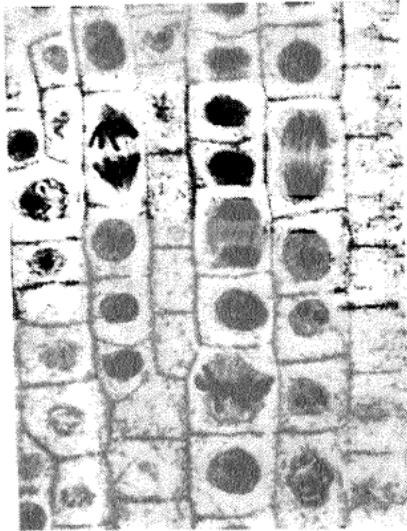
**29)** A normal body cell of a fruit fly contains eight chromosomes. Each normal gamete of this organism contains only four chromosomes, as a result of the process of

- (a) binary fission
- (b) vegetative propagation
- (c) germination
- (d) meiosis

30) The production of monoploid cells by spermatogenesis occurs in

- (a) ovaries
- (b) meristems
- (c) zygotes
- (d) testes

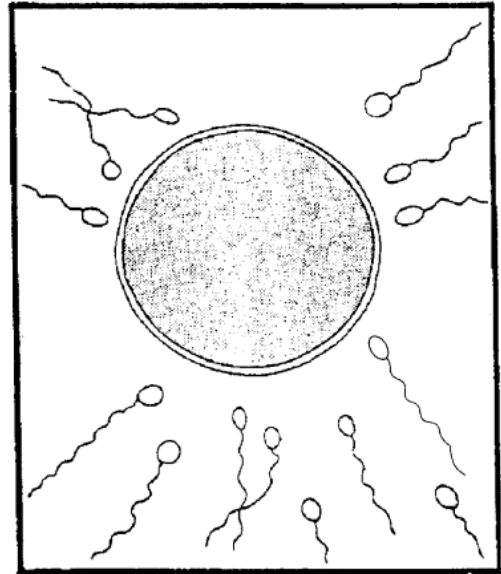
31) A photomicrograph of cells involved in various stages of nuclear division is shown below.



Which title is most appropriate for this photo-micrograph?

- (a) Mitosis in an Onion Root Tip
- (b) Cell Division in Human Blood Cells
- (c) Meiosis in Male Gametes
- (d) Gametogenesis in Yeast Cells

32)



Which statement concerning all of the cells shown in the diagram is correct?

- (a) They contain the same amount of cytoplasm.
- (b) They normally contain the monoploid number of chromosomes.
- (c) They were formed by the process of mitosis.
- (d) They were formed by asexual reproduction.

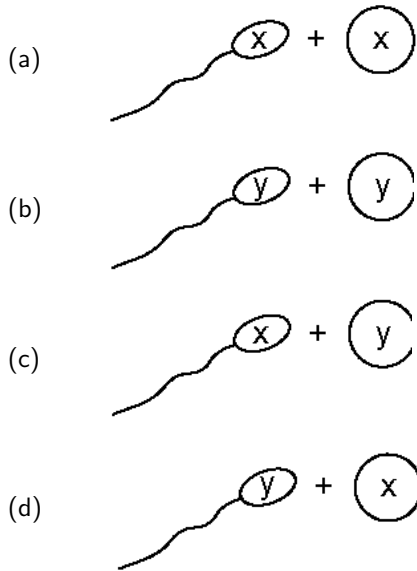
33) What are the normal chromosome numbers of a sperm, egg, and zygote, respectively?

- (a) monoploid, monoploid, and monoploid
- (b) monoploid, diploid, and diploid
- (c) diploid, diploid, and diploid
- (d) monoploid, monoploid, and diploid

34) Sperm cells of the Russian dwarf hamster, *Phodopus sungorus*, contain 14 chromosomes. What is the total number of chromosomes that would be contained in a normal, newly formed zygote of this species?

- (a) 7
- (b) 14
- (c) 28
- (d) 42

35) Which diagram correctly illustrates the fusion of normal gametes that will most likely produce a human male?



36) Identical twins develop from

- (a) one egg, fertilized by one sperm cell
- (b) one egg, fertilized by two separate sperm cells
- (c) two eggs, both fertilized by the same sperm cell
- (d) two eggs, each fertilized by a separate sperm cell

37) In humans, the gene for polydactyly (having extra fingers or toes) is dominant over the gene for the normal number of digits. If parents who are both homozygous dominant for polydactyly have four children, how many of these children would most likely have extra fingers or toes?

- (a) 0
- (b) 2
- (c) 3
- (d) 4

38) A cross between two plants that have pink flowers produced plants that have red, pink, or white flowers. Which is the most likely explanation for these results?

- (a) Intermediate inheritance involved alleles that were not clearly dominant or recessive.
- (b) Mutations occurred during gametogenesis.
- (c) Crossing-over of white and red alleles occurred during meiosis.
- (d) Nondisjunction of homologous pairs of chromosomes resulted in the production of abnormal offspring.

39) In a certain variety of chicken, the genes for black feather color and the genes for white feather color are codominant. This variety of chicken will most likely have

- (a) three possible phenotypes for feather color
- (b) white feather color, only
- (c) only two genotypes for feather color
- (d) black feather color, only

40) In fruit flies, red eye color (R) is dominant and white eye color (r) is recessive. The allele for eye color is carried on the X-chromosome. Which cross would most likely produce 50% white-eyed males and 50% red-eyed males?

- (a)  $X^R X^R \times X^R Y$
- (b)  $X^R X^R \times X^r Y$
- (c)  $X^R X^r \times X^r Y$
- (d)  $X^r X^r \times X^R Y$

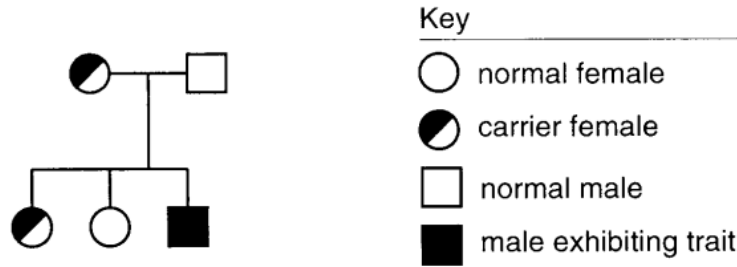
41) The gene for tallness (T) is dominant over the gene for shortness (t) in pea plants. A homozygous dominant pea plant is crossed with a heterozygous pea plant, and 200 seeds are produced. Approximately how many of these seeds can be expected to produce plants that are homozygous dominant?

- (a) 0
- (b) 50
- (c) 100
- (d) 200

42) Genes carried only on an X-chromosome are said to be

- (a) hybrid
- (b) codominant
- (c) autosomal
- (d) sex-linked

43) The pedigree chart below shows the pattern of inheritance for a sex-linked trait.



If this couple has another son, what is the probability that he will exhibit this sex-linked trait?

- (a) 0%
- (b) 25%
- (c) 50%
- (d) 100%

44) In many breeds of cattle, the polled condition (absence of horns) is dominant over the presence of horns, and homozygous red coat color crossed with homozygous white coat color produces roan. Which cross will produce only horned roan offspring?

- (a) polled red x horned white
- (b) horned roan x horned roan
- (c) horned red x horned white
- (d) polled roan x horned roan

45) In a certain species of mouse, gray fur (G) is dominant over cream-colored fur (g). If a homozygous gray mouse is crossed with a cream-colored mouse, the genotype of the F<sub>1</sub> generation will most likely be

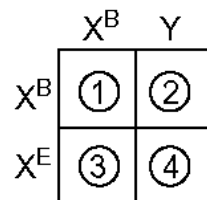
- (a) 100% Gg
- (b) 50% GG and 50% gg
- (c) 25% GG, 50% Gg, and 25% gg
- (d) 75% Gg and 25% gg

46) Which cross could produce a child with type O blood?

- (a)  $I^A i \times I^B I^B$
- (b)  $I^A I^A \times I^B i$
- (c)  $I^A I^B \times ii$
- (d)  $I^A i \times I^B i$

For question 47

In cats, gene *E* produces yellow fur and gene *B* produces black fur. A cat that inherits both of these genes has patches of yellow and black fur and is known as a calico. The alleles for black or yellow are located on the X-chromosome. The cross  $X^B Y \times X^B X^E$  is illustrated in the square below.



47) Calico coat color is most likely due to

- (a) codominant autosomal genes
- (b) codominant sex-linked genes
- (c) recessive autosomal genes
- (d) recessive sex-linked genes

48) *F* represents the gene for brown coat color and *f* represents the gene for white coat color. In the cross  $FF \times ff$ , all the offspring have a brown coat. Which genetic principle is illustrated by this cross?

- (a) crossing-over
- (b) multiple alleles
- (c) codominance
- (d) dominance

**49)** The genes for red hair and freckles are usually inherited together because these genes are

- (a) homologous
- (b) sorted independently
- (c) linked
- (d) hybrid traits

**50)** The principles of dominance, segregation, and independent assortment were first described by

- (a) Watson
- (b) Linnaeus
- (c) Mendel
- (d) Morgan

**51)** Using the results of his experiments with pea plant crosses, Gregor Mendel discovered

- (a) the principles of dominance, segregation, and independent assortment
- (b) that pea plants develop mutations after exposure to radiation
- (c) intermediate inheritance and gene linkage
- (d) that DNA is involved in the inheritance of dominant traits

**52)** Which statement describes the work of Gregor Mendel?

- (a) He developed some basic principles of heredity without having knowledge of chromosomes.
- (b) He explained the principle of dominance on the basis of the gene-chromosome theory.
- (c) He developed the microscope for the study of genes in pea plants.
- (d) He used his knowledge of gene mutations to help explain the appearance of new traits in organisms.

**53)** In guinea pigs, black fur (B) is dominant over white fur (b) and rough fur (R) is dominant over smooth for (r). A cross between two guinea pigs hybrid for both traits (BbRr × BbRr) produces some offspring that have rough, black fur and some that have smooth, black fur. The genotypes of these offspring illustrate the genetic concept of

- (a) intermediate inheritance
- (b) independent assortment
- (c) multiple alleles
- (d) codominance

**54)** Gregor Mendel developed heredity principles from his

- (a) mathematical analysis of the results of pea plant crosses
- (b) working model of the structure of DNA
- (c) mapping of the locations of human genes on chromosomes
- (d) extensive study of breeding *Drosophila*

**55)** In a certain type of plant, tall is dominant over short, and green seed coat is dominant over yellow seed coat. When two plants heterozygous for both of these traits are crossed, the offspring produced are tall, with green seed coats; tall, with yellow seed coats; short, with green seed coats; and short, with yellow seed coats. The results of this cross illustrate

- (a) vegetative propagation
- (b) mutagenic agents
- (c) intermediate inheritance
- (d) independent assortment

**56)** Which cell organelle is most directly involved with the bonding of amino acids?

- (a) mitochondrion
- (b) endoplasmic reticulum
- (c) cell wall
- (d) ribosome

**57)** One similarity between DNA and messenger RNA molecules is that they both contain

- (a) the same sugar
- (b) genetic codes based on sequences of bases
- (c) a nitrogenous base known as uracil
- (d) double-stranded polymers

**58)** What would most likely happen if the ribosomes in a cell were not functioning?

- (a) The cell would undergo uncontrolled mitotic cell division.
- (b) The synthesis of enzymes would stop.
- (c) The cell would produce antibodies.
- (d) The rate of transport of glucose in the cytoplasm would increase.

59) The code of a gene is delivered to the enzyme-producing region of a cell by a

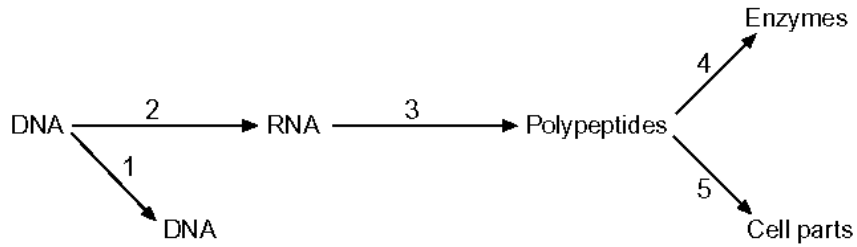
- (a) hormone
- (b) nerve impulse
- (c) messenger RNA molecule
- (d) DNA molecule

60) What is the complementary messenger-RNA sequence for the DNA sequence shown below?

C A A G G T  
| | | | |

- (a) C-A-A-G-G-U
- (b) G-T-T-C-C-A
- (c) G-U-U-C-C-A
- (d) C-A-A-G-G-T

For questions 61-63



61) Which processes occur in the nucleus?

- (a) 1 and 2
- (b) 2 and 3
- (c) 3 and 4
- (d) 4 and 5

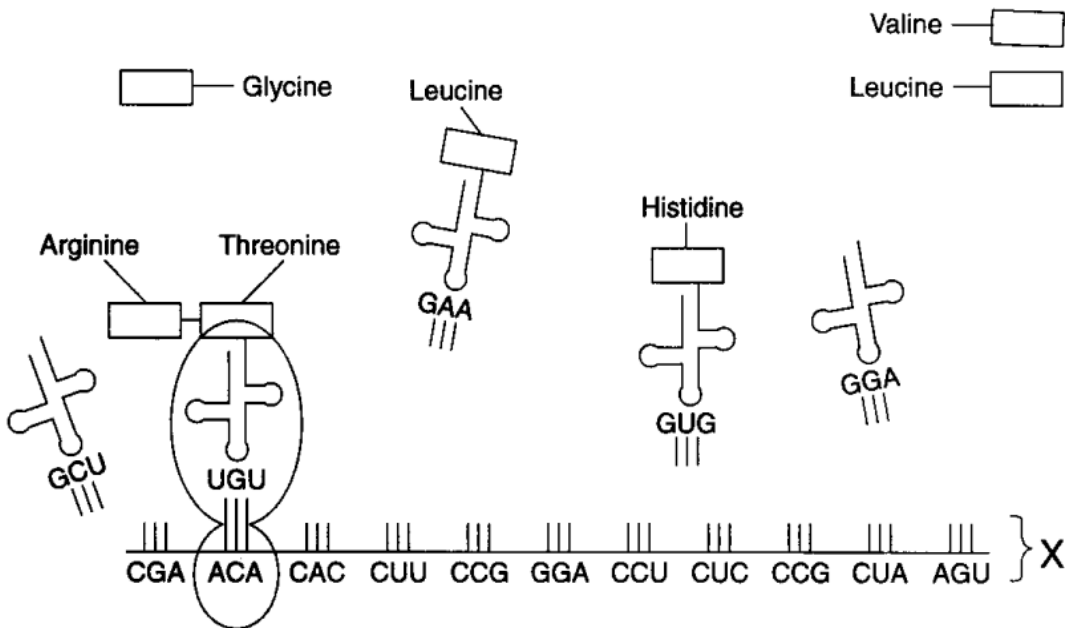
63) What is the product of process 3?

- (a) a strand of DNA
- (b) two complementary strands of DNA
- (c) a strand of RNA
- (d) a chain of amino acids

62) Process 1 is known as

- (a) replication
- (b) mutation
- (c) nondisjunction
- (d) translocation

For questions 64-66



64) The synthesis of structure X occurred in the

- (a) nucleus
- (b) cytoplasm
- (c) lysosome
- (d) vacuole

**65)** The biochemical process represented in the diagram is most closely associated with the cell organelle known as the

- (a) nucleolus
- (b) ribosome
- (c) chloroplast
- (d) mitochondrion

**66)** Which amino acid would be transferred to the position of codon CAC?

- (a) leucine
- (b) glycine
- (c) valine
- (d) histidine

**67)** Four stages in the production of protein molecules in a cell are listed below.

A – Transfer RNA molecules bring amino acids to the ribosome.

B – DNA molecules serve as templates for messenger RNA molecules.

C – Messenger RNA molecules move to ribosomes.

D – Polypeptides are formed as ribosomes. Which sequence best represents the correct order of these stages?

- (a) A → B → C → D
- (b) B → C → A → D
- (c) C → B → A → D
- (d) D → B → A → C

**68)** If a portion of a messenger RNA molecule contains the base sequence A - A - U, the corresponding transfer RNA base sequence is

- (a) A-A-U
- (b) G-G-T
- (c) T-T-C
- (d) U-U-A

For questions 69-70

**Messenger RNA (mRNA) Codes for Selected Amino Acids**

Amino Acid	mRNA Code
Leucine	C-C-A
Arginine	C-G-A
Phenylalanine	U-U-U
Valine	G-U-U
Lysine	A-A-A

**69)** Which base sequence of a DNA molecule produces a codon on an mRNA molecule that will allow the amino acid arginine to be incorporated into a protein?

- (a) C-G-A
- (b) G-C-T
- (c) C-G-U
- (d) G-C-U

**70)** Which amino acid will be carried to a ribosome by a transfer RNA molecule containing the triplet code A-A-A?

- (a) valine
- (b) lysine
- (c) leucine
- (d) phenylalanine

**71)** A single change in the sequence of nitrogenous bases in a DNA molecule would most likely result in

- (a) crossing-over
- (b) polyploidy
- (c) nondisjunction of chromosomes
- (d) a gene mutation

**72)** Some weed killers, insecticides, and food additives alter the DNA of certain cells. Because of this effect, these substances are known as

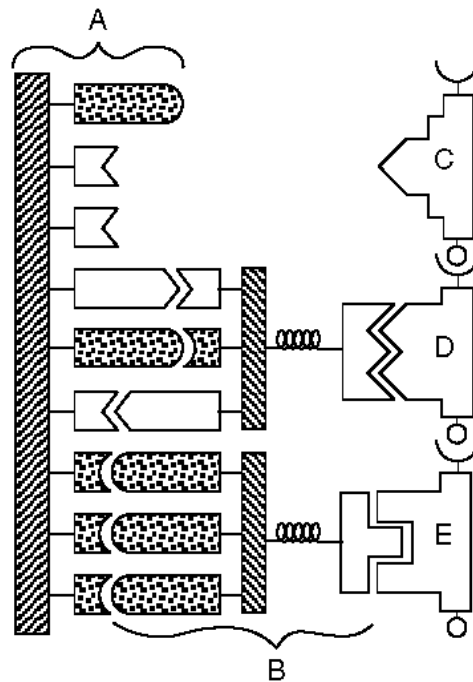
- (a) auxins
- (b) mutagens
- (c) meristems
- (d) autosomes

**73)** In a species of plant, the sudden appearance of one plant with a different leaf structure would most likely be the result of

- (a) stable gene frequencies
- (b) chromosomal mutations
- (c) slow environmental changes
- (d) asexual reproduction

For question 74

The diagram below, represents some components involved in cellular protein synthesis, and on your knowledge of biology.



**74)** The type of molecule represented at A is synthesized according to a template found in

- (a) DNA
- (b) RNA
- (c) dipeptides
- (d) amino acids

**76)** Which base is normally used in the synthesis of RNA but *not* in the synthesis of DNA?

- (a) adenine
- (b) uracil
- (c) cytosine
- (d) guanine

**75)** A DNA nucleotide may contain

- (a) deoxyribose, cytosine, and a lipid
- (b) deoxyribose, thymine, and a phosphate group
- (c) ribose, uracil, and a polypeptide
- (d) ribose, adenine, and thymine

**77)** DNA is a polymer consisting of repeating units known as

- (a) dipeptides
- (b) nucleotides
- (c) amino acids
- (d) organic salts

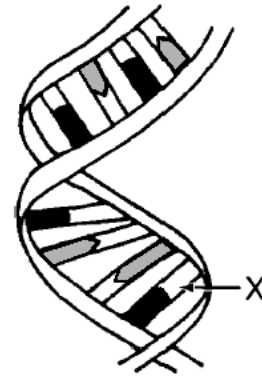
**78)** Which components of DNA are held together by weak hydrogen bonds?

- (a) phosphate and adenine
- (b) phosphate and deoxyribose
- (c) thymine and deoxyribose
- (d) cytosine and guanine

**79)** A molecule of DNA is a polymer composed of

- (a) glucose
- (b) amino acids
- (c) fatty acids
- (d) nucleotides

**80)** The diagram below represents a portion of a nucleic acid molecule.

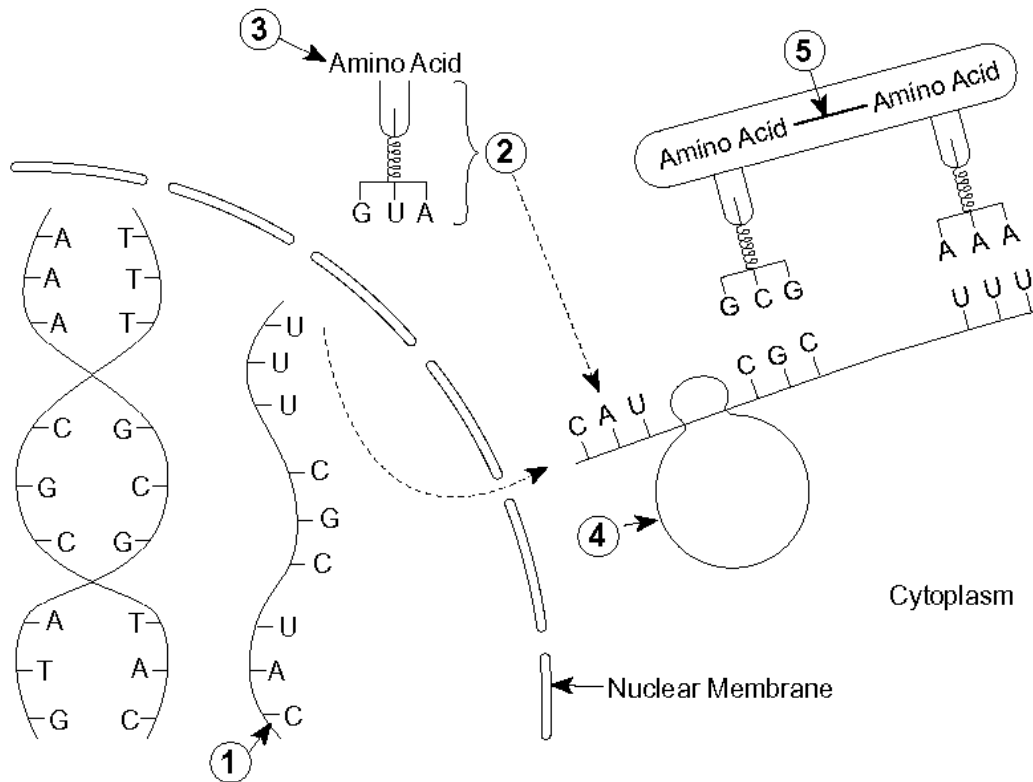


The part indicated by arrow X could be

- (a) adenine
- (b) ribose
- (c) deoxyribose
- (d) phosphate

For questions 81-82

The diagram below represents some biochemical reactions involved in a cellular process.



**81)** The molecule coded directly from DNA is represented by number

- (a) 1
- (b) 2
- (c) 3
- (d) 4

**82)** What is an example of a molecule produced by this type of process?

- (a) glucose
- (b) glycogen
- (c) a fatty acid
- (d) a protein

**83)** Which concept provides an explanation for the process by which cellular activities are indirectly controlled by the nucleus?

- (a) one gene-one polypeptide hypothesis
- (b) fluid-mosaic model
- (c) theory of evolution
- (d) heterotroph hypothesis

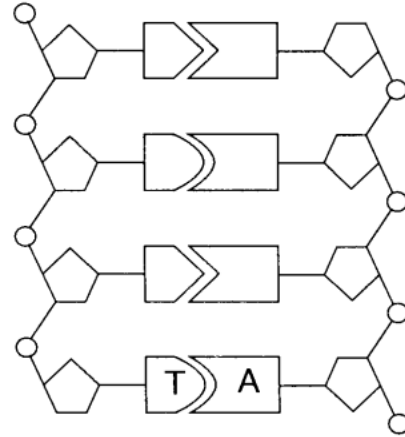
**84)** The diagram below represents Watson and Crick's model of DNA.



The substance indicated by the arrow could be

- (a) thymine
  - (b) deoxyribose
  - (c) ribose
  - (d) uracil
- 85)** The nitrogen bases found in DNA are represented by the letters
- (a) A,U,G,and C
  - (b) A,T,G,and C
  - (c) T,A,P,and C
  - (d) T,U,G, and C

**86)** Which statement best describes a portion of the molecule represented below?



- (a) It consists of many ribose sugars.
- (b) It unites with amino acids in the cytoplasm.
- (c) It contains uracil, which functions in protein synthesis.
- (d) It consists of alternating phosphate groups and deoxyribose molecules.

**87)** In a portion of a gene, the nitrogenous base sequence is T-C-G-A-A-T. Which nitrogenous base sequence would normally be found bonded to this section of the gene?

- (a) A-C-G-T-A-A
- (b) A-C-G-U-U-A
- (c) A-G-C-T-T-A
- (d) U-G-C-A-A-U

**88)** In 1994, a new tomato variety that ripens slowly was developed by a laboratory technique that did not involve methods of natural reproduction. This new variety contains a section of a DNA molecule not found in the tomato from which it was originally developed. Which technique was most likely used to develop this new variety of tomato?

- (a) amniocentesis
- (b) cross-pollination
- (c) genetic engineering
- (d) karyotyping

For question 89

Some geneticists are suggesting the possibility of transferring some of the genes that influence photosynthesis from an efficient variety of crop plant to a less efficient crop plant to produce a new variety with improved productivity.

**89)** Which technique would most likely be used to produce large numbers of genetically identical offspring from this new variety of plant?

- (a) cloning
- (b) karyotyping
- (c) cross-pollination
- (d) chromatography

**90)** Which process could be used by breeders to develop tomatoes with a longer shelf life and to develop cows with increased milk production?

- (a) natural selection
- (b) sporulation
- (c) genetic engineering
- (d) chromatography

**91)** Recombinant DNA is presently used in the biotechnology industry to

- (a) eliminate all infectious disease in livestock
- (b) synthesize insulin, interferon, and human growth hormone
- (c) increase the frequency of fertilization
- (d) create populations that exhibit incomplete dominance

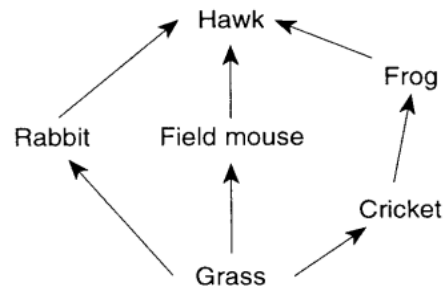
**92)** Which statement concerning an organism produced by cloning is correct?

- (a) The clone is genetically identical to its parent.
- (b) The clone has the combined genes of both of its parents.
- (c) The genotype of the clone will be somewhat different from that of its parent.
- (d) The phenotype of the clone will be entirely different from that of its parents.

**93)** Hawks and owls living in the same area compete for the same type of mouse for food. Which situation would lead to the greatest problem in food supply?

- (a) an increase in the owl population
- (b) an increase in the mouse population
- (c) a decrease in the hawk population
- (d) a decrease in the owl population

**94)** A food web is shown in the diagram below.



Which statement best describes a direct result of a decrease in the rabbit population due to disease?

- (a) The hawk population will increase.
- (b) The grass population will increase.
- (c) The cricket population will decrease.
- (d) The frog population will be eliminated.

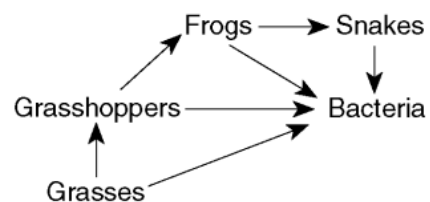
**95)** By which process is the potential energy of organic molecules transferred to a form of energy that is usable by the cells?

- (a) digestion
- (b) hydrolysis
- (c) photosynthesis
- (d) respiration

**96)** A metabolic waste of algae that can be recycled for use in cellular respiration is

- (a) sodium
- (b) organic acid
- (c) carbon dioxide
- (d) oxygen

**97)** A food web is shown below.



Which organisms are necessary for the recycling of nitrogen?

- (a) frogs
- (b) grasshoppers
- (c) snakes
- (d) bacteria

**98)** One type of anaerobic respiration results in the production of

- (a) water and oxygen
- (b) pyruvic acid and glycerol
- (c) nitrogen gas and ammonia
- (d) alcohol and carbon dioxide

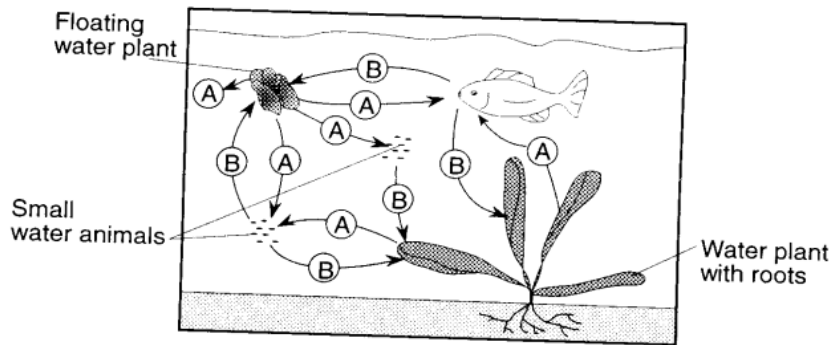
**100)** To collect data about the rate of photosynthesis in a certain type of algae when it is exposed to different colors of light, a student could measure the change in the

- (a) temperature of the water surrounding the algae
- (b) number of ribosomes in the algae cells
- (c) color of algae cells
- (d) number of gas bubbles given off by the algae

**99)** The action of decomposers in the nitrogen cycle most directly aids in the

- (a) synthesis of proteins from nitrates
- (b) removal of nitrogen compounds from the atmosphere
- (c) restoration of nitrogen compounds to the soil
- (d) fixation of atmospheric nitrogen

**101)** The diagram below shows an example of interdependence among aquatic organisms. During the day, organisms either use or give off substance A or B, as shown by the arrows.



Which substances are represented by A and B?

- (a) A represents oxygen and B represents carbon dioxide.
- (b) A represents oxygen and B represents carbohydrates.
- (c) A represents nitrogen and B represents carbon dioxide.
- (d) A represents carbon dioxide and B represents oxygen.

**102)** The chart below lists four groups of factors relating to an ecosystem.

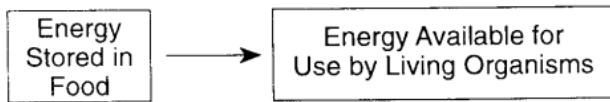
Group A	Group B	Group C	Group D
Sunlight Green plants Rainfall Consumers Oxygen	Sunlight Climate Rainfall Minerals Gases	Sunlight Green plants Rainfall Producers Carbon dioxide	Sunlight Rainfall Consumers Producers Water

Which group contains only abiotic factors?

- (a) A
- (b) B
- (c) C
- (d) D

- 103)** A student measured some abiotic factors present in an aquarium in a biology laboratory. Which data did the student most likely record?
- (a) the weight and color of each type of scavenger
  - (b) the number of each type of green plant and each type of snail
  - (c) the size and number of each species of fish
  - (d) the temperature and oxygen content of the water

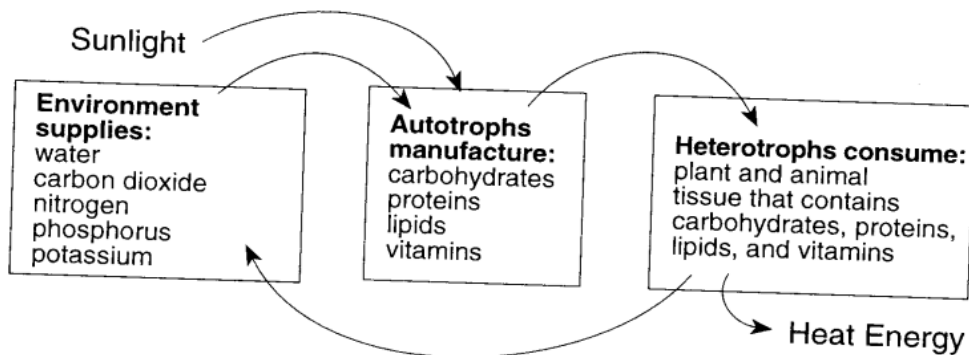
- 104)** Which process is represented by the arrow in the diagram below?



- (a) growth
- (b) respiration
- (c) regulation
- (d) excretion

- 105)** Most of the oxygen gas present in the atmosphere is produced as a result of
- (a) photochemical reactions
  - (b) cellular respiration
  - (c) dehydration synthesis
  - (d) alcoholic fermentation

- 108)** The diagram below provides some information concerning an ecosystem.



- Which title is most appropriate for the diagram?
- (a) Energy Flow and Material Cycles in an Ecosystem
  - (b) Evolution in an Ecosystem
  - (c) Succession in an Ecosystem
  - (d) The Water Cycle in an Ecosystem

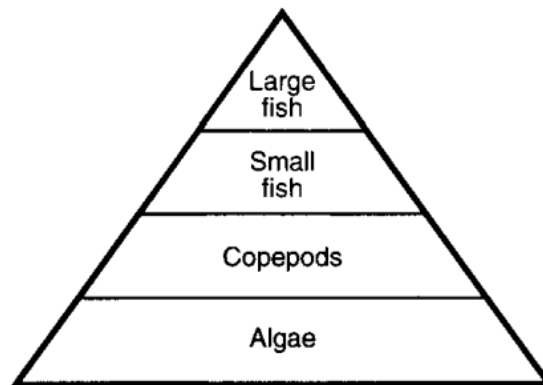
- 106)** Which factor is *not* necessary for an ecosystem to be self-sustaining?
- (a) a constant source of energy
  - (b) living systems that incorporate energy into organic molecules
  - (c) a cycling of materials between organisms and their environment
  - (d) an equal number of producers and consumers

- 107)** Why does each successive feeding level in a pyramid of energy have less biomass?
- (a) Carnivore biomass is less than producer biomass as a result of energy being lost as it flows from producers to carnivores.
  - (b) The primary consumer level contains more stored energy than the producer level.
  - (c) Consumers have more biomass than autotrophs because they must absorb all of the light energy in an ecosystem.
  - (d) Biomass differences in an ecosystem result from competition between producers.

**109)** Energy stored in organic molecules is passed from producers to consumers. This statement best describes an event in

- (a) the process of photosynthesis
- (b) natural selection
- (c) a food chain
- (d) ecological succession

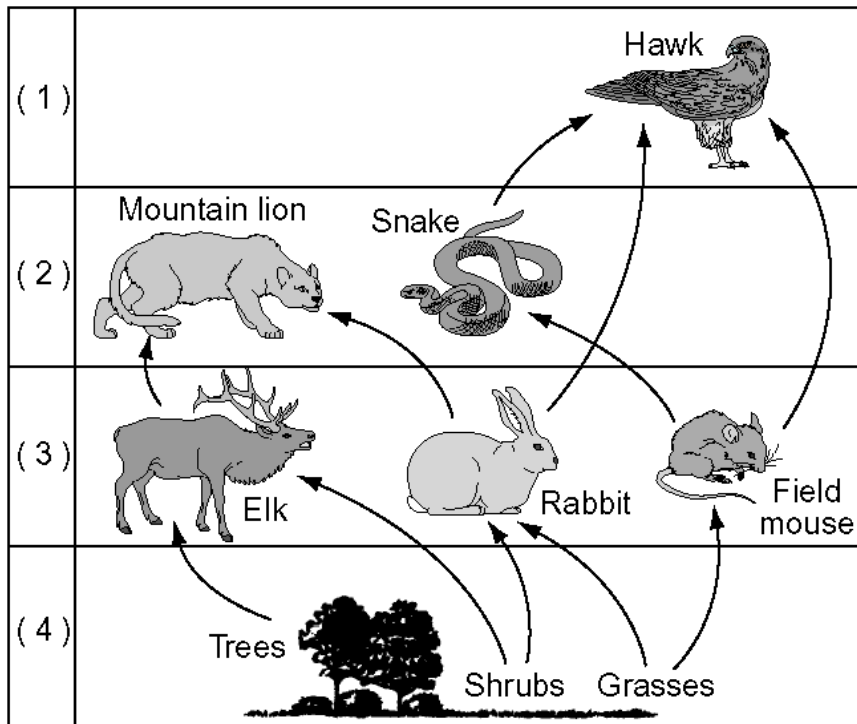
**110)** The diagram below represents a pyramid of biomass in an aquatic environment.



Which statement best explains why mass decreases from one level to the next in this pyramid?

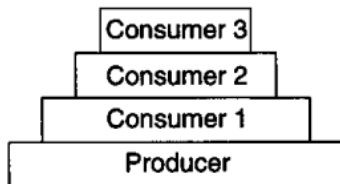
- (a) More organisms die at higher levels than at lower levels, resulting in less mass at higher levels.
- (b) When organisms die at higher levels, their remains sink to lower levels, increasing the mass at lower levels.
- (c) Energy is lost to the environment at each level, so less mass can be supported at succeeding higher levels.
- (d) Organisms decay at each level, and thus less mass can be supported at succeeding higher levels.

111) In the diagram below, which level of organisms contains the greatest amount of available energy?



- (a) 1
- (b) 2
- (c) 3
- (d) 4

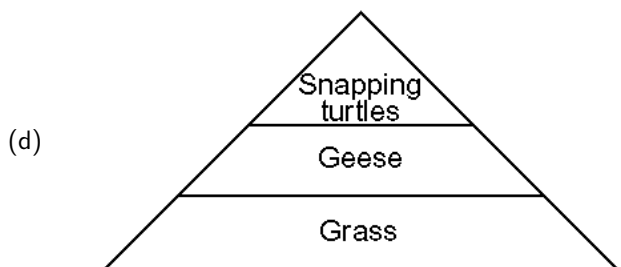
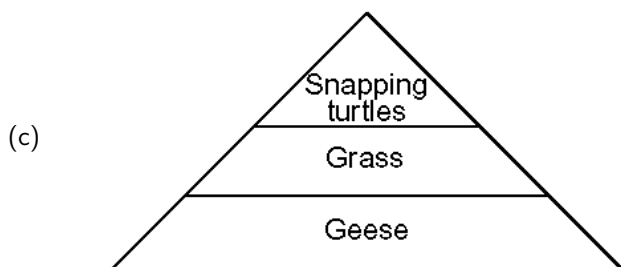
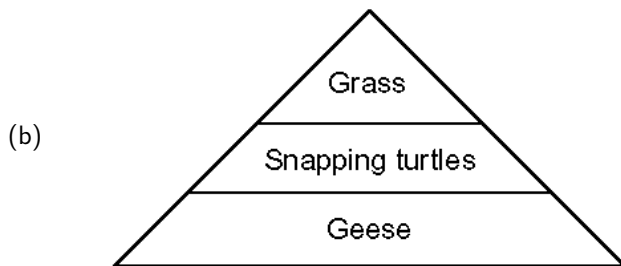
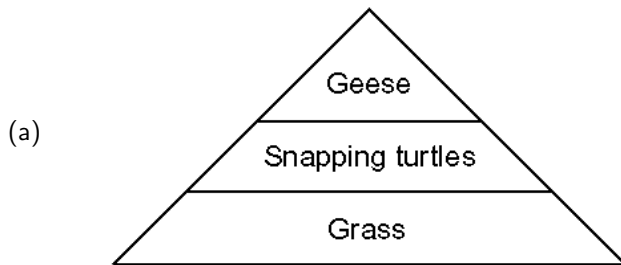
112) The diagram below represents a biomass pyramid.



Which statement concerning the energy in this pyramid correct?

- (a) The producer organisms contain the least amount of stored energy.
- (b) Stored energy decreases from consumer 2 to consumer 3.
- (c) Consumer 3 contains the greatest amount of stored energy.
- (d) Stored energy increases from the producer to consumer 1.

**113)** A student observes a small pond community and notices that many geese are hatched there each spring. The baby geese feed on the grass surrounding the pond. The snapping turtles in the pond feed on the baby geese. Which pyramid of energy correctly illustrates these relationships?



**114)** Variations within a species are most likely the result of

- (a) mutations and sexual reproduction
- (b) synapsis and disjunction
- (c) mitosis and reproduction
- (d) overpopulation and recombination

**115)** Characteristics of a species that make its members better able to live and reproduce in their environment are known as

- (a) favorable adaptations
- (b) homologous structures
- (c) abiotic factors
- (d) biotic factors

**116)** A large population of houseflies was sprayed with a newly developed, fast-acting insecticide. The appearance of some houseflies that are resistant to this insecticide supports the concept that

- (a) species traits tend to remain constant
- (b) biocides cause mutations
- (c) variation exists within a species
- (d) the environment does not change

**117)** A key concept in the modern theory of evolution explains

- (a) how new organs arise according to the needs of an organism
- (b) how variations occur within a species
- (c) the continued increase in the human population
- (d) the presence of asexual reproduction within a species

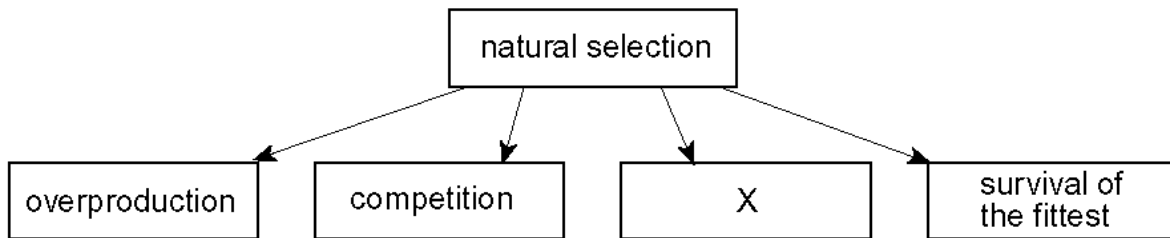
**118)** Differences between the members of a population will most likely be passed to future generations if they are

- (a) due to genetic changes and result in unfavorable variations
- (b) due to genetic changes and result in favorable variations
- (c) not due to genetic changes and result in unfavorable variations
- (d) not due to genetic changes and result in favorable variations

**119)** Darwin's studies of finches on the Galapagos Islands suggest that the finches' differences in beak structure were most directly due to

- (a) acquired characteristics in the parent finches
- (b) the size of the island where the finches live
- (c) mating behaviors of the different finch species
- (d) adaptations of the finches to different environments

**120)** Some of the concepts included in Darwin's theory of natural selection are represented in the diagram below.



Which concept would be correctly placed in box X?

- (a) use and disuse
- (b) variation
- (c) changes in nucleic acids
- (d) transmission of acquired traits

**121)** Although similar in many respects, two species of organisms exhibit differences that make each well adapted to the environment in which it lives. The process of change that may account for these differences is

- (a) evolution
- (b) germination
- (c) regeneration of lost structures
- (d) transmission of homologous structures

**124)** A large island in the Pacific Ocean supports isolated populations of two groups of frogs. The following observations of these frogs were recorded by scientists.

- \n(A) Are different in color
  - \n(B) Excrete different products
  - \n(C) Live in different, isolated habitats
  - \n(D) Can interbreed and produce fertile offspring
- Which observation best supports the inference that these frogs belong to the same species?

- (a) A
- (b) B
- (c) C
- (d) D

**122)** Traits that enable an organism to survive and reproduce in its environment are known as

- (a) adaptations
- (b) differentiations
- (c) hybrid characteristics
- (d) acquired characteristics

**125)** The separation of a small group of individuals from the main population is known as

- (a) chromosomal mutation
- (b) fossil formation
- (c) geographic isolation
- (d) reduction division

**123)** Geographic and reproductive isolation are most closely associated with

- (a) speciation
- (b) extinction
- (c) overproduction
- (d) competition

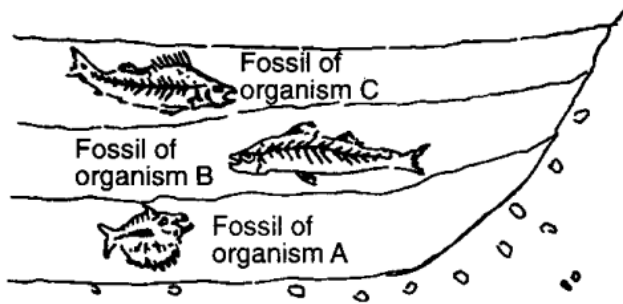
**126)** A large population of wildcats is broken up into several small groups as a result of geographic isolation. Over a long period of time, these groups will most likely become

- (a) reproductively isolated
- (b) identical in genotypes
- (c) identical in phenotypes
- (d) artificially selected

**127)** Fossils of an extinct species of giant armadillo were found to be similar to a smaller species of armadillo presently inhabiting the same region. This similarity could best be explained on the basis of

- (a) evolution from older forms
- (b) inheritance of acquired characteristics
- (c) use and disuse
- (d) the heterotroph hypothesis

**128)** The diagram below represents undisturbed rock strata in a given region. A representative fossil of an organism is illustrated in each layer.



Which statement best describes a relationship between these representative organisms?

- (a) Organism A was probably more structurally advanced than organism B and organism C.
- (b) Organism C probably gave rise to organism A and organism B.
- (c) All of these organisms probably evolved at the same time.
- (d) Organism A was probably more primitive than organism B and organism C.

**129)** The bones in the wing of a bird, the flipper of a whale, and the arm of a human are considered by many scientists to be

- (a) heterotrophic aggregates
- (b) abiotic factors
- (c) complex organelles
- (d) homologous structures

**130)** Normally, when the concentration of glucose in the blood falls below a certain level, stored glucose reenters the blood until the original concentration is reached again. This regulation of the concentration of blood glucose is part of the process known as

- (a) synthesis
- (b) respiration
- (c) pinocytosis
- (d) homeostasis

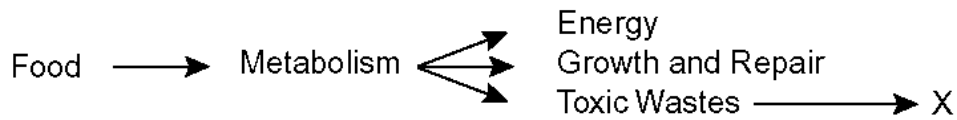
**131)** Veins are blood vessels that

- (a) deliver blood to the cells of the body
- (b) contain striated muscle
- (c) carry blood toward the heart
- (d) readily exchange materials between the blood and body cells

**132)** Which function of human blood includes the other three?

- (a) transporting nutrients
- (b) transporting oxygen
- (c) maintaining homeostasis
- (d) collecting wastes

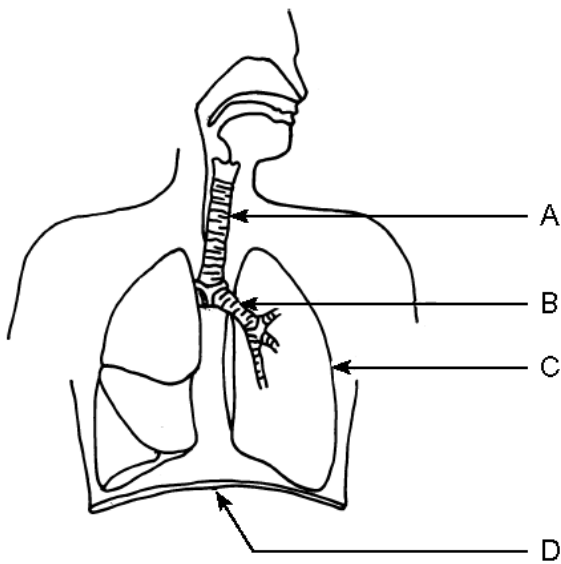
133) The diagram below shows how food is processed in an organism.



In animals, letter X most likely represents:

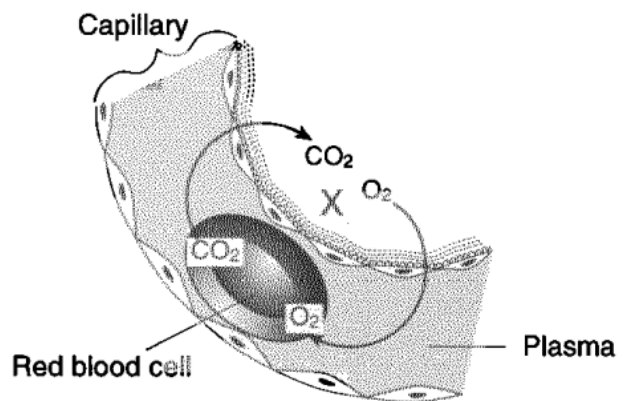
- (a) digestion
- (b) synthesis
- (c) release into the environment
- (d) use as a neurotransmitter

134) Which structure shown in the diagram below contracts, causing a pressure change in the chest cavity during breathing?



- (a) A
- (b) B
- (c) C
- (d) D

135) The diagram below represents part of a capillary in a specific region of the human body.



The region labeled X represents part of

- (a) a glomerulus
- (b) an alveolus
- (c) a villus
- (d) the liver

136) The part of the human central nervous system that conducts impulses from the brain to the peripheral nervous system is protected by the

- (a) vertebrae
- (b) effectors
- (c) receptors
- (d) glomeruli

137) The peripheral nervous system consists of the

- (a) neurons located in the brain and spinal cord
- (b) nerves that extend from the brain and spinal cord
- (c) interneurons of the central nervous system
- (d) portions of the brain known as the medulla and cerebellum

**138)** Which system is most closely associated with the production of regulatory chemicals by glands?

- (a) nervous
- (b) respiratory
- (c) circulatory
- (d) endocrine

**139)** Which statement best describes the chemical substances secreted by endocrine glands?

- (a) They are secreted in one place and most often act at another.
- (b) They are distributed by the nervous system.
- (c) They are found only in vertebrates.
- (d) They are secreted into specialized ducts for transport.

**140)** Which system is responsible for transporting hormones from endocrine glands to various body tissues?

- (a) circulatory
- (b) digestive
- (c) excretory
- (d) nervous

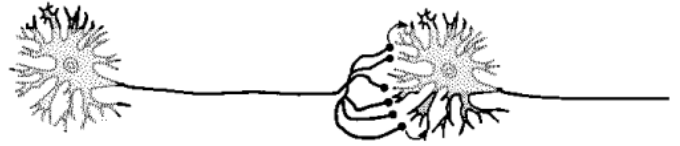
**141)** During a race, the body temperature of a runner increases. The runner responds by perspiring, which lowers body temperature. This process is an example of

- (a) maintenance of homeostasis
- (b) an antigen-antibody reaction
- (c) an acquired characteristic
- (d) environmental factors affecting phenotype

**142)** The secretion of chemicals that stimulate responses in specific body tissues is a function of

- (a) the nervous system, only
- (b) the endocrine system, only
- (c) both the nervous system and the endocrine system
- (d) neither the nervous system nor the endocrine system

**143)** The diagram below represents part of the human nervous system.



The arrows in the diagram show the

- (a) movement of a stimulus in a cyton
- (b) transport of oxygen in a nerve
- (c) transfer of an impulse from one neuron to another
- (d) response of an effector to a stimulus

**144)** To aid in the transmission of an impulse, neuro-transmitters are secreted

- (a) along an axon
- (b) by a dendrite
- (c) by a cyton
- (d) into a synapse

**145)** Which substances are secreted at the endings of nerve cells?

- (a) antibodies
- (b) antigens
- (c) neurotransmitters
- (d) lipids

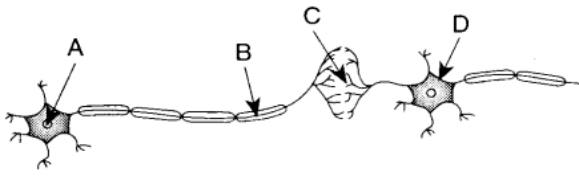
**146)** Which structures in a human transmit electrochemical messages?

- (a) veins
- (b) lymphocytes
- (c) neurons
- (d) nephrons

**147)** A change that initiates an electrochemical message along a neuron is known as

- (a) an effector
- (b) a stimulus
- (c) a response
- (d) an impulse

**148)** The diagram below represents an impulse pathway.



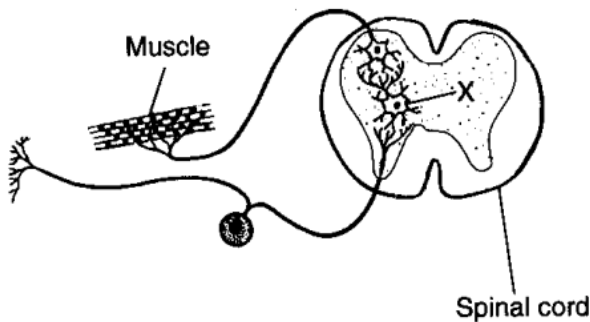
Nerve gas interferes with the action of an enzyme that breaks down acetylcholine. This process allows the acetylcholine to remain in a synapse almost indefinitely. At which location does this inhibiting effect of the nerve gas occur?

- (a) A
- (b) B
- (c) C
- (d) D

**149)** In the human central nervous system, the medulla directly controls

- (a) voluntary activity
- (b) memory
- (c) involuntary activity
- (d) balance

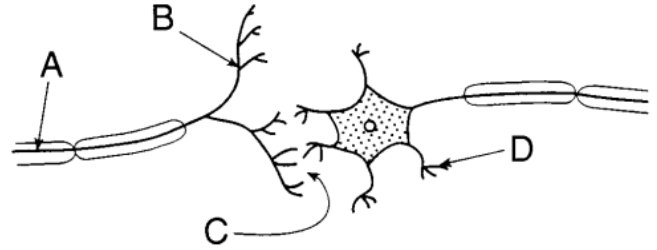
**150)** A reflex arc is illustrated in the diagram below.



Structure X represents

- (a) an effector
- (b) a motor neuron
- (c) an interneuron
- (d) a receptor

**151)** Which letter in the diagram below indicates a synapse?



- (a) A
- (b) B
- (c) C
- (d) D

**152)** A change in the external environment that initiates an impulse is known as a

- (a) synapse
- (b) response
- (c) stimulus
- (d) receptor

**153)** Pollen grains often stimulate an allergic response that produces

- (a) antigens
- (b) antibodies
- (c) plasma
- (d) platelets

**154)** An injection containing weakened forms of a disease-causing organism will usually trigger

- (a) absorption of histamines throughout the body
- (b) secretion of antigens by lymphocytes
- (c) production of temporary resistance to the disease
- (d) production of antibodies providing active immunity

**155)** An individual who has had chicken pox rarely gets this disease again. This situation is an example of

- (a) biological control
- (b) negative feedback
- (c) active immunity
- (d) passive immunity

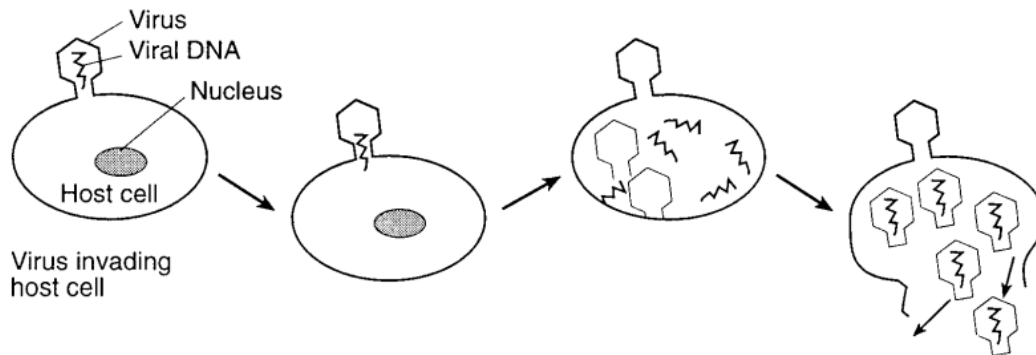
**156)** When penicillin was first introduced, it was very effective in destroying most of the bacteria that cause gonorrhea. Today, certain varieties of this bacterium are resistant to penicillin. Which statement best explains the appearance of these resistant varieties?

- (a) Penicillin stimulated the bacteria to become resistant, and this resistance was passed to the offspring.
- (b) Penicillin killed the susceptible bacteria, while naturally resistant varieties survived and reproduced.
- (c) Penicillin used today is not as strong as the penicillin used when it was first introduced.
- (d) Penicillin stimulated the production of antigens in the resistant bacteria.

**157)** When people who are allergic to pollen come in contact with pollen, their eyes begin to water and itch due to the release of

- (a) antigens from red blood cells
- (b) enzymes from platelets
- (c) histamines from body cells
- (d) hormones from the pituitary gland

**158)** Viral activity is represented in the diagram below.



Invading the host cell enables the virus to

- (a) increase its size
- (b) synthesize needed oxygen
- (c) obtain nutrients
- (d) reproduce

## Answer Key

### Biology Review

- 1) **b**
- 2) **d**
- 3) **c**
- 4) **c**
- 5) **c**
- 6) **c**
- 7) **c**
- 8) **a**
- 9) **b**
- 10) **c**
- 11) **b**
- 12) **a**
- 13) **b**
- 14) **d**
- 15) **a**
- 16) **a**
- 17) **a**
- 18) **a**
- 19) **a**
- 20) **a**
- 21) **d**
- 22) **d**
- 23) **b**
- 24) **a**
- 25) **b**
- 26) **c**
- 27) **d**
- 28) **b**
- 29) **d**
- 30) **d**
- 31) **a**
- 32) **b**
- 33) **d**
- 34) **c**
- 35) **d**
- 36) **a**
- 37) **d**
- 38) **a**
- 39) **a**
- 40) **c**
- 41) **c**
- 42) **d**
- 43) **c**
- 44) **c**
- 45) **a**
- 46) **d**
- 47) **b**
- 48) **d**
- 49) **c**
- 50) **c**
- 51) **a**

- 52) **a**
- 53) **b**
- 54) **a**
- 55) **d**
- 56) **d**
- 57) **b**
- 58) **b**
- 59) **c**
- 60) **c**
- 61) **a**
- 62) **a**
- 63) **d**
- 64) **a**
- 65) **b**
- 66) **d**
- 67) **b**
- 68) **d**
- 69) **b**
- 70) **d**
- 71) **d**
- 72) **b**
- 73) **b**
- 74) **a**
- 75) **b**
- 76) **b**
- 77) **b**
- 78) **d**
- 79) **d**
- 80) **a**
- 81) **a**
- 82) **d**
- 83) **a**
- 84) **a**
- 85) **b**
- 86) **d**
- 87) **c**
- 88) **c**
- 89) **a**
- 90) **c**
- 91) **b**
- 92) **a**
- 93) **a**
- 94) **b**
- 95) **d**
- 96) **d**
- 97) **d**
- 98) **d**
- 99) **c**
- 100) **d**
- 101) **a**
- 102) **b**
- 103) **d**
- 104) **b**
- 105) **a**
- 106) **d**
- 107) **a**
- 108) **a**
- 109) **c**
- 110) **c**
- 111) **d**

- 112) **b**
- 113) **d**
- 114) **a**
- 115) **a**
- 116) **c**
- 117) **b**
- 118) **b**
- 119) **d**
- 120) **b**
- 121) **a**
- 122) **a**
- 123) **a**
- 124) **d**
- 125) **c**
- 126) **a**
- 127) **a**
- 128) **d**
- 129) **d**
- 130) **d**
- 131) **c**
- 132) **c**
- 133) **c**
- 134) **d**
- 135) **b**
- 136) **a**
- 137) **b**
- 138) **d**
- 139) **a**
- 140) **a**
- 141) **a**
- 142) **c**
- 143) **c**
- 144) **d**
- 145) **c**
- 146) **c**
- 147) **b**
- 148) **c**
- 149) **c**
- 150) **c**
- 151) **c**
- 152) **c**
- 153) **b**
- 154) **d**
- 155) **c**
- 156) **b**
- 157) **c**
- 158) **d**