1. Semiconservative replication of DNA refers to the fact that
   1. the daughter DNA is an entirely new duplex and thus the original DNA is intact. B. pieces of the old and new DNA duplexes are jumbled together in the daughter

generation.

C. each strand of the parent DNA serves as a template for the synthesis of its new partner strand. Thus, one strand is conserved in each new double helix. D. DNA replication is modest in its ATP requirements.

E. DNA replication occurs by base pairing between adenine and thymine and between guanine and cytosine.

1. The following statements about the codon are true EXCEPT
   1. the codon is a triplet of nucleotides on messenger RNA (mRNA).
   2. the codon is a triplet of bases on transfer RNA (tRNA).
   3. the codon base pairs with the anticodon.
   4. the codon is degenerate, i.e. most amino acids are represented by more than one codon.
   5. a codon represents an amino acid, or a signal to initiate or terminate protein synthesis.

1. Wobble of the anticodon
   1. refers to the freedom in the pairing of the third base of the codon.
   2. refers to the inaccuracy of base pairing, i.e. if adenine were to pair with guanine, or uracil with cytosine.
   3. is represented, for example, by the codons UUG and CUG, both of which code for leucine.
   4. refers to imprecision in the pairing of the first base of the codon.
   5. occurs only in initiating and terminating codons.

1. The dark reactions of photosynthesis, in which carbon dioxide fixation occurs, are called
   1. Krebs cycle.
   2. Calvin cycle.
   3. Cori cycle.
   4. cyclic AMP.
   5. carbon cycle.

1. All of the following processes occur in the nitrogen cycle EXCEPT
   1. ammonification.
   2. nitrification.
   3. deamination.
   4. denitrification.
   5. nitrogen fixation.

1. All the statements about circadian rhythms are true EXCEPT A. they cycle over a 24-hour period.
   1. they are exemplified in plants by leaf orientations, which change from day to night.
   2. they are exemplified in humans by the sleep-wake cycle.
   3. they are exemplified in humans by changes in body temperature throughout the day and night.
   4. they are entirely controlled by exogenous factors (such as the light-dark cycle).

1. In comparing photosynthesis to respiration, which of the following statements is true? A. Carbohydrate is produced in respiration, but not in photosynthesis.
   1. Oxygen is produced in respiration, but not in photosynthesis.
   2. Carbon dioxide is produced in photosynthesis, but not in respiration.
   3. Water is produced in photosynthesis, but not in respiration.
   4. Oxygen is produced in photosynthesis, but not in respiration.

1. All of the following fates for sugar produced during photosynthesis are possible in a plant cell

EXCEPT

* 1. its polymerization into starch for storage purposes.
  2. its decomposition for energy production.
  3. its polymerization into glycogen for storage purposes.
  4. its use in the synthesis of other organic molecules.
  5. its use in the synthesis of sucrose.

1. An enzyme functions to increase the rate of a reaction by
   1. increasing the concentration of the substrate.
   2. decreasing the Ea (energy of activation).
   3. competing with the substrate.
   4. breaking down ATP.
   5. hydrolyzing the substrate.

1. PKU (phenylketonuria) is an example of an inborn error of metabolism. These "errors" refer to
   1. congenital birth defects.
   2. hormonal overproduction.
   3. inherited lack of an enzyme.
   4. nondisjunction.
   5. atrophy of endocrine glands.

1. All living organisms are classified as eukaryotes (true nucleus) or prokaryotes (before the nucleus).

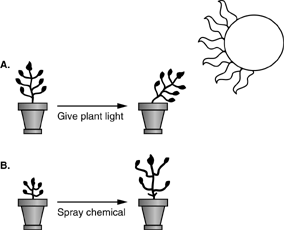
The only example of a prokaryote listed below is

* 1. the AIDS virus.
  2. E. coli.
  3. Homo sapiens.
  4. an oak tree.
  5. amoeba.

1. With respect to the electron transport chain and chemiosmosis, all of the following statements are true EXCEPT
   1. each NADH yields three ATPs.
   2. each FADH2 yields two ATPs.
   3. the cytochrome enzymes utilize NAD+ and FAD as their coenzyme.
   4. hydrogen ions are pumped from the mitochondrial matrix into the intermembranal space.
   5. the cytochrome enzymes utilize iron as their cofactors.

1. All of the following statements concerning ATP are true EXCEPT A. it can be formed in anaerobic glycolysis.
   1. it can be formed in aerobic respiration.
   2. it can be formed in muscle from phosphocreatine.
   3. it can be formed from cAMP (cyclic AMP).
   4. it can be formed from ADP.

Questions 14–15 refer to the diagram below.



1. The second messenger is
   * + - 1. adenyl cyclase.
         2. cAMP.

C.

* + - * 1. the cell membrane.
        2. ATP.

1. The symbol represents
   * 1. a steroid hormone.
     2. an operator.
     3. a protein hormone.
     4. glucose.
     5. an antibody.

1. Lichen, in which an alga and a fungus live in harmony, is an example of
   1. mutualism.
   2. commensalism.
   3. parasitism.
   4. predation.
   5. competition.

1. Konrad Lorenz researched the phenomenon of imprinting. To test his ideas, he had newly hatched ducks see him first. Subsequently, the ducks were allowed to see their mother. These ducks would tend to follow
   1. their true mother.
   2. other ducks.
   3. other chickens.
   4. no one in particular.
   5. Konrad Lorenz.

1. The binomial nomenclature for man is Homo sapiens. Classify man, in proper order starting with its kingdom and working through its order.
   1. Chordata, Animalia, Primates, Mammalia, Vertebrata
   2. Animalia, Chordata, Vertebrata, Mammalia, Primates
   3. Animalia, Vertebrata, Chordata, Mammalia, Primates
   4. Primates, Mammalia, Vertabrata, Chordata, Animalia
   5. Animalia, Chordata, Vertabrata, Primates, Mammalia

1. All of the following structures in a leaf may function in photosynthesis EXCEPT
   1. the cuticle.
   2. the mesophyll.
   3. the guard cells.
   4. the chloroplasts.
   5. the spongy layer.

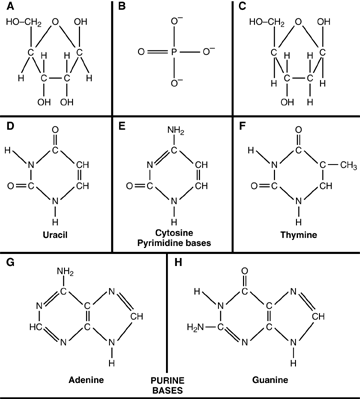
1. Which of the following statements does not apply to members of Class Aves?
   1. They have feathers.
   2. They have compact, hollow bones.
   3. They are homeothermic.
   4. They excrete urea.
   5. They use song in mating behavior.

1. Darwin’s theory of natural selection includes all of the following stipulations EXCEPT A. every organism produces more organisms than can survive.
   1. due to competition, not all organisms survive.
   2. some organisms are more fit, i.e., they are able to survive better in the environment.
   3. the difference in survivability is due to variations between organisms.
   4. variation is due, at least in part, to mutations.

1. Hemophilia is a disease caused by a sex-linked recessive gene on the X-chromosome; therefore, A. females have twice the likelihood of having the disease, since they have two Xchromosomes.
   1. mothers can pass the gene with equal probability to either a son or daughter.
   2. females can never have the disease, they can only be carriers.
   3. inbreeding has no effect on the incidence of the disease, since it is purely sex-linked.
   4. a hemophiliac son is always produced if his father has the gene and, hence, the disease.

1. All of the following statements about vitamin D are correct EXCEPT A. a deficiency causes rickets.
   1. it can be produced in the skin in the presence of ultraviolet light.
   2. dairy products are a good source.
   3. night blindness may result from a deficiency.
   4. it helps absorb calcium from the digestive tract and helps incorporate the calcium into bone.

1. In certain flowers, color is inherited by incomplete dominance. A cross between a homozygous red flower (RR) and a homozygous white flower (rr) will always yield pink flowers. When these pink flowers are subsequently crossed, the expected probabilities may include
   1. 25% pink.
   2. 50% red.
   3. 0% white.
   4. 50% pink.
   5. 100% pink.



1. The structures of the components of a nucleotide are illustrated above. The pentose sugars, the phosphate group, and the five nitrogenous bases are depicted. The two molecules that would be found only in DNA, but not RNA, are represented by the letters
   1. A and D.
   2. B and E.
   3. C and F.
   4. C and D.
   5. A and F.26.

1. The relatively large size of the mammalian brain, allowing for greater learning, association, and memory, is due to the enlargement of the
   1. hindbrain.
   2. cerebellum.
   3. hypothalamus.
   4. cerebrum.
   5. midbrain.

1. Like eukaryotes, prokaryotes may contain all of the following structures EXCEPT
   1. plasma membrane.
   2. cell wall.
   3. ribosomes.
   4. cytoplasm.
   5. mitochondria.

1. Angiosperms are classified as monocots or dicots. Which of the following phrases does not pertain to monocots?
   1. flower parts in groups of three
   2. netted leaf veins
   3. scattered vascular bundles in stem
   4. flower parts in groups of six
   5. exemplified by grasses and orchids

1. The gametophyte generation in the plant life cycle
   1. is diploid.
   2. produces spores.
   3. is haploid.
   4. has become more dominant in the evolution of plants.
   5. is a zygote.



1. The enzyme-catalyzed sequence depicted below represents A. the dephosphorylation of glucose.
   1. the phosphorylation of ADP.
   2. the first step of glycolysis.
   3. phosphofructokinase activity.
   4. a reaction occurring within the mitochondrial matrix.

1. In humans, there are many anatomical adaptations that function to increase surface area for chemical

reactions and transport mechanisms. All of the following are examples EXCEPT A. the alveoli of the lungs.

* 1. the microvilli of the small intestine.
  2. the cristae of the inner mitochondrial membrane.
  3. the villi of the small intestine.
  4. the sensory hairs (cilia) in the cochlea of the inner ear.

1. Concerning the development of the vertebrate brain,
   1. the prosencephalon consists of the pons and cerebellum.
   2. the mesencephalon develops into the myelencephalon and metencephalon.
   3. the rhombencephalon consists of the pons, medulla oblongata, and cerebellum.
   4. the telencephalon develops into the prosencephalon and diencephalon.
   5. the cerebellum is part of the diencephalon.

1. Adaptations of desert plants to hot, dry environments may include all of the following EXCEPT
   1. wide spacing between plants.
   2. deep penetrating roots.
   3. deciduous leaves.
   4. thick, waxy cuticles.
   5. superficial stomata.

1. There are various types of plant stems that have different functions. Which of the following is not a type of stem?
   1. tendrils
   2. nodes
   3. tubers
   4. rhizomes
   5. corms

1. Acquired characteristics
   1. refer to traits inherited as genes.
   2. are not transmitted to the next generation. C. are the basis of Darwin’s theory of natural selection. D. are exemplified by the lengthening of the giraffe’s neck over evolutionary time, due to stretching toward trees.

E. can, for instance, explain the lack of pigment in an albino.

1. All of the following statements about embryonic induction are true EXCEPT A. it is exemplified by the development of the vertebrate lens.
   1. neurulation is an example.
   2. it refers to the interaction whereby certain cells can stimulate the development of nearby cells.
   3. it refers to cleavage.
   4. it most likely occurs due to chemical factors.

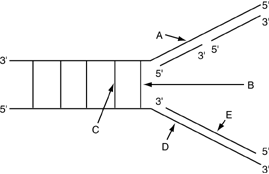
1. Which of the following statements concerning alternation of generations in plants is true? A. The diploid generation consists of gametophytes.
   1. The haploid generation consists of sporophytes.
   2. Gametes result from mitosis.
   3. Gametophytes result from the fusion of gametes.
   4. Meiosis produces sporophytes.

1. Deviation from a Hardy-Weinberg equilibrium may be the result of
   1. absence of mutation.
   2. large population size.
   3. migration.
   4. no natural selection.
   5. lack of differential reproduction.

1. The period of human gestation is divided into three trimesters. The event that is correctly matched to its trimester of occurrence is which of the following?
   1. The third trimester is characterized by development and differentiation.
   2. The greatest growth in size occurs in the first trimester.
   3. The limb buds develop in the first trimester.
   4. Kicking is felt by the mother in the first trimester.
   5. Organ development begins in the second trimester.

1. Which of the following statements about the gymnosperms is not true?
   1. They are seed plants.
   2. They include ginkgo and cycads.
   3. They are cone-bearers.
   4. They are the flowering plants.
   5. They are referred to as the "naked seed" plants

Questions 41–43 refer to the diagram below showing DNA replication.



1. The lagging strand is indicated on the diagram by which letter?
   1. A
   2. B
   3. C
   4. D
   5. E

1. A base pair is indicated on the diagram by which letter?
   1. A
   2. B
   3. C
   4. D
   5. E

1. The replication fork is indicated on the diagram by which letter?
   1. A
   2. B
   3. C
   4. D E. E

Questions 44–47 refer to various transport processes encountered in biology.

1. The nuclear process that refers to the transfer of information from DNA to RNA is
   1. transfusion.
   2. translocation.
   3. transcription.
   4. translation.
   5. transpiration.

1. The transfer of sucrose in sieve tubes is
   1. transfusion.
   2. translocation.
   3. transcription.
   4. translation.
   5. transpiration.

1. Protein synthesis as directed by messenger RNA is
   1. transfusion.
   2. translocation.
   3. transcription.
   4. translation.
   5. transpiration.

1. The introduction of blood directly into the bloodstream is
   1. transfusion.
   2. translocation.
   3. transcription.
   4. translation.
   5. transpiration.

Questions 48–50 refer to the stages of the cell cycle.

1. Cytokinesis accompanies which stage of mitosis?
   1. anaphase
   2. prophase
   3. interphase
   4. metaphase
   5. telophase

1. Which phase, in which DNA is replicated, is not part of mitosis?
   1. anaphase
   2. prophase
   3. nterphase
   4. metaphase
   5. telophase

1. Which stage of mitosis is characterized by the condensation of the chromosomes?
   1. anaphase
   2. prophase
   3. interphase
   4. metaphase
   5. telophase

Questions 51–54 deal with anatomical and physiological aspects of the first meiotic prophase (Prophase

I).

1. The site of crossover between attached homologous chromosomes is
   1. synapsis.
   2. crossing over.
   3. sister chromatids.
   4. chiasma.
   5. centromeres.

1. The constricted point on the chromosome at which sister chromatids are attached is
   1. synapsis.
   2. crossing over.
   3. sister chromatids.
   4. chiasma.
   5. centromeres.

1. Close pairing of homologous chromosomes to form tetrads is/are
   1. synapsis.
   2. crossing over.
   3. sister chromatids.
   4. chiasma.
   5. centromeres.

1. Non-sister chromatids of homologous chromosomes exchange segments is/are
   1. synapsis.
   2. crossing over.
   3. sister chromatids.
   4. chiasma.
   5. centromeres.

Questions 55–56 distinguish between different biomes.

1. The Arctic exemplifies which biome?
   1. tundra
   2. taiga
   3. desert
   4. tropical rainforest
   5. deciduous forest

1. Hot, humid weather and no seasonal changes are characteristic of which biome?
   1. tundra
   2. taiga
   3. desert
   4. tropical rainforest
   5. deciduous forest

Questions 57–59 deal with different mechanisms that cause reproductive isolation.

1. Size, shape, and length of reproductive organs influence mating. This refers to
   1. mechanical isolation.
   2. gamete isolation.
   3. hybrid inviability.
   4. behavioral isolation.
   5. temporal isolation.

1. Pollination/mating is a seasonal event. This refers to
   1. mechanical isolation.
   2. gamete isolation.
   3. hybrid inviability.
   4. behavioral isolation.
   5. temporal isolation.

1. Courtship rituals are required for mating. This refers to
   1. gamete isolation.
   2. hybrid inviability.
   3. behavioral isolation.
   4. temporal isolation.

Questions 60–62 distinguish five animal phyla.

1. Which freshwater and marine filter feeders are sessile and contain spongin or spicules as supportive structures?
   1. porifera
   2. arthropoda
   3. echinodermata
   4. mollusca
   5. platyhelminthes

1. Which phylum includes the parasitic flukes and the tapeworms?
   1. porifera
   2. arthropoda
   3. echinodermata
   4. mollusca
   5. platyhelminthes

1. As is phylum Chordata, which phylum is classified as Deuterostome?
   1. porifera
   2. arthropoda
   3. echinodermata
   4. mollusca
   5. platyhelminthes

Questions 63 - 66 show examples of organic nutrients.

1. Fructose is a
   1. monosaccharide.
   2. disaccharide.
   3. oligosaccharide.
   4. saccharin.
   5. polysaccharide.

1. Lactose is a
   1. monosaccharide.
   2. disaccharide.
   3. oligosaccharide.
   4. saccharin.
   5. polysaccharide.

1. Sucrose is a
   1. monosaccharide.
   2. disaccharide.
   3. oligosaccharide.
   4. saccharin.
   5. polysaccharide.

1. Starch is a
   1. monosaccharide
   2. disaccharide
   3. oligosaccharide
   4. saccharin
   5. polysaccharide

Questions 67–70 describe different human cells that are to be matched with the organelle that is most associated with the cell’s function.

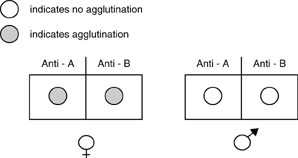
1. Which are especially numerous in skeletal muscle cells?
   1. mitochondria
   2. cilium
   3. rough endoplasmic reticulum
   4. lysosome
   5. flagella

1. Which is found only in sperm cells?
   1. mitochondria
   2. cilium
   3. rough endoplasmic reticulum
   4. lysosome
   5. flagella

1. Leukocytes are
   1. mitochondria.
   2. cilium.
   3. rough endoplasmic reticulum.
   4. lysosome.
   5. flagella.

1. Pancreatic acinar cells are
   1. mitochondria.
   2. cilium.
   3. rough endoplasmic reticulum.
   4. lysosome.
   5. flagella.

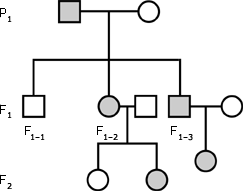
Questions 71–72 refer to the following blood-typing experiment. Two students type their blood in biology lab using antiserum A and antiserum B. The results of their tests are below.



1. When they marry and have children, the possible phenotypes will be
   1. AB only.
   2. Type O only.
   3. Type A and Type B.
   4. Type AB and Type O.
   5. Type B only.

1. The male () depicted above is called a universal donor because A. he has no antigens on his red blood cells.
   1. he has both antibodies in his plasma.
   2. he has no antibodies in his plasma.
   3. he has no antibodies on his red blood cells.
   4. he has no antigens in his plasma.

Questions 73–74 refer to the pedigree below. A square indicates a male; a circle indicates a female. A hollow shape indicates the lack of trait; a darkened shape indicates the presence of trait.

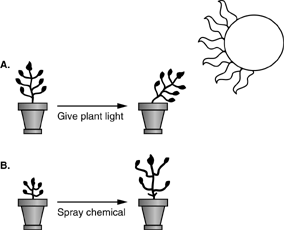


1. The trait, a preauricular gill remnant, which is a tiny hole in the front of the ear, is transmitted by an autosomal dominant gene. The probability that the children of F1–1, should he marry an unafflicted woman, will have the trait is
   1. 50%.
   2. 0%.
   3. 100%. D. 25%

E. This cannot be determined with the information given.

1. F1–3 and his wife just had a baby girl afflicted with this trait. The probability that their next son will have the trait is
   1. 0%—half the kids should have the trait, and one just received it so the next one should not.
   2. 50%.
   3. 100%—all the sons will show the trait.
   4. 25%.
   5. This cannot be determined with the information given.

Questions 75–76 refer to the drawings of the two plants. You have two plants in which you wish to stimulate growth. Plant A receives light and responds as indicated below. Plant B receives a chemical and responds as below.



1. The hormone responsible for the growth movements seen in plant A is
   1. auxin.
   2. florigen.
   3. cytokinin.
   4. abscisic acid.
   5. ethylene.

1. The chemical given to plant B, a genetic dwarf, must be
   1. ethylene.
   2. gibberellins.
   3. cytokinins.
   4. growth hormone.
   5. florigen.

Questions 77–80 refer to an experiment in digestion. Digestion of fat yields glycerol and fatty acids. You wish to determine if and how bile salts and pancreatic juice affect fat digestion. You prepare three tubes as indicated below. While incubating them in a 37° C bath, you measure the pH in the test tubes over the next 45 minutes. Your data are presented in the table below.

Tube A contains 4 mls. of cream + pinch of bile salts

Tube B contains 4 mls. of cream + 4 mls. of pancreatic juice

Tube C contains 4 mls. of cream + 4 mls. of pancreatic juice + pinch of bile salts

|  |  |  |
| --- | --- | --- |
| Data on pH Time (mins.) |  |  |
| 0 15 | 30 | 45 |
| pH—Tube A 7 7 | 7 | 7 |
| pH—Tube B 7 6.9 | 6.7 | 6.3 |
| pH—Tube C 7 6.3 | 6.0 | 5.4 |

1. Digestion of the cream occurs most rapidly in
   1. tube A.
   2. tube B.
   3. tube C.
   4. no digestion occurred.
   5. cannot be determined from the data

1. If you only have two test tubes with which to do your experiment and you wish to figure out the role of bile salts, it is necessary to prepare
   1. tubes A and B.
   2. tubes B and C.
   3. tubes A and C.
   4. just tube C.
   5. just tube A.

1. It is clear that the ingredient necessary for digestion of fats is
   1. cream.
   2. water.
   3. bile salts.
   4. pancreatic juice.
   5. not in any of the tubes.

1. The function of bile salts is to
   1. digest the fat.
   2. chemically degrade the fat.
   3. emulsify the fat into smaller globules.
   4. activate the enzymes in pancreatic juice.
   5. acidify the solution which it is in.

Questions 81–84 refer to a urinalysis report. A lab technician forgets to label three patients’ recent urine samples and a sample of distilled water. He performs various tests on these samples to try to determine which urine belongs to which patient. One patient was on a high-salt diet; one was on a high-protein diet; and one had uncontrolled diabetes mellitus. The results of the tests on the three urine samples and the distilled water tube are shown below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | A | B | C | D |
| Specific gravity | 1.030 | 1.029 | 1.010 | 1.000 |
| Glucose | negative | 299 mg/dl | negative | negative |
| pH | 6.3 | 5.2 | 5.0 | 7 |
| Odor | aromatic | sweet | aromatic | none |
| Volume | 130 mls | 160 mls | 96 mls | 100 mls |

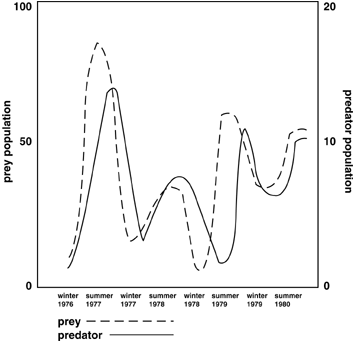
1. The urine sample from the diabetic patient is in which test tube?
   1. tube A
   2. tube B
   3. tube C
   4. tube D
   5. It cannot be determined from data available.

1. Tube D must contain the distilled water because
   1. by definition, the specific gravity of distilled water = 1.000.
   2. by definition, the pH of distilled water is 7.
   3. process of elimination leaves only tube D for water.
   4. specific gravity is the weight of a volume of water divided by the weight of an equal volume of substance.
   5. there is no glucose in it.

1. The effect of a diuretic drug would most directly affect which of the following parameters?
   1. specific gravity
   2. glucose
   3. pH
   4. odor
   5. volume

1. The tube with the highest concentration of hydrogen ions is
   1. tube A.
   2. tube B.
   3. tube C.
   4. tube D.
   5. It cannot be determined by the data available.

Questions 85–89 refer to the graph below, which indicates the interaction between a predator (solid) and prey (dotted) population over the years 1976 to 1980. Their population sizes are indicated on either side of the graph.



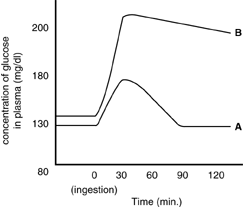
1. The oscillations in the predator/prey population
   1. occur because an increase in prey population will increase predator population indefinitely.
   2. occur because an increase in prey population will allow an increase in predator population until the predators eat too many prey.
   3. occur because an increase in predator population causes a direct and immediate increase in prey population.
   4. occur because of seasonal changes.
   5. are unique in this case and not seen in most predator/prey interactions.

1. The drop in predator population during the winter months is probably due to
   1. cold.
   2. snow.
   3. drop in prey population.
   4. hibernation.
   5. coincidence.

1. The most mild winter probably occurred in the year
   1. 1976.
   2. 1977.
   3. 1978.
   4. 1979.
   5. 1980.

1. The peak prey population was achieved
   1. in the summer of 1977 with a population of 100.
   2. in the summer of 1977 with a population of 75.
   3. in the summer of 1977 with a population of 20.
   4. in the summer of 1977 with a population of 15.
   5. in the summer of 1977, population unknown.

1. In the winter of 1980, a chemical, toxic and fatal to the prey but not to the predator, is introduced into the environment; the subsequent effect to the predator will be A. no effect, since it is non-toxic to him.
   1. a drop in population due to decreased food resources.
   2. a rise in population.
   3. independent of any changes in prey population.
   4. a drop in population due to the yearly winter drop.



1. The plasma glucose levels of the subjects, while still fasting, are
   1. 0 minutes.
   2. 80 mg/dl.
   3. 130 mg/dl.
   4. 180 mg/dl.
   5. not depicted in the graph above.

1. Peak plasma glucose levels are reached A. at the time of ingestion.
   1. at 30 minutes.
   2. at 60 minutes.
   3. at different times for the two subjects.
   4. at 30 mg/dl.

1. Graph A indicates
   1. a normal response to glucose ingestion.
   2. a diabetic response to glucose ingestion.
   3. a maximum plasma glucose level of 180 mg/dl.
   4. a return to fasting glucose levels within a half hour.
   5. a fasting glucose level of 130 mg/dl.

1. Graph B indicates
   1. excess insulin has been secreted.
   2. high tolerance to glucose.
   3. a diabetic condition.
   4. a maximum glucose level of 180 mg/dl.
   5. rapid return to fasting glucose levels.

1. Urinary excretion of glucose may occur
   1. in subject A.
   2. in subject B.
   3. in both subjects.
   4. in neither subject.
   5. but it is unrelated to plasma glucose levels.

Questions 95–97 refer to transport processes through the cell membrane.

The following table indicates the effects of two cell poisons on the transport processes of the cell membrane. One group of cells was given ouabain, and another group was given cyanide. A "+" indicates that the process is still functional, while an "X" indicates that the process cannot occur in the presence of the poison.

Diffusion Na+-K+ Pump Endocytes

Ouabain + X +

Cyanide + X X

1. Which of the following statements is true?
   1. Ouabain did not affect any active processes.
   2. Cyanide did not affect any active processes.
   3. Cyanide prevented ouabain from acting on endocytosis.
   4. Passive processes were unaffected by either poison.
   5. Only processes that do not require ATP were affected by cyanide.

1. The probable mechanisms of action are that
   1. cyanide inhibits the Na+-K+ pump directly.
   2. ouabain inhibits the production of ATP.
   3. cyanide inhibits the production of ATP and, hence, the activity of the Na+-K+ pump.
   4. cyanide inhibits the activity of the Na+-K+ pump and, hence, the production of ATP. E. ouabain inhibits the production of ATP directly and, hence, the activity of the Na+-K+ pump.

1. In the presence of ouabain,
   1. Na+ will accumulate outside the cell.
   2. K+ will accumulate inside the cell.
   3. K+ will accumulate outside the cell due to diffusion.
   4. K+ will accumulate outside the cell due to active transport.
   5. Na+ will accumulate inside the cell due to endocytosis.

Questions 98–100 refer to observations on simple plant tissues.

In a lab examination in your botany class, you are to identify the following three cell types A, B, and C. Your determinations are based on the following key observations.

A B C

Capacity to divide (Mitosis) Yes No No

High concentrations in mesophyll of leaves Yes No No

High numbers in young stems Yes Yes No

1. To identify a parenchyma cell, the key observation that you would look at would be A. its presence in leaves, since leaves are alive at maturity.
   1. its ability to divide, since it is the only live cell.
   2. its presence in stems, since only stems function in food storage.
   3. its presence in leaves, since leaves contain a lot of chloroplasts.
   4. air spaces in the cells when viewed with a microscope.

1. According to the chart, the inability of cell C to divide
   1. indicates that it must be a parenchyma cell, which is the least specialized and thus cannot undergo mitosis, a specialized function.
   2. indicates that it must be a parenchyma cell, since the air spaces preclude the capacity to divide.
   3. indicates that it must be sclerenchyma cell, since dead cells cannot divide. D. indicates that it must be a parenchyma cell, since photosynthesizing cells cannot divide.

E. is not a clue to the identification of any cell type.

1. Which of the following is true?
   1. A is a sclerenchyma cell.
   2. B is a collenchyma cell.
   3. C is a parenchyma cell.
   4. A is a collenchyma cell.