普通生物學

(D)1. Which of the following organelles is common to plant and animal cells?
(A)chloroplasts (B)wall made of cellulose (C)tonoplast (D)mitochondria (E)centrioles

(B)2. Which of the following components is present in a prokaryotic cell?
(A)mitochondria (B)ribosomes (C)nuclear envelope (D)chloroplasts (E)ER

(A)3. Cyanide binds with at least one of the molecules involved in the production of ATP. Following exposure of a cell to cyanide, most of the cyanide could be expected to be found within the
(A)mitochondria. (B)ribosomes. (C)peroxisomes. (D)lysosomes. (E)endoplasmic reticulum.

(C)4. Which metabolic pathway is common to both fermentation and cellular respiration?
(A)the Krebs cycle (B)the electron transport chain (C)glycolysis
(D)synthesis of acetyl CoA from pyruvate (E)reduction of pyruvate to lactate

(A)5. The final electron acceptor of the electron transport chain that functions in oxidative phosphorylation is
(A)oxygen (B)water (C)NAD^+ (D)pyruvate (E)ADP

(B)6. Most CO_2 from catabolism is released during
(A)glycolysis. (B)the Krebs cycle. (C)lactate fermentation. (D)electron transport.
(E)oxidative phosphorylation.

(D)7. The light reactions of photosynthesis supply the Calvin cycle with
(A)light energy. (B)CO_2 and ATP. (C)H_2O and NADPH. (D)ATP and NADPH. (E)sugar and O_2.

(C)8. The decline of MPF at the end of mitosis is caused by
(A)the destruction of the protein kinase (Cdk). (B)decreased synthesis of cyclin.
(C)the enzymatic destruction of cyclin. (D)synthesis of DNA.
(E)an increase in the cell's volume-to-genome ratio.

(C)9. In a nucleosome, the DNA is wrapped around
(A)polymerase molecules. (B)ribosomes. (C)histones. (D)the nucleolus. (E)satellite DNA.

(E)10. Which of the following has the largest genome size and the smallest number of genes per million base pairs?
(A)H. influenzae (bacterium) (B)S. cerevisiae (yeast) (C)A. thaliana (plant)
(D)D. melanogaster (fruit fly) (E)H. sapiens (human)

(C)11. The smallest biological unit that can evolve over time is
(A)a cell. (B)an individual organism. (C)a population. (D)a species. (E)an ecosystem.

(B)12. The largest unit in which gene flow is possible is a
(A)population. (B)species. (C)genus. (D)subspecies. (E)phylum.

(C)13. Penicillins function as antibiotics mainly by inhibiting the ability of some bacteria to
(A)form spores. (B)replicate DNA. (C)synthesize normal cell walls.
(D)produce functional ribosomes. (E)synthesize ATP.

(D)14. Which structure is incorrectly paired with its tissue system?
(A)root hair－dermal tissue (B)palisade parenchyma－ground tissue (C)guard cell－dermal tissue
(D)companion cell-ground tissue (E)tracheid－vascular tissue

(C)15. Wood consists of
(A)bark. (B)periderm. (C)secondary xylem. (D)secondary phloem. (E)cork.

(D)16. Which of the following is not part of an older tree's bark?
(A)cork (B)cork cambium (C)lenticels (D)secondary xylem (E)secondary phloem

(B)17. Which of the following cell types is least likely to have a secondary wall?
(A)sclerenchyma cell (B)parenchyma cell (C)fiber cell (D)tracheid (E)sclereid

(C)18. _____ is to primary xylem as vascular cambium is to _____.
(A)Primary phloem; secondary xylem (B)Tracheid; vessel cell (C)Procambium; secondary xylem
(D)Apical meristem; lateral meristem (E)Stele; primary phloem

(B)19. The type of mature cell that a particular embryonic plant cell will become appears to be determined mainly by
(A)the selective loss of genes. (B)the cell's final position in a developing organ.
(C)the cell's pattern of migration. (D)the cell's age (E)the cell's particular meristematic lineage.

(C)20. Stomata open when guard cells
(A)sense an increase in CO_2 in the air spaces of the leaf.
(B)flop open because of a decrease in turgor pressure.
(C)become more turgid because of an influx of K^+, followed by the osmotic entry of water.
(D)close aquaporins, preventing uptake of water.
(E)accumulate water by active transport.

(D)21. Which of the following is not part of the transpiration-cohesion-tension mechanism for the ascent of xylem sap?
(A)the loss of water from the mesophyll cells, which initiates a pull of water molecules from neighboring cells
(B)the transfer of transpirational pull from one water molecule to the next owing to the cohesion caused by hydrogen bonds
(C)the hydrophilic walls of the narrow tracheids and xylem vessels that help maintain the column of water against the force of gravity
(D)the active pumping of water into the xylem of roots
(E)the reduction of water potential in the surface film of mesophyll cells due to transpiration

(C)22. Which of the following does not appear to involve active transport across membranes?
(A)the movement of mineral nutrients from the apoplast to the symplast
(B)the movement of sugar from mesophyll cells into sieve-tube members in corn
(C)the movement of sugar from one sieve-tube member to the next
(D)K^+ uptake by guard cells during stomatal opening
(E)the movement of mineral nutrients into cells of the root cortex

(B)23. The movement of sap from a sugar source to a sugar sink
(A)occurs through the apoplast of sieve-tube members.
(B)may translocate sugars from the breakdown of stored starch in a root up to developing shoots.
(C)is similar to the flow of xylem sap in depending on tension, or negative pressure.
(D)depends on the active pumping of water into sieve tubes at the source end.
(E)results mainly from diffusion.

(B)24. Which structure or compartment is not part of the plant's apoplast?
(A)the lumen of a xylem vessel (B)the lumen of a sieve tube (C)the cell wall of a mesophyll cell
(D)the cell wall of a transfer cell (E)the cell wall of a root hair

(B)25. Most of the mass of organic material of a plant comes from
(A)water. (B)carbon dioxide. (C)soil minerals. (D)atmospheric oxygen. (E)nitrogen.

(B)26. Micronutrients are needed in very small amounts because
(A)most of them are mobile in the plant.
(B)most function as cofactors of enzymes.
(C)most are supplied in large enough quantities in seeds.
(D)they play only a minor role in the health of the plant.
(E)only the growing regions of the plants require them.

(B)27. A mineral deficiency is likely to affect older leaves more than younger leaves if
(A)the mineral is a micronutrient. (B)the mineral is very mobile within the plant.
(C)the mineral is required for chlorophyll synthesis. (D)the deficiency persists for a long time.
(E)the older leaves are in direct sunlight.

(B)28. Carnivorous adaptations of plants mainly compensate for soil that has a relatively low content of
(A) potassium. (B)nitrogen. (C)calcium. (D)water. (E)phosphate.

(B)29.Mycorrhizae enhance plant nutrition mainly by
(A)absorbing water and minerals through the fungal hyphae.
(B)providing sugar to the root cells, which have no chloroplasts of their own.
(C)converting atmospheric nitrogen to ammonia.
(D)enabling the roots to parasitize neighboring plants.
(E)stimulating the development of root hairs.

(D)30.Which of the following would definitely be a unisexual flower? A flower that
(A)is also incomplete. (B)lacks sepals. (C)is self-compatible. (D)is staminate.
(E)cannot self-pollinate.

(A)31.Germinated pollen grain is to _____ as _____ is to female gametophyte.
(A)male gametophyte; embryo sac (B)embryo sac; ovule (C)ovule; sporophyte (D)anther; seed
(E)petal; sepal

(C)32.A seed develops from
(A)an ovum. (B)a pollen grain. (C)an ovule. (D)an ovary. (E)an embryo.

(A)33.A fruit is a (an)
(A)mature ovary. (B)mature ovule. (C)seed plus its integuments. (D)fused carpel.
(E)enlarged embryo sac.

(B)34.Which of the following conditions is needed by almost all seeds to break dormancy?
(A)exposure to light (B)imbibition (C)abrasion of the seed coat (D)exposure to cold temperatures
(E)covering of fertile soil

(E)35.“Golden Rice" is a transgenic variety that
(A)is resistant to various herbicides and thus rice fields can be weeded with those herbicides.
(B)is resistant to a virus that commonly attacks rice fields.
(C)includes bacterial genes that produce a toxin that reduces damage from insect pests.
(D)produces much larger, golden grains that increase crop yields.
(E)contains daffodil genes that increase the vitamin A content of the rice.

(B)36.Which of the following plant hormones is incorrectly paired with its function?
(A)auxin－promotes stem growth through cell elongation
(B)cytokinins－initiate programmed cell death
(C)gibberellins－stimulate seed germination
(D)abscisic acid－promotes seed dormancy
(E)ethylene－inhibits cell elongation

(B)37.Buds and sprouts often form on tree stumps. Which of the following hormones would you expect to stimulate their formation?
(A)auxin (B)cytokinins (C)abscisic acid (D)ethylene (E)gibberellins

(B)38.The signal for flowering could be released earlier than normal in a long-day plant experimentally exposed to flashes of
(A)far-red light during the night. (B)red light during the night.
(C)reed light followed by far-red light during the night. (D)far-red light during the day.
(E)red light during the day.

(B)39.If a long-day plant has a critical night length of 9 hours, which of the following 24-hours cycles would prevent flowering?
(A)16 hours light/8 hours dark (B)14 hours light/10 hours dark
(C)15.5 hours light/8.5 hours dark (D)4 hours light/8 hours dark/4 hours light/8 hours dark
(E)8 hours light/8 hours dark/light flash/8 hours dark

(C)40.The subscripts in the following choices indicate specific Avr and R genes in pathogens and plant cells. Uppercase letters indicate dominant alleles, while lowercase symbolizes recessive alleles. In which of the situations would the pathogen be avirulent?
(A)Avr_D-R_d (B)Avr_E-R_G (C)Avr_M-R_M (D)Avr_g-R_g (E)Avr_e-R_E

(A)41.Consider the energy budgets for a human, an elephant, a penguin, a mouse, and a python. The _____ would have the highest total annual energy expenditure, and the _____ would have the highest energy expenditure per unit mass.
(A)elephant; mouse (B)elephant; human (C)human; penguin (D)mouse; python
(E)penguin; mouse

(C)42.Which of the following structures or substances is incorrectly paired with a tissue?
(A)osteon－bone (B)platelets－blood (C)fibroblasts－skeletal muscle
(D)chondroitin sulfate－cartilage (E)basement memberane－epithelium

(B)43.Compared to a smaller cell, a larger cell of the same shape has a
(A)less surface area. (B)less surface area per unit of volume. (C)the same surface-to-volume ratio.
(D)a smaller average distance between its mitochondria and the external source of oxygen.
(E)a smaller cytoplasm-to-nucleus ratio.

(B)44.Which of the following vertebrate organ systems does not ope directly to the external environment?
(A)digestive system (B)circulatory system (C)excretory system (D)respiratory system
(E)reproductive system

(C)45.Most of our cells are surrounded by
(A)blood. (B)basement membranes. (C)interstitial fluid. (D)pure water. (E)air

(C)46.The mammalian trachea and esophagus both open into the
(A)large intestine. (B)stomach. (C)pharynx. (D)rectum. (E)epiglottis.

(C)47.Our oral cavity, with its dentition, is most functionally analogous to an earthworm's
(A)intestine. (B)pharynx. (C)gizzard. (D)stomach. (E)anus.

(C)48.Which of the following organs is incorrectly paired with its function?
(A)stomach－protein digestion (B)oral cavity－starch digestion (C)large intestine－bile production
(D)small intestine －nutrient absorption (E)pancreas－enzyme production

(B)49.If you were to jog a mile a few hours after lunch, which stored fuel would you probably tap?
(A)muscle proteins (B)muscle and liver glycogen (C)fat stored in the liver
(D)fats stored in adipose tissue (E)blood proteins

(D)50.Pulse is a direct measure of
(A)blood pressure. (B)stroke volume. (C)cardiac output. (D)heart rate. (E)breathing rate.

(C)51. When you hold your breath, which of the following blood gas changes first leads to the urge to breathe?
(A)rising O_2 (B)falling O_2 (C)rising CO_2 (D)falling CO_2 (E)rising CO_2 and falling O_2

(B)52. In negative-pressure breathing, inhalation results from
(A)forcing air from the throat down into the lungs. (B)contracting the diaphragm.
(C)relaxing the muscles of the rib cage. (D)using muscles of the lungs to expand the alveoli.
(E)contracting the abdominal muscles.

(B)53. A decrease in the pH of human blood caused by exercise would
(A)decrease breathing rate. (B)increase heart rate.
(C)decrease the amount of O_2 unloaded from hemoglobin. (D)decrease cardiac output.
(E)decrease CO_2 binding to hemoglobin.

(A)54. Compared to the interstitial fluid that bathes active muscle cells, blood reaching these cells in arteries has a
(A)higher P_{O_2}. (B)higher P_{CO_2}. (C)greater bicarbonate concentration. (D)lower pH.
(E)lower osmotic pressure.

(D)55. Which of the following results in long-term immunity?
(A)the passage of maternal antibodies to her developing fetus
(B)the inflammatory response to a splinter
(C)the administration of serum obtained from people immune to rabies
(D)the administration of the chicken pox vaccine
(E)the passage of maternal antibodies to her nursing infant

(E)56. Which of the following is not part of the body's nonspecific defense system?
(A)natural killer (NK) cells (B)inflammation (C)phagocytosis by neutrophils
(D)phagocytosis by macrophages (E)antibodies

(E)57. Which of the following molecules is incorrectly paired with a source?
(A)lysozyme－tears (B)interferons－virus-infected cells (C)interleukin-1－macrophages
(D)perforins－cytotoxic T cells (E)immunoglobulins－helper T cells

(C)58. Which of the following best describes the difference in the way B cells and cytotoxic T cells respond to invaders?
(A)B cells confer active immunity; cytotoxic T cells confer passive immunity.
(B)B cells kill viruses directly; cytotoxic T cells kill virus-infected cells.
(C)B cells secrete antibodies against a virus; cytotoxic T cells kill virus-infected cells.
(D)B cells accomplish cell-mediated immunity; cytotoxic T cells accomplish humoral immunity.
(E)B cells respond the first time the invader is present; cytotoxic T cells respond subsequent times.

(D)59. Which of the following is a characteristic of the early stages of local inflammation?
(A)precapillary arteriole constriction (B)fever (C)attack by cytotoxic T cells
(D)release of histamine (E)antibody-complement-mediated lysis of microbes

(B)60. Which of the following is not true about helper T cells?
(A)They function in both cell-mediated and humoral immune responses.
(B)They recognize polysaccharide fragments presented by class Ⅱ MHC molecules.
(C)They bear surface CD4 molecules.
(D)They are subject to infection by HIV.
(E)When activated, they secrete IL-2 and other cytokines.

(A)61. The majority of water and salt filtered into Bowman's capsule is reabsorbed by
(A)the transport epithelia of the proximal tubule.
(B)diffusion from the descending limb of the loop of Henle into the hyperosmotic interstitial fluid of the medulla.
(C)active transport across the transport epithelium of the thick upper segment of the ascending limb of the loop of Henle.
(D)selective secretion and diffusion across the distal tubule.
(E)diffusion from the collecting duct into the increasing osmotic gradient of the renal medulla.

(E)62. The high osmolarity of the renal medulla is maintained by all of the following except
(A)diffusion of salt from the ascending limb of the loop of Henle.
(B)active transport of salt from the upper region of the ascending limb.
(C)the spatial arrangement of juxtamedullary nephrons.
(D)diffusion of urea from the collecting duct.
(E)diffusion of salt from the descending limb of the loop of Henle.

(E)63. Select the pair in which the nitrogenous waste is incorrectly matched with the benefit of its excretion.
(A)urea－low toxicity relative to ammonia (B)uric acid－can be stored as a precipitate
(C)ammonia－very soluble in water (D)uric acid－minimal loss of water when excreted
(E)urea－very insoluble in water

(C)64. Which of the following is not a mechanism for reducing the rate of heat exchange between an animal and its environment?
(A)feathers or fur (B)vasoconstriction (C)nonshivering thermogenesis
(D)countercurrent heat exchanger (E)blubber or fat layer

(D)65. Which process in the nephron is least selective?
(A)secretion (B)reabsorption (C)active transport (D)filtration
(E)salt pumping by the loop of Henle

(A)66. The vertebrate liver functions in all of the following regulatory processes except
(A)osmoregulation by variable excretion of salts. (B)maintenance of blood sugar concentration.
(C)detoxification of harmful substances. (D)production of nitrogenous wastes.
(E)caloric storage in the form of glycogen.

(D)67. A distinctive feature of the mechanism of action of thyroid hormones and steroid hormones is that
(A)these hormones are regulated by feedback loops.
(B)target cells react more rapidly to these hormones than to local regulators.
(C)these hormones bind with specific receptor proteins on target-cell plasma membranes.
(D)these hormones bind to receptors inside cells.
(E)these hormones affect metabolism.

(C)68. Which of the following hormones is incorrectly paired with its action?
(A)oxytocin－stimulates uterine contractions during childbirth
(B)thyroxine－stimulates metabolic processes
(C)insulin－stimulates glycogen breakdown in the liver
(D)ACTH－stimulates the release of glucocorticoids by the adrenal cortex
(E)melatonin－affects biological rhythms, seasonal reproduction

(E)69. Which of the following is not an example of the close structural and functional relationship between the nervous and endocrine systems?
(A)the secretion of hormones by neurosecretory cells
(B)the multiple functions of norepinephrine
(C)the stimulation of the adrenal medulla in the short-term reponse to stress
(D)the embryonic development of the posterior pituitary from the hypothalamus
(E)the alteration of gene expression by steroid hormones

(C)70. A portal vessel carries blood from the hypothalamus directly to the
(A)thyroid. (B)pineal gland. (C)anterior pituitary. (D)posterior pituitary. (E)thymus.

(C)71. The main target organs for tropic hormones are
(A)muscles. (B)blood vessels. (C)endocrine glands. (D)kidneys. (E)nerves.

(B)72. Which of the following structures is incorrectly paired with its function?
(A)gonads－gamete-producing organs
(B)spermatheca－sperm-transferring organ found in male insects
(C)cloaca－common opening for reproductive, excretory, and digestive systems
(D)baculum－bone that stiffens the penis, found in some mammals
(E)endometrium－lining of the uterus; forms the maternal part of the placenta

(B)73. A difference between estrous and menstrual cycles is that
(A)nonmammalian vertebrates have estrous cycles, whereas mammals have menstrual cycles.
(B)the endometrial lining is shed in menstrual cycles but reabsorbed in estrous cycles.
(C)estrous cycles occur more frequently than menstrual cycles.
(D)estrous cycles are not controlled by hormones.
(E)ovulation occurs before the endometrium thickens in estrous cycles.

(C)74. Peaks of LH and FSH production occur during
(A)the flow phase of the menstrual cycle. (B)the beginning of the follicular phase of the ovarian cycle.
(C)the period surrounding ovulation. (D)the end of the luteal phase of the ovarian cycle.
(E)the secretory phase of the menstrual cycle.
(A)75. During human gestation, organogenesis occurs
(A)in the first trimester. (B)in the second trimester. (C)in the third trimester.
(D)while the embryo is in the oviduct. (E)during the blastocyst stage.
(D)76. Fertilization of human eggs most often takes place in the
(A)vagina. (B)ovary. (C)uterus. (D)oviduct (fallopian tube). (E)vas deferens.
(B)77. In male mammals, the excretory and reproductive systems share the
(A)testes. (B)urethra. (C)ureter. (D)vas deferens. (E)prostate.
(B)78. Which of the following is common to both avian and mammalian development?
(A)holobalstic cleavage (B)epiblast and hypoblast (C)trophoblast (D)yolk plug (E)gray crescent
(D)79. The archenteron develops into
(A)the mouth in protostomes. (B)the blastocoel. (C)the endoderm. (D)the lumen of the digestive tract.
(E)the placenta.
(C)80. In a frog embryo, the blastocoel is
(A)completely obliterated by yolk platelets. (B)lined with endoderm during gastrulation.
(C)located primarily in the animal hemisphere. (D)the cavity that becomes the coelom.
(E)the cavity that later forms the archenteron.
(B)81. Differences in the development of different cells in the early frog embryo (zygote to blastula) are due to
(A)the differences between meroblastic and holoblastic cleavage.
(B)the heterogeneous distribution of cytoplasmic determinants, such as proteins and mRNA.
(C)inductive interactions occurring between the developing cells.
(D)concentration gradients for regulatory molecules such as BMP-4.
(E)the position of the cells relative to the zone of polarizing activity (ZPA).
(D)82. In the early development of an amphibian embryo, an important " organizer " is the
(A)neural tube. (B)notochord. (C)archenteron roof. (D)dorsal lip of the blastopore.
(E)dorsal ectoderm.
(C)83. Which of the following occurs when a stimulus depolarizes a neuron's membrane?
(A)Na^+ diffuses out of the cell.
(B)The action potential approaches zero.
(C)The membrane potential changes from the resting potential to a voltage closer to the threshold potential.
(D)The depolarization is all or none.
(E)The inside of the cell becomes more negative in charge relative to the outside of the cell.
(B)84. Action potential are usually propagated in only one direction along an axon because
(A)the nodes of Ranvier conduct only in one direction.
(B)the brief refractory period prevents opening of voltage-gated Na^+ channels.
(C)the axon hillock has a higher membrane potential than the tips of the axon.
(D)ions can flow along the axon only in one direction.
(E)both sodium and potassium voltage-gated channels open in one direction.
(A)85. Which of the following structures or regions is incorrectly paired with its function?
(A)limbic system－the motor control of speech
(B)medulla oblongata－homeostatic control center
(C)cerebellum－coordination of movement and balance
(D)corpus callosum－band of fibers connecting left and right cerebral hemispheres
(E)hypothalamus－production of hormones and regulation of temperature, hunger, and thirst

(C)86. Receptor sites for neurotransmitters are located on the
(A)tips of axons. (B)axon membranes in the regions of the nodes of Ranvier.
(C)postsynaptic membrane. (D)membranes of synaptic vesicles. (E)presynaptic membrane.
(C)87. All the following electrical changes of neurons are graded events except
(A)EPSPs. (B)IPSPs. (C)action potentials. (D)depolarizations caused by stimuli.
(E)hyperpolarizations caused by stimuli.
(C)88. Of the following components of the nervous system, which is the most inclusive?
(A)brain (B)spinal cord (C)central nervous system (D)gray matter (E)neuron
(E)89. Which of the following receptors is incorrectly paired with its category?
(A)hair cell－mechanoreceptor (B)muscle spindle－mechanoreceptor
(C)taste receptor－chemoreceptor (D)rod－electromagnetic receptor
(E)gustatory receptor－electromagnetic receptor
(B)90. The role of calcium in muscle contraction is
(A)to break the cross-bridges as a cofactor in the hydrolysis of ATP.
(B)to bind with troponin, changing its shape so that the myosin binding sites on the actin filament are exposed.
(C)to transmit the action potential across the neuromuscular junction.
(D)to spread the action potential through the T tubules.
(E)to reestablish the polarization of the plasma membrane following an action potential.
(C)91.Which of the following is a true statement about cardiac muscle cells?
(A)They lack an orderly arrangement of actin and myosin filaments.
(B)They have less extensive sarcoplasmic reticulum and thus contract more slowly than smith muscle cells.
(C)They are connected by intercalated discs, through which action potentials spread to all cells in the heart.
(D)They have a resting potential more positive than an action potential threshold.
(E)They contract only when stimulated by neurons.
(B)92. Which of the following changes occurs when a skeletal muscle contracts?
(A)The A bands shorten. (B)The I bands shorten. (C)The Z lines slide farther apart.
(D)The thin filaments contract. (E)The thick filaments contract.
(C)93. Which of the following levels of study in ecology includes all other levels in the list?
(A) population (B)organism (C)landscape (D)ecosystem (E)community
(A)94. Which of the following is correctly paired with its description?
(A)neritic zone－shallow area over continental shelf (B)benthic zone－surface water of shallow seas
(C)pelagic zone－seafloor (D)aphotic zone－zone in which light penetrates
(E)intertidal zone－open water at the edge of the continental shelf
(D)95. Which of the following do all terrestrial biomes have in common?
(A)annual average rainfall in excess of 25 cm
(B)a distribution predicted almost entirely by rock and soil patterns
(C)clear boundaries between adjacent biomes
(D)vegetation demonstrating vertical stratification
(E)cold winter months
(C)96. The growing season would generally be shortest in which biome?
(A)tropical rain forest (B)savanna (C)taiga (D)temperate deciduous forest
(E)temperate grassland

(B)97. According to the inequality known as Hamilton's rule (rB＞C),
(A)natural selection could not favor altruism if the altruist loses its life.
(B)natural selection would favor altruistic acts when the benefit to the receiver, reduced by the coefficient of relatedness, exceeds the cost to the altruist.
(C)natural selection is more likely to favor altruistic acts when the beneficiary is an offspring than when it is a sibling.
(D)kin selection is a stronger selection factor than the individual reproductive success favored by natural selection.
(E)Altruism must always be reciprocal.

(D)98. Which of the following is least likely to involve cognition?
(A)navigation of a sparrow during seasonal migration (B)being aware of your neighbor's lawn care
(C)territoriality (D)positive rheotaxis of a fish in a current (E)optimal foraging

(C)99. The core idea of sociobiology is that
(A)human behavior is rigidly predetermined by inheritance.
(B)humans cannot learn to alter their social behavior.
(C)many aspects of social behavior have an evolutionary basis.
(D)the social behavior of humans is comparable to that of bees.
(E)environment outweighs genes in human behavior.

(C)100. The concept of trophic structure of a community emphasizes the
(A)prevalent form of vegetation. (B)keystone predator. (C)feeding relationships within a community.
(D)effects of coevolution. (E)species richness of the community

(D)101. According to the concept of competitive exclusion,
(A)two species cannot coexist in the same habitat.
(B)extinction or emigration are the only possible results of competitive interactions.
(C)competition within a population results in the success of the best-adapted individuals.
(D)two species cannot share the exact same niche in a community.
(E)resource partitioning will allow a species to utilize all the resources of its niche.

(C)102. Food chains are relatively short in communities because
(A)two herbivore species may not feed on the same plant species.
(B)local extinction of one species dooms all the other species in a food web.
(C)energy is lost as it passes from one trophic level to the next higher level.
(D)very few predatory species have evolved.
(E)most plant species are inedible.

(D)103. According to the rivet model of community organization,
(A)two closely related species cannot coexist in the same community.
(B)extinction is rare in well-organized communities.
(C)species can be easily replaced if one should be driven extinct by human actions.
(D)all species in a natural community contribute to its integrity.
(E)communities are loosely structured groups of individualistic species with similar abiotic requirements.

(B)104. An example of Müllerian mimicry is
(A)a butterfly that resembles a leaf. (B)two poisonous frogs that resemble each other in coloration.
(C)a minnow with spots that look like large eyes. (D)a beetle that resembles a scorpion.
(E)a carnivorous fish with a wormlike tongue that lures prey.

(B)105. Predation and parasitism are similar in that both can be characterized as
(A)＋/＋ interactions. (B)＋/－ interactions. (C)＋/0 interactions. (D)－/－ interactions.
(E)symbiotic interactions.

(C)106. According to the hypothesis of island biogeography, species richness would be greatest on an island that is
(A)small and remote. (B)large and remote. (C)large and close to a mainland.
(D)small and close to a mainland. (E)environmentally homogeneous.

(C)107. The distinction between the parazoans and eumetazoans is based mainly on the absence versus the presence of (A)body cavities. (B)a complete digestive tract. (C)true tissues.
(D)a circulatory system. (E)mesoderm.

(E)108. What is the main basis for placing the arthropods and nematodes in the Ecdysozoa?
(A)Animals in both groups are segmented.
(B)Animals in both groups undergo ecdysis.
(C)They both have radial, determinate cleavage, and their embryonic development is similar.
(D)The fossil record has revealed a common ancestor to these two phyla.
(E)Their SSU-rRNA sequences are quite similar, and these sequences differ from those of the lophotrochozoans and deuterostomes.

(C)109. Bilateral symmetry in the animal kingdom is best correlated with
(A)an ability to sense equally in all directions. (B)the presence of a skeleton.
(C)motility and active predation and escape. (D)development of a true coelom.
(E)adaptation to terrestrial environments.

(A)110. Among the characteristics unique to animals is
(A)gastrulation. (B)multicellularity. (C)sexual reproduction. (D)flagellated sperm.
(E)heterotrophic nutrition.

(B)111. Which of the following subdivisions of the animal kingdom encompasses all the others in the list?
(A)protostomes (B)bilateria (C)pseudocoelomates (D)coelomates (E)deuterostomes

(D)112. Choose the phylum characterized by animals that have segmented bodies:
(A)Cnidaria (B)Platyhelminthes (C)Porifera (D)Arthropoda (E)Mollusca

(B)113. The water vascular system of echinoderms
(A)functions as a circulatory system that distributes nutrients to body cells.
(B)functions in locomotion, feeding, and gas exchange.
(C)is bilateral in organization, even though the adult animal has radial anatomy.
(D)moves water through the animal's body for suspension feeding.
(E)is analogous to the hydrostatic skeleton of annelids.

(A)114. Water movement through a sponge would follow what path?
(A)porocyte→spongocoel→osculum (B)blastopore→gastrovascular cavity→protostome
(C)choanocyte→mesohyl→spongocoel (D)porocyte→choanocyte→mesohyl
(E)colloblast→coelom→porocyte

(D)115. Which of the following is not a characteristic of most members of the phylum Annelida?
(A)hydrostatic skeleton (B)segmentation (C)metanephridia (D)pseudocoelom
(E)closed circulatory system

(E)116. Which of the following combinations of phylum and description is incorrect?
(A)Echinodermata－bilateral and radial symmetry, coelom from archenteron
(B)Nematoda－roundworms, pseudocoelomate
(C)Cnidaria－radial symmetry, polyp and medusa body forms
(D)Platyhelminthes－flatworms, gastrovascular cavity, acoelomate
(E)Porifera－gastrovascular cavity, coelom present

(E)117. Which of the following characteristics is probably most responsible for the incredible diversification of insects on land?
(A)segmentation (B)exoskeleton (C)tracheal system (D)metamorphosis (E)flight

(C)118. Some 530-million-year-old Chinese fossils resemble lancelets but have a more elaborate brain and a brain case (cranium). These fossils may represent
(A)the first chordate. (B)a " missing link " between the urochordates and cephalochordates.
(C)an early vertebrate. (D)a primitive bony fish. (E)a non-tetrapod gnathostome.

(D)119. In addition to skeletal differences, cartilaginous fishes can be distinguished from bony fishes
(A)by the presence in bony fishes of a cranium.
(B)by the presence in bony fishes of a lateral line.
(C)by the presence in cartilaginous fishes of unpaired fins.
(D)by the absence in cartilaginous fishes of a swim bladder.
(E)by the absence in cartilaginous fishes of paired sensory organs.

(D)120. Mammals and extant birds share all of the following characteristics except
(A)endothermy. (B)descent from reptiles. (C)a dorsal, hollow nerve cord.
(D)teeth specialized for diverse diets. (E)the ability of some species to fly.

(B)121. Unlike eutherian (placental) mammals, both monotremes and marsupials
(A)lack nipples. (B)have some embryonic development outside the mother's uterus.
(C)lay eggs. (D)are found in Australia and Africa. (E)include only insectivores and herbivores.

(E)122. Which of the following is not thought to be ancestral to humans?
(A)reptile (B)a bony fish (C)a primate (D)an amphibian (E)a bird

(C)123. A uniform dispersion pattern for a population may indicate that
(A)the population is spreading out and increasing its range.
(B)resources are heterogeneously distributed.
(C)individuals of the population are competing for some resource, such as water and minerals for plants or nesting sites for animals.
(D)there is an absence of strong attractions or repulsions among individuals.
(E)the density of the population is low.

(A)124. A " cohort " in a human life table consists of
(A)people who are the same age. (B)people who live in the same city.
(C)people of the same education level. (D)people who have the same occupation.
(E)people who have the same number of children.

(C)125. The term (K－N)/K influences dN/dt such that
(A)the increase in actual population numbers is greatest when N is small.
(B)as N approaches K, r, the intrinsic rate of increase, becomes smaller.
(C)when N equals K, population growth is zero.
(D)when K is small, the population begins growing exponentially.
(E)as N approaches K, the birth rate approaches zero.

(D)126. A population's carrying capacity is
(A)the number of individuals in that population.
(B)a constant that can be estimated for all populations.
(C)inversely related to r.
(D)the population size that can be supported by available resources for that species within the habitat.
(E)set at 8 billion for the human population.

(D)127. The current size of the human population is closest to
(A)2 million. (B)3 billion. (C)4 billion. (D)6 billion. (E)10 billion.

(C)128. Which of the following organisms is incorrectly paired with its trophic level?
(A)cyanobateria－primary producer (B)grasshopper－primary consumer
(C)zooplankton－secondary consumer (D)eagle－tertiary consumer (E)fungi－detritivore

(B)129. The role of decomposers in the nitrogen cycle is to
(A)fix N_2 into ammonia.
(B)release ammonia from organic compounds, thus returning it to the soil.
(C)denitrify ammonia, thus returning N_2 to the atmosphere.
(D)convert ammonia to nitrate, which can then be absorbed by plants.
(E)incorporate nitrogen into amino acids and organic compounds.

(D)130. The recent increase in atmospheric CO_2 concentration is mainly a result of an increase in
(A)primary production.
(B)the biosphere's biomass.
(C)the absorption of infrared radiation escaping from Earth.
(D)the burning of fossil fuels and wood.
(E)cellular respiration by the exploding human population.

(A)131. Which of the following is a result of biological magnification?
(A)Top-level predators may be most harmed by toxic environmental chemicals.
(B)DDT has spread throughout every ecosystem and is found in almost every organism.
(C)The greenhouse effect will be most significant at the poles.
(D)Energy is lost at each trophic level of a food chain.
(E)Many nutrients are being removed from agricultural lands and shunted into aquatic ecosystems.

(D)132. Which of these ecosystems has the lowest primary production per square meter?
(A)a salt marsh (B)an open ocean (C)a coral reef (D)a grassland (E)a tropical rain forest

(D)133. Which of the following conditions is the most likely indicator of a population in an extinction vortex?
(A)The population is divided into smaller populations.
(B)The species is rare.
(C)The effective population size of the species is around 500.
(D)Genetic measurements indicate a continuing loss of genetic variation.
(E)All populations are connected by corridors.

(E)134. What is the greatest threat to biodiversity?
(A)overexploitation of commercially important species
(B)introduced species that compete with or prey on native species
(C)the high rate of destruction of tropical rain forests
(D)disruption of trophic relationships as more and more prey species become extinct
(E)human alteration, fragmentation, and destruction of terrestrial and aquatic habitats

(B)135. Which of the following statements about the declining-population approach to conservation is not correct?
(A)We need information on whether or not the population in question is in decline.
(B)We need to do something quickly, even if we have no information, because conservation biology is a crisis discipline.
(C)Several hypotheses about why the population is declining should be evaluated.
(D)A proposed reason for the decline should be tested experimentally.
(E)Humans may not be the cause of every population decline.

(C)136. According to the small-population approach, what would be the best strategy for saving a population that is in an extinction vortex?
(A)determining the minimum viable population size by taking into account the effective population size
(B)establishing a nature reserve to protect its habitat
(C)introducing individuals from other populations to increase genetic variation
(D)determining and remedying the cause of its decline
(E)reducing the population size of its predators and competitors