

國立中央大學八十九學年度轉學生入學試題卷

(9) 生命科學系 二年級 科目：普通生物學 共 2 頁 第 1 頁

選擇題 (單選, 以下 25 題題目, 每題均有 5 個答案, 請選出一個最適合之答案: 50%)

- Many tropical plants circumvent the loss of carbon fixation due to oxygen by using a four carbon synthesis (C4) metabolism. The special cells of these plants, which can carry out C4 synthesis are
A. mesophyll cells B. bundle sheath cells C. epidermal cells D. guard cells E. xylem cells
- Microtubules become shorter, pulling chromatids to the ends of the spindle, during
A. anaphase B. interphase C. metaphase D. prophase E. telophase
- Mendel's understanding of the inheritance of traits in peas, expressed in modern language, included all of the following except:
A. Parents transmit information encoded in genes. B. Each individual contains two genes for each trait.
C. Not all genes are identical; alternative forms (alleles) exist. D. Each of the alleles present in an individual is discrete.
E. If a given allele is present, its effects will be seen in the individual.
- The codons that serve as "stop" signals for the protein synthesis are called
A. anticodons B. release codons C. nonsense codons D. amino acid codons E. tRNA codons
- When an RNA virus invades a cell, it typically first
A. causes the cell to make many copies of virus RNA B. causes the host cell to start dividing
C. closes the channels in the membrane D. inserts the RNA into a host chromosome
E. makes a DNA copy of the viral RNA
- Most genetic engineering experiments include four stages. Which of the following is not one of them?
A. cleaving the source DNA B. production of recombinant DNA C. cloning copies of the recombinants
D. screening the cloned copies for the desired gene E. integration of the entire bacterial chromosome
- The polymerase chain reaction, more popularly known as PCR, includes which of the following steps?
A. denaturation of primers and the DNA fragment to be amplified
B. annealing of primers to the complementary sequences on the DNA C. primer extension with DNA polymerase
D. repeating steps 1-3 in many cycles E. all of the above
- Hardy-Weinberg pointed out that the original proportions of the genotypes in a population will remain constant from generation to generation if certain assumptions are met. These are
A. The population is very large and random mating is occurring B. no gene mutation and migration takes place
C. no selection occurs D. a, b, and c E. a and b only
- If populations within a common area split into species, the process is known as
A. sympatric speciation B. allopatric speciation C. racial speciation
D. ecotypical speciation E. reproductive speciation
- The major cause of thinning of the ozone layer was attributed to
A. greenhouse gases B. nitric and sulfuric acids C. chloroflourocarbons D. phosphorus E. water vapor
- Plants as well as brown, green, and red algae show a basic life cycle which involves the alternation of generations between a(n)
A. spore and a pollen B. megaspore and a microspore C. seed and a cone
D. sporophyte and a gametophyte E. egg and a sperm
- Abscission occurs when plant sheds its leaves. The sequential steps of it are:
A. young leaves produce hormones that inhibit the development of specialized layers of cells in abscission zone, a protective layer, which may be several layers thick develops on the stem side of the petiole base
B. these cells get impregnated with suberin, a moisture-repelling lipid
C. pectins in the separation layer break down due to environment, which ultimately separate the leaf from the stem
D. new leaves immediately start growing in the same area
E. a, b, and c only
- Which of the following is not true about pseudocoelomates?
A. they possess an internal body cavity called as pseudocoel B. they contain a bony skeleton
C. they possess a complete, one-way digestive tract D. the pseudocoel permits resistance to muscle contraction
E. they lack a defined circulatory system
- Oxygen diffuses to the tissues of terrestrial arthropods through the
A. arteries B. cells of the cortex C. circulatory system D. lungs E. tracheae and tracheoles

參考用

注：背面有試題

國立中央大學八十九學年度轉學生入學試題卷

生命科學系 二年級

科目：普通生物學

共 2 頁 第 2 頁

15. Birds are different from reptiles in
A. presence of scales B. their lack of teeth C. presence of feathers
D. presence of a flight skeleton E. only b, c, and d
16. Which of the following are characteristic of all mammals and not of any other living vertebrates?
A. hair B. milk producing glands C. a and b D. endothermy E. placenta
17. The characteristic that makes the muscle cells unique is the relative abundance and organization of
A. collagen fibers B. gelatinous mass C. actin and myosin fibers D. keratin fibers E. fibroblast cells
18. The secretion of pepsinogen and HCl is controlled by the hormone
A. gastrin B. pepsin C. insulin D. cholecystokinin E. secretin
19. In spite of very low pressure in the veins, blood flow back to the lungs is ensured by all of the following mechanisms except
A. veins have one way valves B. veins have thinner muscle layers C. veins have thinner elastic fiber layers
D. veins can be expanded to hold additional blood E. veins have periodic sphincter muscles
20. Breathing is under the reflex control of chemoreceptors located in the aortic and carotid bodies in the brain. These chemoreceptors act on the respiratory control center to help keep which of the following constant?
A. PO_2 B. PCO_2 C. pH D. a and c E. b and c
21. The effect of myelin and nodes of Ranvier is to make nerve impulses travel
A. away from as well as toward the cell body B. faster C. in many directions at once
D. laterally from axon to axon E. slower
22. An example of a hormone that exerts its action within the target cell only by interacting with cell-surface receptors is
A. insulin B. cortisol C. testosterone D. estrogen E. progesterone
23. Which of the following is not a nonspecific defense of the vertebrate system?
A. cells that ingest invading microbes B. antimicrobial proteins that kill pathogens C. immunoglobulin synthesis
D. the inflammatory response E. the temperature response
24. The ability of a vertebrate to generate millions of different lymphocytes is a result of its DNA undergoing
A. somatic rearrangement B. somatic reestablishment C. clonal variability D. instructional variation E. gene cloning
25. The presence of the loop of Henle, allows which of the following animals to resorb water and produce a hypertonic urine?
A. birds B. freshwater fish C. mammals D. a and c E. b and c

參考用

問答題：

1. Please describe the function of the following organelles or structures: (10%)
a) Golgi apparatus b) Cytoskeleton c) Rough endoplasmic reticulum
d) Glomerulus e) Alveoli
2. Term explanation: (6%)
a) lymphokines b) cyclic AMP c) Action potential
3. Over the years, many schemes have been proposed for classifying organisms into kingdoms. Although increasingly under fire, the Whittaker's five-kingdom system is still widely accepted. What are the five kingdoms? (5%)
4. Indicate the location (or structure) where the following processes occur in the plant (12%).
1) sugars are made from carbon dioxide in chloroplast
2) capturing light energy in chloroplast
3) glycolysis
4) krebs cycle in mitochondria
5) chemiosmosis
(a) within mitochondria
(b) in bacteria
5. How do amphibians get air into their lung? How does this differ from the way other terrestrial vertebrates get air into their lungs? (3%)
6. What are the five agents that account for the evolution change and how do these agents act on microevolution or gene pools? (14%)