

國立高雄師範大學九十六學年度碩士班招生考試試題

系所別：科學教育研究所

科目：生物學（共 2 頁，第 1 頁）

一、Short-Answer Questions (each 5% , 50%)

1. What are the key replication enzymes at the replisome, and how is DNA replication on both leading and lagging strands made efficient through the conformation of the DNA at the replisome?
2. How do scientists, lacking the ability to make controlled genetic crosses in humans, study the inheritance of and give genetic counseling on human genetic disorders?
3. Classic albinism is an autosomal recessive mutation, yet two albino parents may produce a child with normal pigment. How can this be so?
4. Briefly list the basic steps involved in constructing a DNA fingerprint for a paternity case.
5. Considerable concern has been voiced over engineering crop plants with certain kinds of traits, notably the expression of pesticide genes and herbicide resistance, for fear that such traits may find their way into natural plant populations, including weeds. How might this be prevented?
6. Briefly describe three mechanisms by which genetic material is transferred between bacterial cells.
7. It is sometimes not easy to locate or identify genes based on cDNA. How do cDNA and DNA with respect to a given gene differ to create this problem?
8. Describe and distinguish between the three tissue systems of plant organs.
9. Describe the major consequences of photorespiration.
10. Describe the process of sugar loading and unloading of plant.

二、Multiple choice (each 2% , 30%)

1. A major type of lipid found in cell membrane is
(A) steroids (B) triglycerides (C) phospholipids (D) glycerol (E) waxes
2. Which of the following is **not** found in prokaryotic cells?
(A) pili (B) a cell wall (C) a capsule (D) ribosomes (E) a nucleus
3. Smooth endoplasmic reticulum
(A) is the major site of carbohydrate synthesis in eukaryotic cells.
(B) produces proteins for cell membranes.
(C) stores calcium ions in muscle cells
(D) produces antibodies.
(E) both A and C.
4. In the chloroplast, sugars are made in a compartment that is filled with a thick fluid called the
(A) stroma (B) thylakoid (C) matrix (D) cytoplasm (E) mesophyll
5. Which of the following researchers discovered fundamental principles of genetics by breeding garden peas?
(A) Watson and Crick (B) Krebs (C) Jenner (D) Mendel (E) Hippocrates

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6. Which of the following assumptions was **not** part of Darwin's theory of natural selection?
(A) Traits are inherited as discrete particles.
(B) The earth is very old.
(C) Populations produce more offspring than their environment can support.
(D) Organisms compete for limited resources.
(E) both A and B.
7. Which of the following choices lists taxonomic categories in order from least inclusive to most inclusive?
(A) genus; family; class; order; phylum
(B) genus; phylum; family; order; class
(C) genus; order; class; family; phylum
(D) family; genus; class; order; phylum
(E) genus; family; order; class; phylum
8. Which of the following types of plant cells functions in large part to limit a plant's loss of water vapor?
(A) guard cell (B) root hairs (C) endodermal cells (D) xylem (E) companion cells
9. Which of the following is not a variety of mechanoreceptor?
(A) touch receptors (B) pain receptors (C) pressure receptors
(D) stretch receptors (E) auditory hair cells
10. Which of the following organs performs the greatest number of functions?
(A) kidney (B) liver (C) gallbladder (D) spleen (E) nephron
11. According to the competition exclusion principle, two species can not continue to occupy the same
(A) habitat (B) ecological niche (C) range (D) territory (E) biome
12. An animal species in which an individual produce both eggs and sperms is called
(A) diecious (B) monocious (C) hermaphroditic (D) polyploid (E) pleiotropic
13. Genetic drift resulting from a disaster that drastically reduces population size is called
(A) a bottleneck effect (B) natural selection (C) gene flow (D) mutation (E) a founder effect
14. Which of the following vessels transports oxygenated blood from the lung back to the heart?
(A) pulmonary artery (B) aorta (C) vena cava (D) pulmonary vein (E) coronary artery
15. Which of the following hormones directly stimulates the secretion of testosterone?
(A) androgen (B) HCG (C) FSH (D) TSH (E) LH

三、問答題

1. Please define and explain the term "biodiversity" ? Please describe the importance of biodiversity to human life. (10%)
2. Please define and explain the term "environmental hormones"? How these compounds will impact on biota and humans? (10%)