

國立彰化師範大學 97 學年度碩士班招生考試試題

系所： 生物學系碩士班

組別： 甲/乙/丙組

科目： 普通生物學(二)

☆☆請在答案紙上作答☆☆

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一、各用約 20 字說明其功能：(共 25%)

1. Ribosome
2. Endosperm
3. Conidia
4. Glycogen
5. Pericycle

二、單選題：共 10 題，每題 2.5% (共 25%)

1. The process by which unrelated organisms with similar environmental demands evolve superficially similar structures is:
 - a. Homologous structures
 - b. Vestigial structures
 - c. Convergent evolution
 - d. Convergent structures
2. *Panthera* is a taxon at which level?
 - a. order
 - b. family
 - c. phylum
 - d. genus
3. An example of _____ selection is the death of extremely overweight and underweight babies.
 - a. Directional
 - b. Disruptive
 - c. Natural
 - d. Stabilizing
4. The first genetic material was most likely a(n)
 - a. DNA polymer
 - b. DNA oligonucleotide
 - c. RNA polymer
 - d. protein

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5. Who was the naturalist who synthesized a concept of natural selection independently of Darwin?
 - a. Charles Lyell
 - b. Thomas Malthus
 - c. Alfred Wallace
 - d. John Henslow

6. Given a population that contains genetic variation, what is the correct sequence of the following events, under the influence of natural selection? 1. Differential reproduction occurs. 2. A new selective pressure arises. 3. Allele frequencies within the population change. 4. Poorly adapted individuals have decreased survivorship.
 - a. 2, 4, 1, 3
 - b. 4, 2, 1, 3
 - c. 4, 1, 2, 3
 - d. 4, 2, 3, 1

7. Which of the following is applied to both anagenesis and cladogenesis?
 - a. branching
 - b. increased diversity
 - c. speciation
 - d. more species

8. Which of the following must occur during a period of geographic isolation in order for two sibling species to remain genetically distinct following their geographic reunion in the same home range?
 - a. behavior isolation
 - b. Food isolation
 - c. ecological isolation
 - d. reproductive isolation

9. Species that are not closely related and that do not share many anatomical similarities can still be placed together on the same phylogenetic tree by comparing their
 - a. chloroplast genomes
 - b. mitochondrial genomes
 - c. homologous genes that are poorly conserved
 - d. homologous genes that are highly conserved

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10. Which factor is the most important in producing the variability that occurs in each generation of humans?
- mutation
 - sexual recombination
 - genetic drift
 - natural selection

三、請回答下列問題：(共 50%)

- (a) Give the roles they play in the vascular plants by the following cells : sieve cell 、 sieve tube member 、 tracheid and vessel 。 (8 %)

(b) Draw the figures of tracheid and vessel to show their structural difference 。 (4 %)
- Illustrate the following physiological phenomena 。 (13 %)

 - compatible solute for osmoregulation (3 %)
 - nitrogenase complex of nitrogen fixation (3 %)
 - photosystem II of photosynthesis (3 %)
 - signal transduction pathway of GA1-induced α -amylase production in seed germination of cereal grains (4 %)
- 請以中文翻譯以下有關生態學上的文句 (15%)

Organisms are open systems that interact continuously with their environment. The scientific study of the interactions between organisms and the environment is called ecology (from the Greek *oikos*, home, and *logos*, to study). It is these interactions that determine both the distribution of organisms and their abundance leading to three questions that ecologists often ask about organisms: Where do they live? Why do they live where they do? And how many are there?

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4. 陸域生物相 (Terrestrial Biomes) 的分布與結構主要由氣候所決定，下圖表示北美洲幾個主要的陸域生物相與氣候圖 (Climograph) 的關係，請將北美六個主要的陸域生物相 (1) Arctic and alpine tundra, (2) Temperate broadleaf forest, (3) Temperate grassland, (4) Desert, (5) Tropical forest, (6) Coniferous forest，依據年均溫與年降雨量填入 A~F 適當的格子中。(10%)

