

# 國立彰化師範大學105學年度碩士班招生考試試題

系所： 生物學系

科目： 普通生物學

☆☆請在答案紙上作答☆☆

共 5 頁，第 1 頁

## 一、單選題：每一題 1%，共 25 題，25%

1. The term "ecology" is defined as the study of the  
(A) environment.  
(B) relationships between organisms.  
(C) relationships between organisms and their environment.  
(D) impact of humans on the environment.
2. All populations of different species living and interacting within an ecosystem are referred to collectively as a(n)  
(A) community.                      (B) biome.                      (C) population.                      (D) ecosystem.
3. Habitability is the ability of  
(A) an organism to survive in a particular habitat.  
(B) the physical environment to support life.  
(C) the organism to take in resources.  
(D) the physical environment to change.
4. Organisms that derive their energy from sunlight are referred to as  
(A) autotrophs or primary producers.  
(B) autotrophs or secondary producers.  
(C) heterotrophs or primary producers.  
(D) heterotrophs or secondary producers.
5. The gene pool refers to all of the genetic information within a  
(A) cell.                      (B) individual.                      (C) population.                      (D) species.
6. A group of local subpopulations is called a(n)  
(A) community.                      (B) species.                      (C) metapopulation.                      (D) ecogroup.
7. A population's density is calculated as the  
(A) area over which the population is distributed.  
(B) number of individuals within the population.  
(C) unit of area divided by the number of individuals.  
(D) number of individuals per unit area.
8. A population that is increasing in size has an intrinsic rate of population growth ( $r$ ) that is  
(A)  $< 0$ .                      (B)  $= 0$ .                      (C)  $> 0$ .                      (D)  $> 1$ .

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共 5 頁，第 2 頁

9. A systematic compilation of mortality and survival data for a population is called a(n)  
(A) age pyramid. (B) life table.  
(C) cohort group. (D) probability summary.
10. The preferential selection by a female of a male peacock with the longest tail feathers and the most eyespots on the tail feathers is an example of  
(A) polandry. (B) polygyny.  
(C) intrasexual selection. (D) intersexual selection.
11. The carrying capacity refers to the  
(A) minimum amount of resources needed to sustain a finite population with zero population growth.  
(B) maximum sustainable population size for the prevailing environment.  
(C) minimum number of individuals in a population required to assure reproductive success.  
(D) maximum growth rate of a population in which resources are unlimited.
12. In a typical metapopulation,  
(A) suitable habitat is relatively patchy rather than uniform.  
(B) only the smaller subpopulations are at risk of extinction.  
(C) the isolation of habitat patches prevents recolonization after local extinction.  
(D) the dynamics of local populations are synchronized.
13. Which of the following is the correct hierarchy of the population concept?  
(A) local population < metapopulation < subspecies < species  
(B) metapopulation < local population < subspecies < species  
(C) local population < metapopulation < species < subspecies  
(D) metapopulation < local population < species < subspecies
14. When the relationship between two interacting species is detrimental to the populations of both species, the interaction is referred to as  
(A) parasitism. (B) mutualism. (C) competition. (D) amensalism.
15. The portion of potential resources and conditions that an organism actually exploits as a result of interactions with other species is its  
(A) home range. (B) territory. (C) realized niche. (D) fundamental niche.
16. An organism that feeds on plant or algal tissues is referred to as a(n)  
(A) herbivore. (B) omnivore (C) carnivore. (D) decomposer.

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共 5 頁，第 3 頁

17. Which of the following is an example of Mullerian mimicry?
- (A) walking sticks that resemble twigs.
  - (B) stinkbugs that produce a noxious odor.
  - (C) flounders whose colors resemble the sea floor.
  - (D) wasps with black and yellow bands.
18. Within a food web, herbivores are considered to be
- (A) basal species.
  - (B) intermediate species.
  - (C) top predators.
  - (D) represented at any level.
19. When apparent competition occurs, the
- (A) populations of predator and prey species are smaller.
  - (B) population of the predator species is larger and the populations of the prey species are smaller.
  - (C) population of the predator species is smaller and the populations of the prey species are larger.
  - (D) populations of predator and prey species are larger.
20. Plants assimilate energy through the process of
- (A) decomposition.
  - (B) respiration.
  - (C) photosynthesis.
  - (D) regeneration.
21. The highest diversity of plant and animal life occurs in
- (A) tropical savannas.
  - (B) tropical rain forests.
  - (C) temperate deciduous forests.
  - (D) boreal forests.
22. An endemic species is best defined as a species that
- (A) is a habitat specialist with a large geographical distribution.
  - (B) has so few individuals remaining that it ceases to perform its role within an ecosystem.
  - (C) no longer occurs in a given area yet still survives elsewhere.
  - (D) occurs in a single geographic area and nowhere else.
23. Species living on isolated islands are especially vulnerable to extinction by
- (A) overhunting.
  - (B) pollution.
  - (C) the introduction of exotic species.
  - (D) habitat destruction.

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24. Which of the following gases in the atmosphere is not considered a greenhouse gas?  
(A) carbon dioxide.      (B) nitrogen.      (C) water vapor.      (D) ozone.
25. The mechanism of evolution proposed by Charles Darwin in *The Origin of Species* is  
(A) acclimatization.      (B) natural selection.  
(C) acquired inheritance.      (D) adaptation.

## 二、選擇題：每一題 3%，共 5 題，15%

1. 請問台灣最新成立的國家公園是下列何者?  
(A) 台江國家公園  
(B) 澎湖南方四島國家公園  
(C) 東沙環礁國家公園  
(D) 金門國家公園
2. Three-domain system (三域系統)是比" Kingdom(界)"更高一級的分類系統，是由美國微生物學家和生物物理學家在1977年提出的細胞生命形式的分類，請問該分類系統主要是依據下列何者去區分的?  
(A) 細胞壁 (cell wall)      (B) 細胞核 (Cell nucleus)  
(C) 多醣類 (polysaccharide)      (D) 核糖體RNA (ribosomal RNA)
3. 請問"三域系統"是哪三域?  
(A) 真核域、真菌域、細菌域  
(B) 真核域、細菌域、古菌域  
(C) 真菌域、真核域、原核域  
(D) 真核域、古核域、原核域

請翻頁繼續作答

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4. 根據下列的同物異名表，請問該動物的學名最可能為何？

<i>Volsella fortunei</i> Dunker, 1857
<i>Dreissena siamensis</i> Morelet, 1866
<i>Modiola lacustris</i> Martens, 1875
<i>Limnoperna lemeslei</i> Rochebrune, 1881
<i>Limnoperna supoti</i> Brandt, 1974
<i>Limnoperna coreana</i> Park & Choi, 2008

- (A) *Volsella fortunei* (Dunker, 1857)  
(B) *Volsella fortunei* (Dunker, 1857)  
(C) *Limnoperna fortunei* (Dunker, 1857)  
(D) *Limnoperna coreana* (Dunker, 1857)
5. 族群內某特定基因座有二個等位基因 A 及 a，A 的出現頻率為 0.3。若該族群處在哈溫平衡 (Hardy-Weinberg equilibrium)，則其異基因型合子 (heterozygotes) 的頻率為何？  
(A) 0.9                      (B) 0.21                      (C) 0.42                      (D) 0.49

### 三、簡答題：每一題 5%，共 2 題，10%

1. competitive exclusion principle(競爭排斥原理)
2. synapomorphy (近裔共性)

### 四、問答題：50%

1. 請詳細說明痛風 (gout) 形成的原因。(5%)
2. 請寫出一種糖尿病常見的病徵。葡萄糖分子在形成這個病徵中所扮演的角色為何？(10%)
3. 請詳細說明 Nitrate assimilation 的目的地、反應步驟、以及參與反應的酵素。(10%)
4. 請您舉出一例真菌在分子生物學上的貢獻。(5%)
5. 請您詳述一例真菌與其他物種互利共生的現象。(5%)
6. 請您詳述植物體內水分運輸的原理。(一項 2.5 分)(10%)
7. 請您詳述保衛細胞如何調控鉀離子以造成膨壓改變來調控氣孔開關。(5%)