

大葉大學 97 學年度 研究所碩士班 招生考試試題紙

系所別	組別	考試科目 (中文名稱)	考試日期	節次	備註
生物資源學系碩工班	甲	生態學或生物化學	4月13日	第一節	共四頁 P4-1

註：考生可否攜帶計算機或其他資料作答，請在備註欄註明（如未註明，一律不准攜帶）
備註：請選擇生態學或生物化學其中一份試題作答，切勿多份作答 0830410260

研究所入學考試 生物化學試題

1. (A) Asp-Trp-Tyr (B) Tyr-Lys-Met (C) Leu-Val-Phe (D) Asp-His-Glu (E) Gly-Pro-Arg

Which one of the above tripeptides: (16%)

- (1) is most negatively charged at pH 7?
 - (2) contains the largest number of nonpolar R groups?
 - (3) contains sulfur?
 - (4) will have the greatest light absorbance at 280 nm?
2. Which sugar is a non-reducing sugar (A)lactose (B)maltose (C)sucrose (D)glucose? (4%)
3. The main structural difference between cellulose and starch is (A)sugar composition (B)stereochemical glycosidic bond (C)different length of polymer (D)different branched polymer. (4%)
4. Which of the following is a heteropolysaccharide?(A)Cellulose (B) Hyaluronate (C) Glycogen(D)Chitin(E)Starch (4%)
5. Which of the following monosaccharides is not an aldose? (A)erythrose(B)fructose(C)glucose(D)ribose(E)galactose (4%)
6. Which fatty acid is an essential fatty acid? (A)lauric acid (B)palmitic acid(C)linoleic acid(D)oleic acid (4%)
7. Prostaglandins are formed from (A)arachidonic acid (B)oleic acid (C)palmitic acid by oxidation and cyclization. (4%)
8. 糖酵解(Glycolysis)作用可分兩個階段，各五個反應。請問在(1)第一個階段可產生多少 ATP? (5%) (2)第二個階段可產生多少 ATP? (5%) (3)整個糖酵解作用共產生多少 ATP? (10%)
9. 請說明下列的反應或酵素在細胞中的哪個位置進行。(20%)
- (1) Glycolysis
 - (2) TCA cycle
 - (3) Electron transport
 - (4) Oxidative phosphorylation
 - (5) Pyruvate dehydrogenase
 - (6) Succinate dehydrogenase
 - (7) ATP-Citrate lyase
 - (8) Pyruvate carboxylase
 - (9) Isocitrate lyase
 - (10) Cholesterol biosynthesis
10. Please write the component of monosaccharide and linkage of the following carbohydrates: lactose, sucrose, maltose, cellobiose, isomaltose, cellulose, glycogen, chitin, starch, hyaluronate. (20%)

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0830~1020

研究所入學考試 生態學試題

A. 選擇題 (每題 4%，共 40%)

- Which of the following levels of organization is/are correctly ordered?
 - population, ecosystem, landscape, individual, interaction
 - individuals, population, interactions, community, ecosystem
 - biosphere, landscape, individuals, community, interactions
 - ecosystem, landscape, region, interactions, populations
 - None of the choices are correct.
- Which of the following organisms use inorganic matter as their energy source?
 - photosynthesizers
 - chemosynthesizers
 - autotrophs
 - both photosynthesizers and chemosynthesizers
 - photosynthesizers, chemosynthesizers and autotrophs
- Density is defined as
 - the number of individuals within a population.
 - abundance.
 - the number of individuals per unit area.
 - the distribution of individuals within a given area.
 - None of the choices are correct.
- The age distribution of a population can reveal
 - growth potential.
 - survivorship.
 - reproduction.
 - both growth potential and survivorship.
 - growth potential, survivorship and reproduction.
- $dN/dt = r_{max}N [(K - N)/K]$ represents
 - annual growth rate.
 - geometric population growth.
 - exponential growth rate.
 - logistic growth.
 - None of the choices are correct.
- Which of the following environments for germinating seed is most likely to favor a plant species that makes many small seeds, compared to one that makes fewer larger seeds?
 - nutrient limitation
 - competition from established plants
 - shade
 - deep burial in soil
 - disturbance

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0830~1030

生態學試題

7. Which statement about organisms' "niches" is false?
 - A. The niche summarizes environmental factors influencing growth, survival, and reproduction of a species.
 - B. The niche concept was developed by Joseph Grinnell and Charles Elton.
 - C. The "fundamental" niche refers to physical, but not biological aspects of the environment.
 - D. Interactions such as competition and parasitism may restrict the size of an organism's niche.
 - E. In the laboratory, two species with identical niches are especially easy to maintain in a mixed culture.
8. Mycorrhizal fungi acquire _____ from their plant partners.
 - A. sugars
 - B. soil nutrients
 - C. proteins and lipids
 - D. growth hormones
 - E. protection from consumers
9. A keystone species is one
 - A. that makes up a very large proportion of total community biomass.
 - B. that feeds on a very large fraction of all available prey species.
 - C. that is fed on by a very large fraction of all predators in its community.
 - D. whose feeding activities have a disproportionate effect on the structure of its community.
 - E. that occupies the lowest level (the base) of the food web.
10. "Primary" succession is succession that
 - A. involves establishment of primary producers where there were none.
 - B. leads to establishment of a climax community dominated by primary producers.
 - C. occurs on newly exposed geologic substrates, not organic soil.
 - D. occurs where organic soils have been exposed but not destroyed by disturbance.
 - E. occurs after fire or agricultural abandonment.

B. 簡答題 (30%)

1. Species Richness vs. Species Evenness vs. Species Abundance vs. Species Diversity (10%)
2. Disturbance (defined by White and Pickett) (3%)
3. "R selection" & "K selection" (5%)
4. Metabolic water (3%)
5. Eusocioality 之特徵 (3%)
6. Biomes (3%)
7. Metabolic water (3%)

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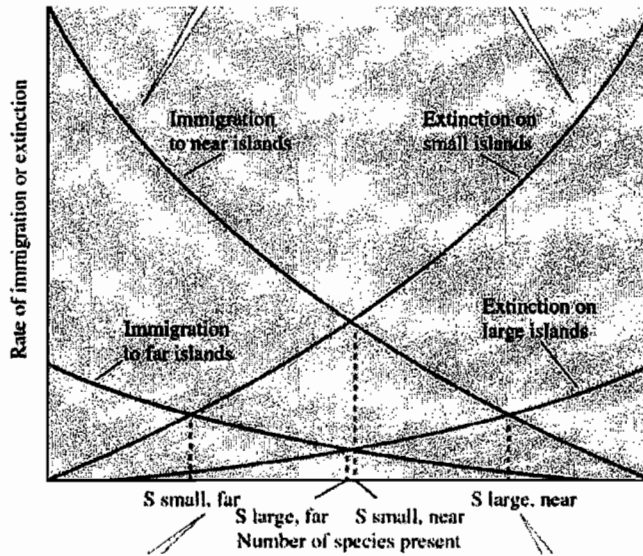
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生態學試題

C. 申論題

1. 何謂 Countercurrent Heat Exchangers? 請舉
2. 請依據右圖，說明「島嶼生物地理」之理論
3. 下圖是「捕食者」與「被捕食者」間依存關係參照 Lotka Volterra 的模型公式（如下）說

$$dN_h/dt = r_h N_h - p N_h N_p$$

$$dN_p/dt = cp N_h N_p - d_p N_p$$



例說明。(10%)

與原則。(10%)

係的兩個圖形。請
明之。(10%)

