

國立中山大學 102 學年度轉學考招生考試試題

科目名稱：普通生物學【海資系二年級】

題號：752001

※本科目依簡章規定「不可以」使用計算機

共 1 頁第 1 頁

- 一、動物界之循環系統，如何讓每一細胞於單位時間獲得充分的氧氣，請概分五項詳述其重要之演化步驟與過程（25 分）。
- 二、請就生物學的論述，說明何謂「生命」（5 分），並詳述「恆定」的概念（10 分）。
- 三、太陽能如何轉換成生物所需之能量，請詳述其轉換的步驟與過程，並說明每一轉化步驟的意義（30 分）。
- 四、
 1. 何謂 genome（5 分）
 2. 何謂 expressed sequence tags (EST)（5 分）
 3. 何謂 acclimation（5 分）
 4. 請以基因體學概念說明馴化機制（5 分）
 5. 請就你所知，簡述生物學研究發展史（5 分）
 6. 何謂生物科技產業（5 分）

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請注意：(a)若涉及計算，請將演算過程列出，否則不予計分

(b) $\log 2=0.30$ $\log 3=0.48$

(c)原子量：H=1, C=12, N=14, O=16, Na=23

- Give the number of significant figures in each of the following numbers :
(a)0.0123 g (b) 3.40×10^3 mL (c)1.6402 g
(d)1.020 L (e)1600 mL (10%, 2% each)
- Write the ground-state electron configuration of
(a)He (b)O (c)F (d)Cu (e)As (10%, 2% each)
- What is the maximum number of orbitals that can be identified by each of the following sets of quantum numbers? When "none" is the correct answer, explain your reasoning.
(a) $n=3, l=0, m=+1$ (b) $n=5, l=1$ (c) $n=7, l=5$
(d) $n=4, l=2, m=-2$ (e) $n=2, l=2$ (10%, 2% each)
- Give the systematic name for each of the following compounds :
(a)LiH (b)KI (c)CaCl₂ (d)CoBr₂ (e)Al₂O₃ (10%, 2% each)
- Which solvent, water or carbon tetrachloride, would you choose to dissolve each of the following ?
(a)MgF₂ (b)SO₂ (c)CO₂ (d)KrF₂ (e)CH₂O (10%, 2% each)
- Distinguish between the end point and the equivalence point of an acid-base titration. (10%)
- Calculate the mass of sodium acetate (CH₃COONa) that must be added to 500 mL of 0.200 M acetic acid (CH₃COOH) to form a pH=5.00 buffer solution. (pK_a of acetic acid is 4.70) (10%)
- Consider the reaction
$$2\text{O}_{(g)} \rightarrow \text{O}_{2(g)}$$

(a)Predict the signs of ΔH and ΔS . (4%)
(b)Would the reaction be more spontaneous at high or low temperature? Explain your answers. (4%)
- The reaction
$$\text{A} \rightarrow \text{B} + \text{C}$$

is known to be zero order in A and to have a rate constant of $5.0 \times 10^{-2} \text{ M} \cdot \text{s}^{-1}$ at 25°C. An experiment was run at 25°C where $[\text{A}]_0 = 1.0 \times 10^{-3} \text{ M}$
(a)Write the integrated rate law for this reaction. (4%)
(b)Calculate the half-life for the reaction. (4%)
(c)Calculate the concentration of B after $5.0 \times 10^{-3} \text{ s}$ has elapsed. (4%)
- Calculate the molar solubility of silver chloride in 0.10 M NH_{3(aq)}, given that $K_{sp} = 1.6 \times 10^{-10}$ for silver chloride and $K_f = 1.6 \times 10^7$ for the ammonia complex of Ag⁺ ions, Ag(NH₃)₂⁺. (10%)