

大葉大學 九十三 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
分子生物科技學系	甲	生物化學	3月28日	第二節	P2-1

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） (0230012200 文=頁

Please answer questions according to the biological compound category (請依照歸類 A-E 回答下類問題。每大題各 20 分，各題分數列於該題後；總分 100 分)

A、醣類 (共三題；A,1-3)

(A-1) The citric acid cycle plays roles in both oxidative and synthetic processes; i.e., it is amphibolic. However, which one of the following pathways is not included? (a) fatty acid synthesis (b) glycogenesis (c) gluconeogenesis (d) transamination (e) deamination (2%)

(A-2) Please describe the two major functions of pentose phosphate pathway. (8%)

(A-3) Please describe the generation of high-energy phosphate (ATP) in catabolism of one molecule of glucose during glycolysis and citric acid cycle under aerobic condition. (10%)

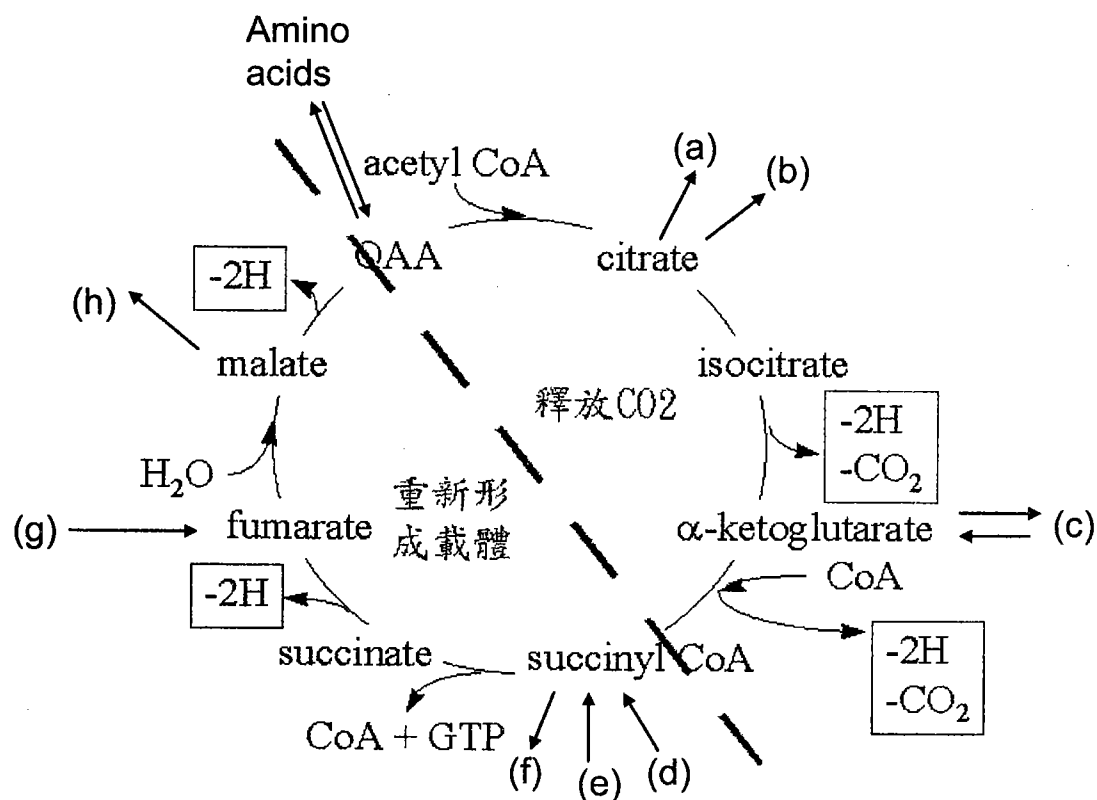
B、新陳代謝 (參考下頁所列圖形回答問題；共兩大題；B,1-2)

(B-1) The above diagram is one of the key metabolism to the living cell, please:

a. give the name to the metabolism refer to (1 point).

b. give the importance of the above identified metabolism (1 point).

a-h are intermediates (Amino acids, Aspartate, Phenylalanine, Tyrosine, Cholesterol, Fatty acids, Glucose, Isoleucine, Methionine, Valine, Odd-chain fatty acids, Porphyrins) for reactions related to the above identified metabolism, please write the correct intermediate to each of the blank (1 point each, total 8 points).

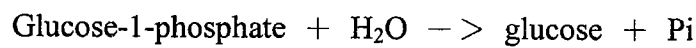


大葉大學 九十三 學年度 研究所碩士班 招生考試試題紙

系 所 別	組 別	考 試 科 目 (中文名稱)	考 試 日 期	節 次	備 註
分子生物科技學系	甲	生 物 化 學	3月28日	第二節	P2-2

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） (0:30~12:00) 共二頁

(B-2) ΔG° for the reaction:



is $-20.9 \text{ kJ} \cdot \text{mol}^{-1}$

Please answer the following questions.

- what is ΔG° (2 points)?
- what is the relationship between ΔG° and k (2 points)?
- calculate the equilibrium constant for the hydrolysis of glucose-1-phosphate at 37°C (2 points).
- is this a thermodynamically favored reaction (2 points)?
- is the reaction may or may not occur in living cell, and why (2 points)?

C、胺基酸（共兩題；C，1-2）

(C-1)、Structure of Asparagine and Histidine (6 points)

(C-2)、Please briefly describe the principles of any two techniques for separating amino acids (14 points)

D 脂肪（共兩題；D,1-2）

(D-1)、Please briefly describe two major lipid components and their structure of the biological membrane? (10 points)

(D-2)、What process primed the free fatty acid for oxidation? If the fatty acid is oxidized in mitochondria, what process help the fatty acid transportation across the mitochondrial membrane? (10 points)

E、能量與醣解（共兩大題；E，1-2）

(E-1)、Organisms can obtain chemical energy from a variety of metabolic storage e.g. glycogen, fats and proteins. Compare the three fuel sources in regards to the following (12 points) :

- speed of access
- maximal fuel per unit mass
- ability to metabolically regulate usage

(E-2)、There are two key enzymes control glycogen metabolism in the liver. Please name the two enzymes and briefly describe their role in controlling glucose levels in the blood. (8 points)