銘傳大學 96 學年度研究所碩士班招生考試
生物科技學系碩士班
第一節

生物化學試題

（限用答案本作答）

請用英文或中文做答　每題十分

1. Lysine has the following pK_a values: pK_1=2.2 pK_2=9.0 pK_3=10.5

a. Draw an appropriate titration curve for lysine, labeling the axes and indicating the equivalence points and the pK_a values.

b. Calculate the pH at which the ε-amino group of lysine is 20% dissociated. (log2=0.3　log4=0.6　log8=0.9)

2. What is the Z scheme of photosynthesis? How the products of this reaction used to fix CO_2?

3. Compare the entry-level substrates, products and metabolic purposes of glycolysis and gluconeogenesis.

4. Give examples to explain how hormones act to modify the metabolism of fatty acids.

5. Describe how a protein is targeted for degradation and what are the structural features of proteins that mark them for destruction?

6. Consider the following data for an enzyme-catalyzed hydrolysis reaction (1) in the absence of inhibitor and (2) by the inhibitor I:

[Substrate]	1/[S]	(1) V	1/V	(2) V_I	$1/V_I$
0.6 mM	1.67	20.8 μmol/min	0.05	4.2 μmol/min	0.24
1 mM	1	29 μmol/min	0.04	5.8 μmol/min	0.18
2 mM	0.5	45 μmol/min	0.03	9 μmol/min	0.12
6 mM	0.17	67.6 μmol/min	0.02	13.6 μmol/min	0.08
18 mM	0.06	87 μmol/min	0.01	16.2 μmol/min	0.07

a. Using a Michaelis-Menton equation, determine K_m for the two reactions.

b. What type of inhibition is being measured?

7. What structural differences characterize starch, cellulose and glycogen.

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8. Make a list of the ways that transcription in eukaryotes differs from in prokaryotes.

9. There are many structural differences between DNA and RNA. Please describe the differences.

10. Describe the function of the following terms
a. Flippase b. Transposon c. Glucagon d. Steroids e. Trypsin

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