

第一部分

1. A weak acid HA is 5 % dissociated in a 0.1 M solution.
 - (a). What is K_a of this acid?
 - (b). What is the pH of this solution? (8 %)
2. A protein molecule, in its folded native form, has one favored conformation. But when it is denatured, it becomes a random coil, with many possible conformations.
 - (a). What will happen to ΔS , when it becomes denatured?
 - (b). What is required to impose on ΔH , if this protein is to hold its stable structure? (8 %)
3. Given the following sequence for an RNA molecule, find a secondary structure that will be maximally stable.
GUCCAGCCAUUGCGUUCGCAAUGGC (4 %)
4. What possible forces are involved to hold a stable native protein? (5 %)
5. Please draw a schematic model of an antibody molecule. (5 %)
6. Please describe the fluid mosaic model for a typical cell membrane. (5 %)
7. Please explain the competitive and non-competitive inhibition of enzymes. (5 %)
8. Please show schematically the photosynthetic electron transport chain of higher plants. (5 %)
9. Please show schematically the rotary model of the F_1 ATP synthase for ATP formation. (5 %)

八十七學年度輻射生物研究所系(所) _____ 組碩士班研究生入學考試

科目 生物化學 科號 1401 共 2 頁第 2 頁 *請在試卷【答案卷】內作答

10. Please briefly explain the function of DNA ligase and helicase.
(5%)
11. Please show schematically a simple operon model for the control of lactose utilization in *E coli*.
(10%)
12. Please describe briefly the stages and events in the eukaryotic cell cycle.
(10%)

第二部分

1. Please write down two differences and two similarities in chemical structure (or composition) between RNA and DNA. 8%
2. Draw a purine and a pyrimidine base of a nucleotide. 6%
3. Choose right answer 4%
(3-1): Mutation occurred from C--G to T--A (a. Transition b. Transversion).
(3-2): Mutation occurred from C--G to G--C (a. Transition b. Transversion).
4. (4-1): What does ligase enzyme do?
(4-2): Does ligation belong to energy-dependent or energy-independent process? 2%
5. Comparison between genomic library and cDNA library. 5%