

國立交通大學試題紙

科目：生化學

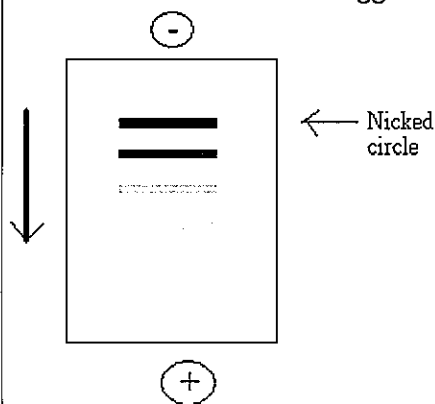
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請“✓”明 不可看書 ✓可看書

* 請將答案依題號順序寫入答案卷

答題時字跡需工整，否則不予計分。Write your answers legibly; otherwise you will get zero score.

1. Please describe the meaning of the following rate constants in an enzymatic reaction: K_m , V_{max} , k_{cat} and k_{cat}/K_m .
2. What are the methods that can be used to determine the three dimensional structure of a protein? Please give two examples and briefly describe their theory and limitation.
3. What are the modern methods used to study proteomics? Please give a simple flow sheet and briefly describe two of the techniques involved.
4. Please give the approximate size of a cell, protein and water molecule.
5. What would you do to clone a gene from cell?
6. A closed circular supercoiled DNA is relaxed by treatment with topoisomerase. No matter how much enzyme is used, or how long the experiment is run, the experimenter always finds a gel electrophoresis pattern indicating some DNA with one, two, and three superhelical turns in addition to the relaxed circle. Suggest an explanation for this observation.

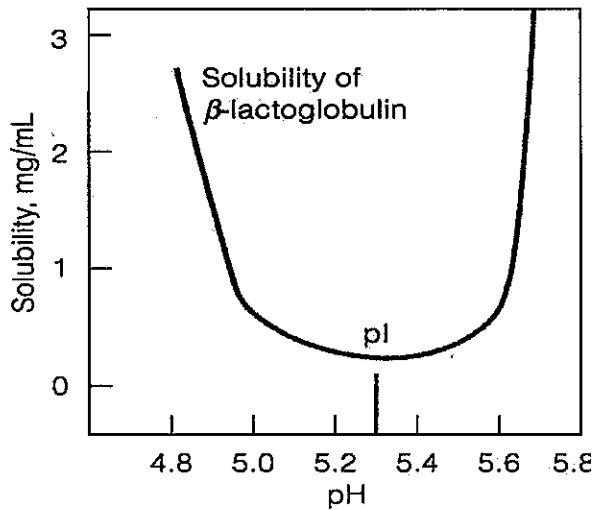


7. Label the following statements true or false and give the reasons for your answers:
 - a. A reaction is said to be spontaneous when it can proceed in either the forward or reverse direction.
 - b. A nonspontaneous reaction will proceed spontaneously in the reverse direction.
 - c. A spontaneous process always happens very quickly.
 - d. A spontaneous process can occur with a large decrease in entropy.

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8. The solubility of a typical protein is illustrated in the following figure. Please describe what is PI and explain why the solubility of the protein is better at pH higher or lower than its PI.



9. Given the following sequence for one strand of a double-strand oligonucleotide
5'ACGTAAGCT3'
Draw the complete primary chemical structure of its complementary DNA strand. (You may draw only the first four nucleotides)
10. Explain why double strands of DNA molecules can be separated more easily at pH > 11.