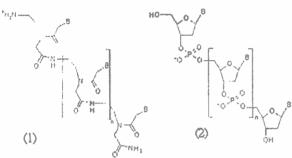
	國	立	清	***	大	學	命	題	紙
	95 學年度_	工學院		微機電系統	<u> 统工程研究</u>	3所	碩士班入	學考試	
科目_	生物化學	科目	弋碼	<u>2407</u> 共	1頁第	頁	*請在【	答案卷卡】	

Answer the following questions briefly but in sufficient details. (#1-16: 6 points each; #17: 4 points.)

- 1. The weak acid HA is 2% ionized in a 0.2 M solution. What is the Ka for this acid and what is the pH of this solution?
- 2. When performing agarose gel electrophoresis of DNA, what pH of the buffer would you use? To which direction (cathode or anode) do you expect the DNA will migrate? What is the major purpose to use agarose gels in DNA electrophoresis?
- 3. Please explain the principle of isoelectric focusing and how the experiment is performed.
- 4. Please explain how CsCl density gradient is used to study DNA conformation. How do you generate a suitable CsCl density gradient in a test tube?
- 5. What is the name of the bond (eg. Glycosidic, ester, hydrogen, peptide, disulfide, etc...?) between each unit in the polymers shown below? What are these polymers? B represents a nitrogenous base.



- 6. Please describe the possible effects of beta-mercaptoethanol and iodoacetate on enzyme structure and function.
- 7. Please explain why high performance liquid chromatography (HPLC) can achieve better separation of analytes than conventional column liquid chromatography.
- 8. Please describe a technology that can be used to determine whether two different proteins interact with each other.
- 9. What instrument can be used to provide the most accurate molecular weights of proteins? What is the principle of the instrument?
- 10. What are the physiological functions of nucleotide sugars? Give one nucleotide sugar as an example to explain how it is synthesized.
- 11. What is the major function of cholesterol in animal cell membrane? If you plan to design a drug to block cholesterol synthesis in liver, what enzyme would you choose to be the target? Why?
- 12. What are the definitions and units of  $K_{M}$  and  $k_{cat}$  in enzyme kinetic analysis?
- 13. Please show the reaction catalyzed by pyruvate dehydrogenase complex. List the cofactors participate in the reaction. Why is the reaction important?
- 14. What is "fluorescence"? Give an example to explain how fluorescence can be used in protein study.
- 15. What are the major biochemical components of extracellular matrix and the major extracellular buffering system in the human body?
- 16. Give approximate values for: (A) the hydrogen bond length; (b) the thickness of cell membranes; (c) the length of a 5000 kb DNA molecule.
- 17. Please explain the principle of the atomic force microscope (AFM)? What are the major applications of AFM in life science?