

一、複選題；每題 5 分 (Each question may have more than one answer)

1. Which of the following enzymes may be used in cloning a foreign DNA fragment into a vector?
 - A. restriction endonuclease
 - B. DNA ligase
 - C. reverse transcriptase
 - D. RNA polymerase
 - E. all the above four enzymes

2. Which of the following description about human genome are correct?
 - A. It is the biggest genome in eukaryotic cells
 - B. It may encode for 100,000 protein
 - C. It contains 3 billion base pairs
 - D. 75% of genome is exon sequences
 - E. Intron starts with AG (5'end) and ends with GT (3'end)

3. Restriction fragment length polymorphism (RFLP) can be used for
 - A. detect gene expression in the tissue
 - B. determine paternal-offspring relation
 - C. determine victim- suspect relation in forensic medicine
 - D. detect alternative splicing
 - E. all the above four are true

4. Which of the following techniques can be used to detect tissue distribution of a gene?
 - A. Southern Blot
 - B. Western Blot
 - C. RT-PCR
 - D. Northern Blot
 - E. In situ hybridization

5. Which of the following techniques may be used in proteomics?
 - A. 2-D gel electrophoresis
 - B. mass spectrometry
 - C. gel filtration
 - D. affinity chromatography
 - E. all of the above four

(背面仍有題目,請繼續作答)

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6. You need to express the recombinant protein for the receptor of a growth hormone. Which of the following expression system is your best choice?
- A. *E. coli*
 - B. mammalian cells
 - C. pichia
 - D. insect cells
 - E. all of above four
7. Which of the following may have therapeutic potential if overexpression of the gene X is the cause of the disease?
- A. recombinant protein X
 - B. RNAi of gene X
 - C. a small molecule which antagonizes receptor for protein X
 - D. antibody against protein X
 - E. all the above four
8. Polymerase chain reaction (PCR) can be applied in the field of
- A. epidemiology
 - B. forensic medicine
 - C. paleontology
 - D. prenatal diagnosis
 - E. all the above four
9. You try to express a cDNA with 1000 bp in the eukaryotic cells. After the recombinant protein was expressed and purified, you found there were three different proteins with 90 Kd, 50 Kd and 40 Kd on SDS gel. Which of the following possibilities may be true?
- A. Overglycosylation of the protein
 - B. Degradation of protein
 - C. Alternative splicing
 - D. Dimerization of protein
 - E. all of the above are true
10. Which of the following statements may be true for a DNA fragment of 200bp?
- A. It may encode a protein with 66 amino acids
 - B. It may have six different open reading frames
 - C. It may contain three methionines
 - D. It may have four stop codons in one frame
 - E. all of the above four are true

II. 問答題與簡答題 (每題十分)

11. Describe RNA editing of the transcript of the gene for the apolipoprotein B.
12. List the enzymes and describe their functions that are necessary for DNA replication in *E. coli*
13. Describe the regulation of the *ara* operon of *E. coli*.
14. Describe three major mechanisms of translational regulator in eukaryotic cells
15. Briefly explain the following:
 - a). Nonsense suppressor (2%)
 - b). Branch migration (2%)
 - c). Autotroph (2%)
 - d). SELEX (2%)
 - e). snRNA (2%)