

系所組別： 生物資訊研究所

考試科目： 生物化學

考試日期： 0308，節次： 2

※ 考生請注意：本試題 可 不可 使用計算機**A. Please choose the correct answer (only one answer) for each of the questions.****(30%)****1. Which can be used for the identification of molecule structure?**

- (A) Electrophoresis
- (B) Ultracentrifugation
- (C) NMR
- (D) Gel filtration

2. Which enzyme is the most sensitive to α -amanitin?

- (A) Poly A synthetase
- (B) RNA polymerase I
- (C) RNA polymerase II
- (D) RNA polymerase III

3. Which enzyme can be inhibited by Actinomycin D

- (A) Telomerase
- (B) DNA dependent RNA polymerase
- (C) RNA dependent RNA polymerase
- (D) Helicase

4. Which residue can not be phosphorylated on protein?

- (A) Proline
- (B) Serine
- (C) Threonine
- (D) Tyrosine

5. What is the primary structure of protein?

- (A) β -sheet
- (B) Sequence of amino acids
- (C) α -helix
- (D) Functional domain of protein

6. The translation of protein occurs in

- (A) Mitochondria
- (B) Lysosome
- (C) Golgi complex
- (D) Endoplasmic reticulum

7. Which method can get the one-by-one sequence of protein?

- (A) Edman reaction
- (B) Protein remodeling
- (C) Mass Spectrum
- (D) Paper chromatography

(背面仍有題目,請繼續作答)

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8. Which of following is not a structural motif encountered in DNA-binding proteins?

- (A) Zinc finger domain
- (B) RING domain
- (C) Basic helix-loop-helix domain
- (D) Leucine Zipper domain

9. What kind of modification can distinguish the parental and daughter strands in replication?

- (A) Phosphorylation
- (B) Glycosylation
- (C) Methylation
- (D) Acetylation

10. What is the net charge of histone protein?

- (A) Positive
- (B) Negative
- (C) Neutral
- (D) Nobody knows

11. Which of the following side chains is most frequently used for binding metal ions by protein molecules?

- (A) Alanine
- (B) Proline
- (C) Histidine
- (D) Asparagine

12. Which of the following lipids are not found in animal membranes?

- (A) Phosphoglycerides
- (B) Cholesterol
- (C) Triacylglycerols
- (D) Sphingolipids

13. Which of the following posttranslational modifications represents formation of a covalent bond between the side chains of two amino acid residues?

- (A) Disulfide bond formation
- (B) Hydroxylation
- (C) Phosphorylation
- (D) Glycosylation

14. Which enzyme has an associated RNA that acts as a template for DNA synthesis?

- (A) Telomerase
- (B) RNaseP

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(C) Peptidyl transferase

(D) Nucleotidyl transferase

15. Which enzymes are not involved in the *E.coli* DNA replication?

(A) Primase

(B) Topoisomerase

(C) DNA ligase

(D) DNA methyltransferase

B. Please choose appropriate answers for each question. (4 points for each)**(28%)****1. What kinds of posttranslational modification can be observed on protein?**

(A) Phosphorylation

(B) Acetylation

(C) Methylation

(D) Glycosylation

2. Please choose the appropriate statement for the “reporter gene”

(A) can be used to determine the structure of a gene of interest

(B) can be used to measure the activity of a promoter

(C) can be used to determine when and where a promoter is activate

(D) can be used to analyze RNA-binding protein-mediated stability of mRNA

3. Which enzyme requires a primer for its reaction?

(A) Restriction enzyme

(B) DNA ligase

(C) Reverse transcriptase

(D) DNA polymerase III

4. Please choose appropriate statement for phenomena of “gene is activate”

(A) the promoter is generally free of nucleosomes

(B) the promoter of gene is hypermethylation

(C) the entire gene is generally free of nucleosomes

(D) the RNA synthesis can be observed by in situ hybridization assay.

5. Please choose appropriate methods for study of DNA-protein interaction in transcription

(A) EMSA (gel shift assay)

(B) Yeast two-hybridization

(C) Chromatin IP (ChIP)

(D) Microarray assay

6. Which enzymes are involved in the citric acid cycle?

(A) Succinate dehydrogenase

(背面仍有題目,請繼續作答)

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- (B) Succinyl-CoA synthetase
- (C) Pyruvate kinase
- (D) Isocitrate dehydrogenase

7. Which enzymes are involved in the gluconeogenesis?

- (A) Pyruvate carboxylase
- (B) Glucose 6-phosphate dehydrogenase
- (C) Glucose 6-phosphatase
- (D) Fructose bisphosphate aldolase

C. Please answer the following questions. (42%)

1. A student would like to get a profile of EGF-induced gene expression in HeLa cells. Please design an experimental flowchart (實驗流程) by using proteomic methodology. (8 points)

2. A student would like to get a profile of EGF-induced gene expression in HeLa cells. Please design an experimental flowchart by using genomic methodology. (8 points)

3. Signal transduction plays an important role in intracellular communication. Based on your knowledge, please make an example about growth factor-activated signal pathway. (8 points)

4. Please explain the following terms and its purpose or function (18 points)
 - A. Reporter gene (3 points)
 - B. ESTs (Expressed Sequence Tags) (3 points)
 - C. BLAST (basic local alignment search tool) (3 points)
 - D. siRNA (small interfering RNA) (3 points)
 - E. ChIP (Chromatin IP) (3 points)
 - F. Pseudogene (3 points)