

科目：生物化學

適用：應化系(生物醫學碩士班)

編號：381

考生注意：

1. 依次序作答，只要標明題號，不必抄題。
2. 答案必須寫在答案卷上，否則不予計分。
3. 限用藍、黑色筆作答；試題須隨卷繳回。

本 試 題

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第 1 頁

一、單選題 (1-20題，每小題3分，共計60分)

1. The NADPH required for the regeneration of GSH from GSSG is synthesized by the reactions of
 - A) the pentose phosphate pathway.
 - B) glycolysis.
 - C) the citric acid cycle.
 - D) Both A and B are correct.
 - E) Both A and C are correct.
2. The major carrier of chemical energy in all cells is:
 - A) acetyl triphosphate.
 - B) adenosine monophosphate.
 - C) adenosine triphosphate.
 - D) cytosine tetraphosphate.
 - E) uridine diphosphate.
3. In eukaryotes the enzymes of the citric acid cycle are found in the _____.
 - A) cytosol
 - B) mitochondria
 - C) nucleus
 - D) endoplasmic reticulum
 - E) cytosol and mitochondria
4. Fatty acids are oxidized in the _____.
 - A) mitochondrial matrix
 - B) cytosol
 - C) endoplasmic reticulum
 - D) nucleus
 - E) mitochondrial inner membrane space
5. Two amino acids of the standard 20 contain sulfur atoms. They are:
 - A) cysteine and serine.
 - B) cysteine and threonine.
 - C) methionine and cysteine
 - D) methionine and serine
 - E) threonine and serine.
6. Proteins often have regions that show specific, coherent patterns of folding or function. These regions are called:
 - A) domains.
 - B) oligomers.
 - C) peptides.
 - D) sites.
 - E) subunits.
7. Which of the following is responsible for the maintenance of protein secondary structure?
 - A) salt bridges
 - B) hydrogen bonds
 - C) van der Waals forces
 - D) hydrophobic interactions
 - E) disulfide crosslinks

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8. The PCR reaction mixture does *not* include:
- A) all four deoxynucleoside triphosphates.
 - B) DNA containing the sequence to be amplified.
 - C) DNA ligase.
 - D) heat-stable DNA polymerase.
 - E) oligonucleotide primer(s).
9. In glycoproteins, the carbohydrate moiety is always attached through the amino acid residues:
- A) asparagine, serine, or threonine.
 - B) aspartate or glutamate.
 - C) glutamine or arginine.
 - D) glycine, alanine, or aspartate.
 - E) tryptophan, aspartate, or cysteine.
10. If Gly has a positive charge in a buffer at pH 1, then Gly-Gly-Gly in the same buffer should have which of the following charges?
- A) +3
 - B) +2
 - C) +1
 - D) -1
 - E) 0
11. A fatty acid designated as 16:0 is _____, while one that is designated 18:2 ($\Delta 8,11$) is _____.
- A) simple; complex
 - B) complex; simple
 - C) saturated; unsaturated
 - D) unsaturated; saturated
 - E) monounsaturated; polyunsaturated
12. Programmed cell death is called:
- A) metastasis.
 - B) apoptosis.
 - C) mitotic termination.
 - D) oncogenic transformation.
 - E) ubiquitination.
13. Ketone bodies are synthesized in the _____ from _____.
- A) mitochondria; oxaloacetate
 - B) liver; oxaloacetate
 - C) mitochondria; acetyl CoA
 - D) liver; acetyl CoA
 - E) adipocyte; fatty acid
14. Cholesterol is synthesized from:
- A) acetyl-CoA.
 - B) choline.
 - C) lipoic acid.
 - D) malate.
 - E) oxalate.

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15. The nucleotide sequence that is complementary to 5'-TTTAAA-3' is

- ____.
- A) TTTAAA B) AAATTT
C) GAAATTTAAAAA D) UUUAAA
E) More information is needed.

16. Which of the following enzymes is involved in extending the ends of linear chromosomal DNA?

- A) telomerase B) ligase
C) primase D) RNA polymerase
E) DNA polymerase

17. Urea synthesis in mammals takes place primarily in tissues of the:

- A) brain. B) kidney.
C) liver. D) skeletal muscle.
E) small intestine.

18. Gene silencing by RNA interference acts by ____ of the target gene.

- A) inhibiting transcription B) inhibiting translation
C) inhibiting splicing D) degradation of the mRNA
E) inhibiting polyadenylation

19. Proteins with charges can be separated by _____ chromatography.

- A) exclusion B) size
C) affinity D) ion exchange
E) gel

20. Which of the following is a DNA sequence?

- A) Coactivator B) Corepressor
C) Enhancer D) Inducer
E) Transactivator

二、名詞解釋 (21-25題，每小題4分，共計20分)

21. non-coding RNA (ncRNA)

22. microRNA (miRNA)

23. isoelectric focusing (IEF)

24. mRNA alternative splicing

25. confocal microscopy

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三、簡答題 (26-27題，每小題10分，共計20分)

26. Denaturing a native protein tends to decrease its water solubility. Explain your reasoning.
27. The 2008 Nobel Prize in Chemistry was given to Osamu Shimomura, Martin Chalfie and Roger Y. Tsien "for the discovery and development of the green fluorescent protein, GFP". Describe and give some examples of the value from their scientific discovery.

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