

科目：生物化學

適用：應化系

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

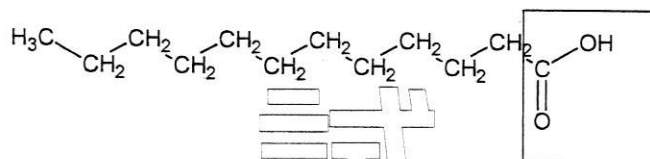
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## 一、單選題 (1-20題，每小題3分，共計60分)

1. Posttranslational glycosylation of proteins is inhibited specifically by:
  - A) chloramphenicol.
  - B) cycloheximide.
  - C) puromycin.
  - D) streptomycin.
  - E) tunicamycin.
2. In glycoproteins the carbohydrate is most often linked to threonine, asparagine, or \_\_\_\_\_.
  - A) serine.
  - B) lysine.
  - C) valine.
  - D) aspartic acid.
  - E) tyrosine.
3. Which of the following is a DNA sequence?
  - A) Silencer.
  - B) Repressor.
  - C) Activator.
  - D) Histon.
  - E) DNA binding domain.
4. Sunlight is most likely to cause which of the following mutations?
  - A) interstrand crosslink
  - B) depurination
  - C) deamination
  - D) heat-stable DNA polymerase.
  - E) thymine dimmer
5. Shown below is the structure of the fatty acid, lauric acid:



The boxed portion is considered to be both \_\_\_\_.

- A) hydrophilic and hydrophobic
  - B) polar and hydrophobic
  - C) polar and hydrophilic
  - D) nonpolar and hydrophylic
  - E) none of the above.
6. The three dimensional structures of a protein is maintained by
    - A) disulfide linkages.
    - B) hydrophobic bonds.
    - C) hydrogen bonds.
    - D) ionic bonds.
    - E) all of the above.

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7. Glycolysis in the erythrocyte produces pyruvate that is further metabolized to:
- A)  $\text{CO}_2$ . B) ethanol.  
C) glucose. D) hemoglobin.  
E) lactate.
8. Complete oxidation of 1 mole of which fatty acid would yield the most ATP?
- A) 18-carbon mono-unsaturated fatty acid  
B) 16-carbon saturated fatty acid  
C) 16-carbon mono-unsaturated fatty acid  
D) 16-carbon poly-unsaturated fatty acid  
E) 14-carbon saturated fatty acid
9. Proteins with charges can be separated by \_\_\_\_ chromatography.
- A) exclusion B) affinity  
C) ion exchange D) high pressure liquid  
E) gas
10. Urea synthesis in mammals takes place primarily in tissues of the:
- A) brain. B) kidney.  
C) liver. D) skeletal muscle.  
E) small intestine.
11. In eukaryotes the enzymes of glycolysis are found in the \_\_\_\_.
- A) cytosol. B) mitochondria.  
C) nucleus. D) endoplasmic reticulum.  
E) Golgi complex.
12. A fatty acid designated as 22:0 is \_\_\_\_, while one that is designated 22:3 <sup>$\Delta^{5,8,11}$</sup>  is \_\_\_\_.
- A) simple lipid; complex lipid  
B) complex lipid; simple lipid  
C) saturated lipid; unsaturated lipid  
D) unsaturated lipid; saturated lipid  
E) monounsaturated; polyunsaturated
13. Which the fatty acid that has the higher melting temperature?
- A) 16:0 B) 18:0  
C) 18:1 <sup>$\Delta^9$</sup>  D) 18:2 <sup>$\Delta^{9,12}$</sup>   
E) 18:3 <sup>$\Delta^{6,9,12}$</sup>

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14. At the isoelectric pH of a tetrapeptide:

- A) only the amino and carboxyl termini contribute charge.
- B) the amino and carboxyl termini are not charged.
- C) the total net charge is zero.
- D) there are four ionic charges.
- E) none of the above.

15. The DNA oligonucleotide abbreviated pATCGAC

- A) has 7 phosphate groups.
- B) has a hydroxyl at its 3' end.
- C) has a phosphate on its 3' end.
- D) has an A at its 3' end.
- E) violates Chargaff's rules.

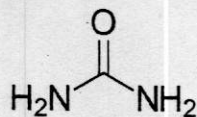
16. Phosphate groups are usually added to enzymes by a \_\_\_\_\_ using \_\_\_\_\_.

- A) phosphorylase, ADP
- B) kinase, ADP
- C) synthase, creatine phosphate
- D) kinase, ATP
- E) one of the above

17. If an aerobic organism (for example, the bacterium *E. coli*) were fed each of the following three compounds as a source of energy, the energy yield per mole from these molecules would be in the order:

- A) alanine > glucose > palmitate.
- B) glucose > alanine > palmitate.
- C) glucose > palmitate > alanine.
- D) palmitate > alanine > glucose.
- E) palmitate > glucose > alanine.

18. The structure shown below is \_\_\_\_\_.



- A) urea
- B) uridine
- C) uric acid
- D) carbodiamine
- E) diamino diphenyl sulphone

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19. Drugs called statins lower cholesterol levels because they \_\_\_\_\_.

- A) degrade HMG-CoA reductase
- B) bind serum cholesterol
- C) inhibit HMG-CoA reductase
- D) bind bile salts
- E) bind serum free form fatty acids (FFAs)

20. 12.1% of Tris-base (MW=121) is equivalent to

- A) 100 M
- B) 10 M
- C) 1 M
- D) 0.1 M
- E) 0.01 M

二、名詞解釋 (21-25題，每小題4分，共計20分)

- 21. Gluconeogenesis
- 22. Polymerase chain reaction (PCR)
- 23. Affinity chromatography
- 24. RNA interference (RNAi)
- 25. Co-immunoprecipitation (co-IP)

三、簡答題 (26-27題，每小題10分，共計20分)

- 26. How to characterize and predict the protein-protein interaction?  
Explain at least 3 *methods*; provide suitable *examples* and sufficient description.
- 27. Describe the possible outcomes that could occur because of a single base change in an mRNA.

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