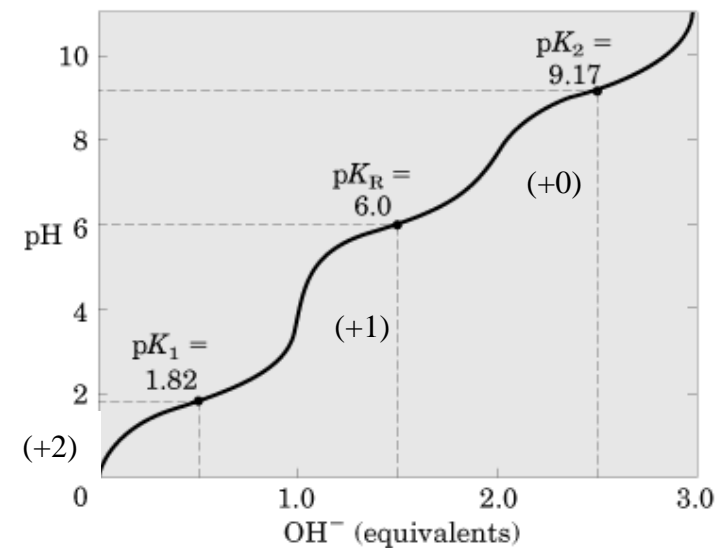


國立嘉義大學 100 學年度  
生化科技學系碩士班招生考試試題

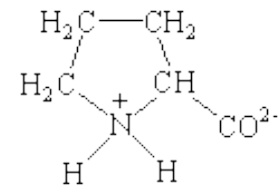
科目：生物化學

一、選擇題：(每小題 3 分，共 60 分)

I. The titration curve of 'X' amino acid solution is shown in following figure.



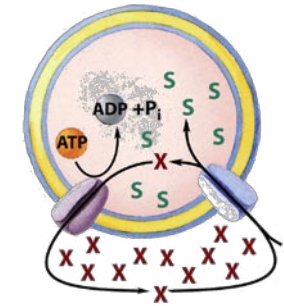
1. The 'X' amino acid is (a) tyrosine (b) aspartic acid (c) glycine (d) arginine (e) histidine.



2. The chemical structure, C1CCN(C1)C(=O)[O-], is (a) glycine (b) cysteine (c) tryptophan (d) proline (e) histidine.
3. 'X' amino acid could not buffer solution at pH (a) 2.5 (b) 4 (c) 5.5 (d) 6.5 (e) 9
4. The pI value of 'X' amino acid is about (a) 2 (b) 4 (c) 6 (d) 7.5 (e) 9
5. Which concentration of 'X' amino acid (M.W. 155) solution contains the highest buffer capacity?  
(a) 50 mM (b) 1% (c) 100mM (d) 2% (e) 0.5%

6. The properties of the transporter showed below:

- (a) passive transport;  
(b) primary active transport;  
(c) secondary active transport.



7. One of the principal products of pentose phosphate pathway is required for the biosynthesis of nucleotides:  
(a) NADPH;  
(b) NADH;  
(c) ribose-5-phosphate;  
(d) glucose-6-phosphate.
8. The sugar does not contain reducing end:  
(a) sucrose;  
(b) maltose;  
(c) starch;  
(d) glucose.
9. The enzyme reaction requires pyridoxal phosphate (PLP) as a cofactor:  
(a) glutamate dehydrogenase;  
(b) glutamine synthetase;  
(c) carbamoyl phosphate synthetase I;  
(d) transaminase.

10. The amino acid generally receives excess amino groups in skeletal muscle:

- (a) glutamate;
- (b) glutamine;
- (c) aspartate;
- (d) alanine

11. An example of a glycerophospholipid that is involved in cell signaling is:

- (a) arachidonic acid.
- (b) ceramide.
- (c) phosphatidylinositol.
- (d) testosterone.
- (e) vitamin A (retinol).

12. Identify the molecule(s) derived from sterols.

- (a) Arachidonic acid
- (b) Gangliosides
- (c) Phosphatidylglycerol
- (d) Prostaglandins
- (e) Vitamin D

13. Which of these can be synthesized by plants but *not* by humans?

- (a) Linoleate [18:2( $\Delta^{9,12}$ )]
- (b) Palmitate (16:0)
- (c) Phosphatidylcholine
- (d) Pyruvate
- (e) Stearate (18:0)

14. During  $\beta$  oxidation of fatty acids, \_\_\_\_\_ is produced in peroxisomes but not in mitochondria.

- (a) acetyl-CoA
- (b)  $\text{FADH}_2$
- (c)  $\text{H}_2\text{O}$
- (d)  $\text{H}_2\text{O}_2$
- (e) NADH

15. The major site of formation of acetoacetate from fatty acids is the:

- (a) adipose tissue.
- (b) intestinal mucosa.
- (c) kidney.
- (d) liver.
- (e) muscle.

16. The reaction of the citric acid cycle that produces an ATP equivalent (in the form of GTP) by substrate level phosphorylation is the conversion of:

- (a) citrate to isocitrate.
- (b) fumarate to malate.
- (c) malate to oxaloacetate.
- (d) succinate to fumarate.
- (e) succinyl-CoA to succinate.

17. How many NADH is produced in citric acid cycle?

- (a) 1. (b) 2. (c) 3. (d) 4. (e) 5.

18. After passing through the citric acid cycle, one mole of pyruvate will result in the formation of \_\_\_\_\_ moles of carbon dioxide.

- (a) 1. (b) 2. (c) 3. (d) 4.

19. How many GTP is produced in citric acid cycle?

- (a) 1. (b) 2. (c) 3. (d) 4. (e) 5.

20. How many  $\text{FADH}_2$  is produced in citric acid cycle?

- (a) 1. (b) 2. (c) 3. (d) 4. (e) 5.

## 二、簡答題：(40分)

1. Please briefly describe the properties of fluid mosaic model. (5分)

2. Please briefly describe the function of fructose-2,6-bisphosphate during glycolysis. (5分)

3. 請簡述“Citric Acid Cycle”在細胞新陳代謝中的功能(請舉出2項)。(10分)

4. Could we quantify the peptide (N-GPRNQQDETKSVA-C) with absorbance of ultraviolet light at 280nm? Why? (10分)

5. Describe the possible disease or situation showing the presence of a high concentration of ketone bodies in the urine of a patient. Why do ketone bodies accumulate in such patients? (10分)