**Quiz I**

**Biochemistry I March 10, 2020**

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**I. Multiple choice questions (单选题)**

**1.** Based on the Henderson-Hasselbalch equation, calculate the pH when the ratio of acetic acid to acetate is 10 to 1 (the p*K*a of acetic acid is 4.76).  
A) 5.76 B) 4.76 C) 3.76 D) 2.76 E) 1.0

**Answer**  C

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**2.**  Which of the following atoms does not commonly form hydrogen bonds between or within biological molecules?

A) Oxygen B) Carbon C) Hydrogen

D) Nitrogen E) All four atoms above commonly form

**Answer** B

**3.** In a mixture of the four proteins listed below, which should elute second in size-exclusion chromatography?

A) hexokinase *M*r = 102,000 B) myoglobin *M*r = 16,890

C) cytochrome c *M*r = 13,000 D） RNA polymerase *M*r = 450,000

**Answer**  A

**4**. What is the effect on your blood pH when you hold your breath? A) increase B) decrease C) no effect D) hard to tell

**Answer**  B

**5.** Which of the following tripeptides:

A) YFK B) GPL C) NKR D) EHD E) QME (1) has a sulfur-containing R group? **Answer**  E

(2) contains the largest number of nonpolar R groups? **Answer**  B

(3) will have the greatest light absorbance at 280 nm? **Answer**  A

(4) is most positively charged at pH 8? **Answer**  C

(5) will elute first from a cation-exchange resin? **Answer**  D

(6) will yield DNP-glutamine when reacted with

l-fluoro-2,4-dinitrobenzene and hydrolyzed in acid? **Answer**  E

**II. Simple-answer questions (简答题)**

1. What is Henderson-Hasselbalch Equation? The amino acid histidine has three ionizable groups, with p*K*a values of 1.8, 6.0, and 9.2. Calculate what fraction of the histidine side chains will carry a positive charge at pH 7. **Be sure to show your work.**
2. Henderson-Hasselbalch Equation is the equation relates the pH of weak acid and its conjugate base solution to their relative concentration.
3. pH=pKa+lg([A]/[AH+])

From message we’ve got, we know that:

pH=7 pKa=6.0

7=6.0+ lg([A]/[AH+])

[A]/[AH+]=10

So about 9 percent of Histidine side chains carry a positive charge.

1. Predict the fragments that will be generated from the treatment of the peptide LWRSEHMKSYPMFQR with trypsin.

Three fragments will be generated, which are ‘LWR’, ‘SEHMK’ and ‘SYPMFQR’.