

نموذج إجابة مادة كيمياء الكربوهيدرات والأحماض الأمينية والليبيدات (419ك)

نصف ورقة امتحانيه – دور يناير 2017

أستاذ المادة: د. بهاء الدين مصطفى عدلى الجندي

Section 2: Amino Acids, Proteins, and Lipids

[24 Marks]

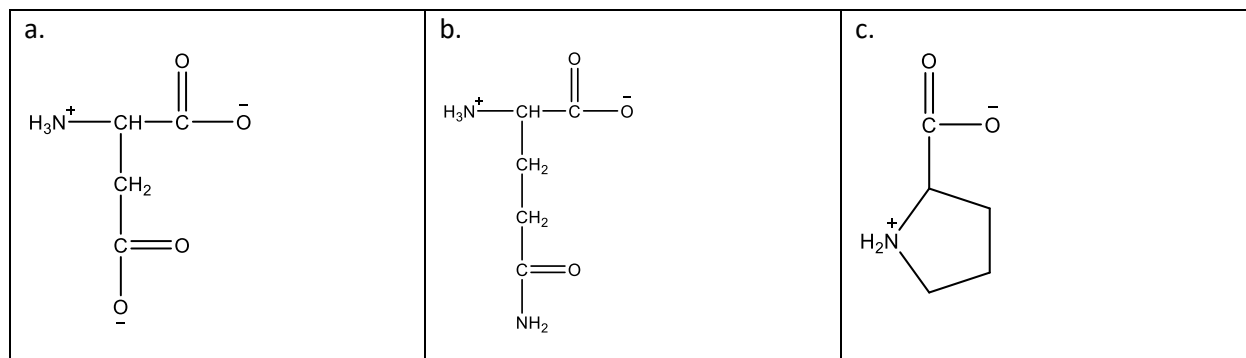
1. Draw the form in which each of the following amino acids predominantly exists at physiological pH (7.3): [3 Marks]

a. aspartic acid

b. glutamine

c. proline

Answer:



2. **Complete hydrolysis** of an unknown basic **decapeptide** gives Gly, Ala, Leu, Ile, Phe, Tyr, Glu, Arg, Lys, and Ser. Terminal residue analysis shows that the **N terminus is Ala** and the **C terminus is Ile**. Incubation of the decapeptide with **chymotrypsin** gives two tripeptides, A and B, and a tetrapeptide, C. Amino acid analysis shows that peptide A contains Gly, Glu, Tyr, and peptide B contains Ala, Phe, and Lys; and peptide C contains Leu, Ile, Ser, and Arg. Terminal residue analysis gives the following results.

	N Terminus	C Terminus
A	Gln	Tyr
B	Ala	Phe
C	Arg	Ile

Incubation of the decapeptide with **trypsin** gives a dipeptide D, a pentapeptide E, and a tripeptide F. Terminal residue analysis of F shows that the N terminus is Ser, and the C terminus is Ile. Propose a structure for the decapeptide and for fragments A through F. [7 Marks]

Answer:

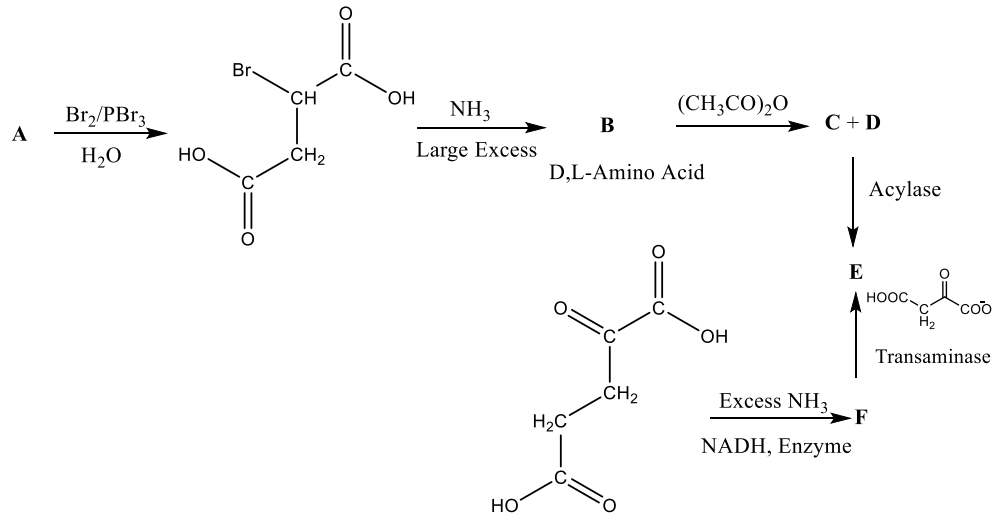
A: Glu-Gly-Tyr B: Ala-Lys-Phe C: Arg-(Ser? Leu?)-Ile

Trypsin fragments: D: Ala-Lys E: Phe-Glu-Gly-Tyr-Arg F: Ser-Leu-Ile

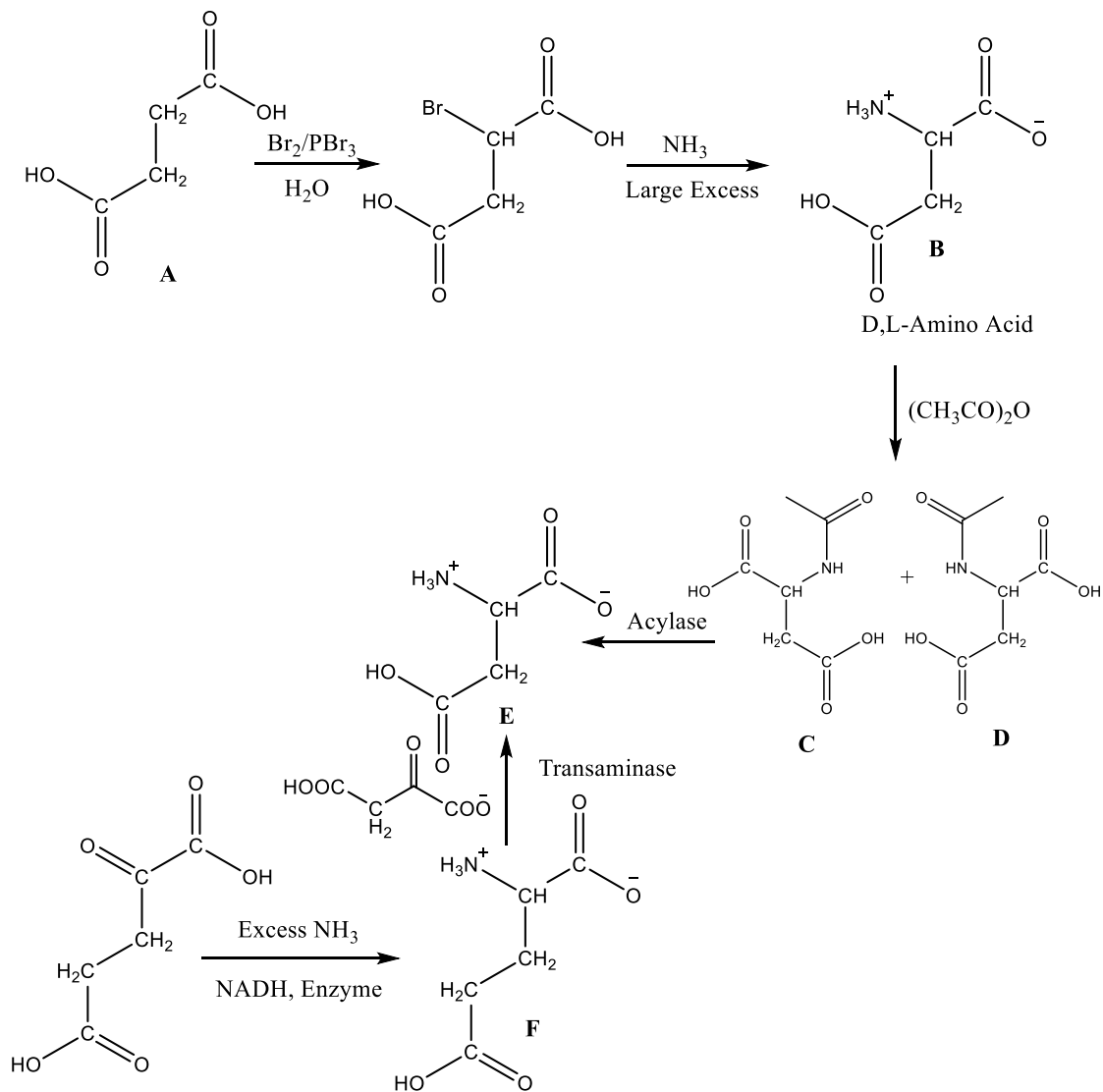
Decapeptide: Ala-Lys-Phe-Glu-Gly-Tyr-Arg- Ser-Leu-Ile

Trypsin cleaves at the carboxyl group of lysine and arginine. Chymotrypsin cleaves at the carboxyl group of phenylalanine, tyrosine, and tryptophan.

3. Deduce the structures of **A**, **B**, **C**, **D**, **E**, and **F**. Note that **C** and **D** are isomers and only one of them gives **E**. [6 Marks]



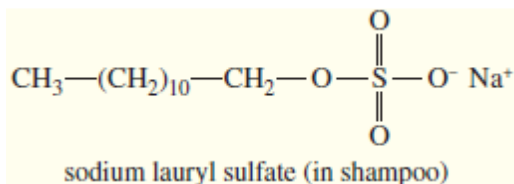
Answer:



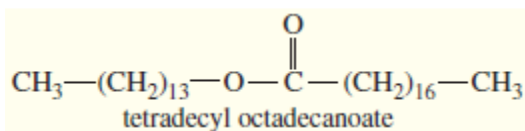
4. Give the general classification of each compound and indicate if it is simple lipid or complex lipid. [4 Marks]

Answer:

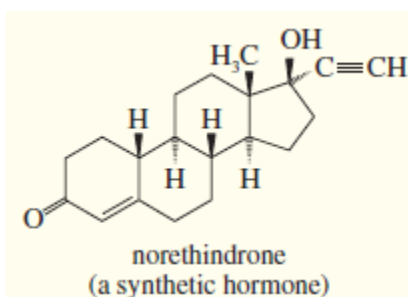
a. Synthetic detergent



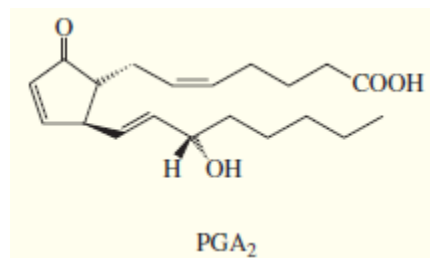
b. Wax (complex lipid)



c. Steroids (simple lipid)



d. Prostaglandins (simple lipid)



5. True or False:

[4 Marks]

- Phosphoglycerides usually have one phosphoric acid group and two fatty acids. **True**
- Saponification is the Acid-catalyzed hydrolysis of ester linkages in fats and oils. **False**
- Prostaglandins are biochemical regulators more powerful than steroids and regulate functions such as blood pressure and allergic response. **True**
- Sesquiterpene has 15 C's, 3 isoprenes. **True**
- In solid phase synthesis, you have to purify the intermediates in every step. **False**
- Secondary structures like alpha helix, exists extensively in structural proteins such as wool and silk and determine the overall shape and properties of these proteins. **True**
- Globular proteins have polypeptide chains arranged in long strands or sheets. **False**
- Denaturation is the disruption of the normal structure of a protein, such that it loses biological activity. **True**

All best wishes,

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