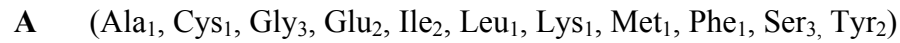


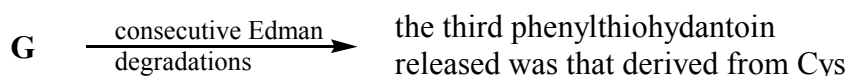
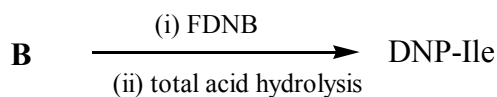
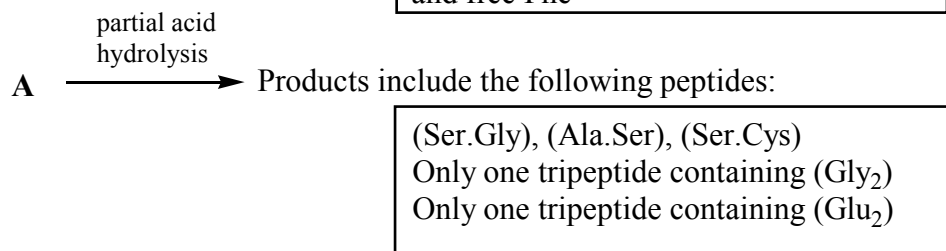
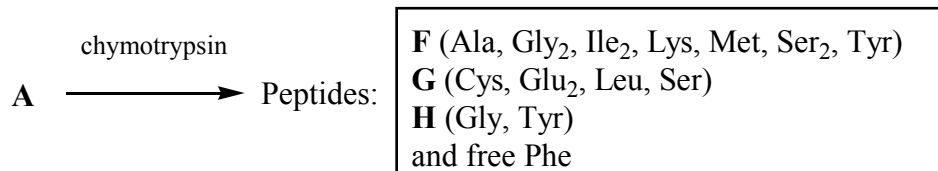
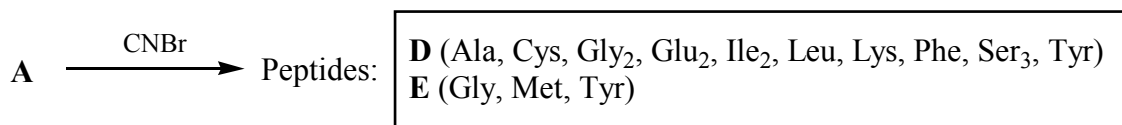
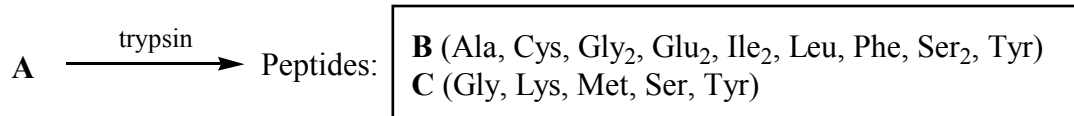
Page 1	This page
Page 2	a) Phylloxin - example from lecture course set out as exam-style question
Page 3	b) Drosocin
Page 4	c) Peptide from <i>Bombyx mori</i>
Page 5	d) Brevinin
Page 6	e) Drosocin - worked answer

a) Phylloxin: example from lecture course

Phylloxin, **A**, is a peptide isolated from the skin of the hylid frogs belonging to the genus *Phyllomedusinae*. Total acid hydrolysis results in the isolation of the following amino acids:



Use the following information to establish the sequence of amino acids in phylloxin.



(22 marks)

- (b) (i) No amino acid is liberated by the action of carboxypeptidase on peptide **A**. What does this fact reveal?
- (ii) What is the overall charge of phylloxin at physiological pH?

(3 marks)

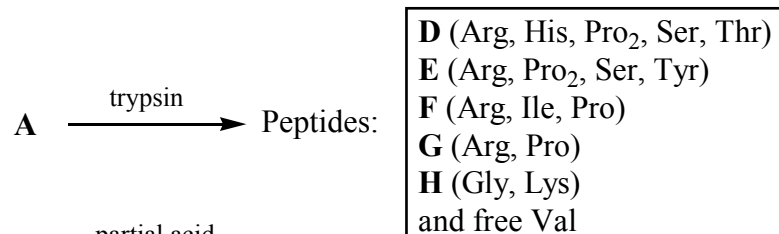
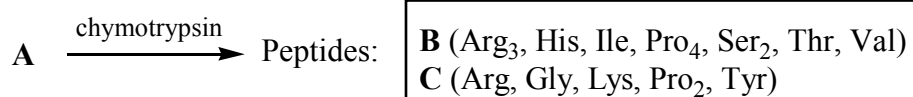
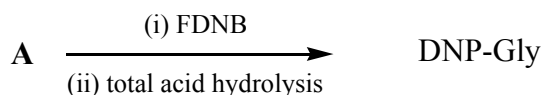
Footnote: Amino acid abbreviations separated by commas and given in brackets indicate the peptide *composition*, not necessarily the *sequence*.

b) Drosocin I

Drosocin I, **A**, is an insect peptide with antimicrobial activity. Use the following information to establish the sequence of amino acids in Drosocin. To gain full marks your answer must include a full explanation of your method and deductions.

Total acid hydrolysis of **A** results in the isolation of the following amino acids:

A (Arg₄, Gly, His, Ile, Lys, Pro₆, Ser₂, Thr, Tyr, Val)



Pro. Thr and Ser. His

The **only** tripeptides containing arginine are (Arg, Ile, Val) and (Arg, Pro₂)

(25 marks)

Footnote: Amino acid abbreviations separated by commas and given in brackets indicate the peptide *composition*, not necessarily the *sequence*.

c) Peptide from *Bombyx mori*

A peptide, **A**, with the amino acid composition shown below, was isolated in 1997 from a lipopolysaccharide-binding protein of the silkworm *Bombyx mori*.

(Ala₄,Arg₁,Asn₂,Asp₁,Glu₃,Gly₁,His₁,Ile₂,Leu₃,Lys₁,Phe₄,Tyr₁)

Use the following information to establish the sequence of the 24 amino acids in **A** and state, with an explanation, whether the peptide is cationic or anionic at pH 7.

A $\xrightarrow{\text{Two consecutive Edman degradations}}$ Sequential release of Glu then Ala

A $\xrightarrow{\text{Chymotrypsin}}$ Free Asn and five peptides

B , (Leu,Tyr) C , (Ala ₂ ,Glu,Phe) D , (Ala,Asn,Glu,Ile,Phe) E , (Arg,Asp,Leu ₂ ,Phe) F , (Ala,Glu,Gly,His,Ile,Lys,Phe)
--

A $\xrightarrow{\text{Trypsin}}$ Three peptides

G , (Ala,Asp,Leu,Lys,Phe) H , (Ala ₂ ,Arg,Glu,Leu,Phe) I , (Ala,Asn ₂ ,Glu ₂ ,Gly,His,Ile ₂ ,Leu,Phe ₂ ,Tyr)
--

A $\xrightarrow{\text{His-specific degradation}}$ An undecapeptide (**J**) containing Gly and Asn, and a tridecapeptide (**K**) containing His

A $\xrightarrow{\text{Partial acid hydrolysis}}$ Products include the following dipeptides:

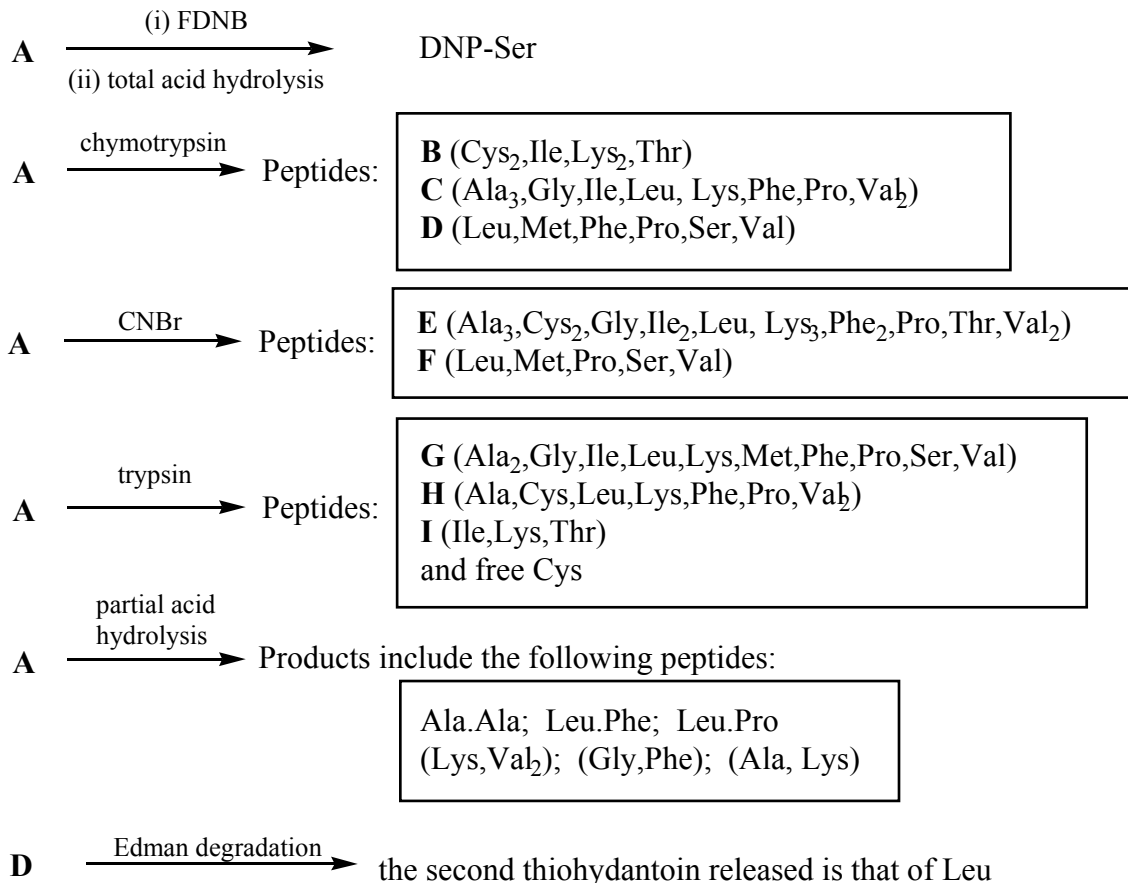
Ala.Glu; Glu.Ala; Gly.Ile; Tyr.Ile; Glu.Phe; Leu.Phe; Phe.Leu
--

d) Brevinin

- (a) Brevinin-1, **A**, is a peptide with antimicrobial activity. Use the following information to establish the sequence of amino acids in Brevinin-1.

Total acid hydrolysis results in the isolation of the following amino acids:

(Ala₃, Cys₂, Gly₁, Ile₂, Leu₂, Lys₃, Met₁, Phe₂, Pro₂, Ser₁, Thr₁, Val₃)



The action of carboxypeptidase on **A** sequentially releases Cys, Lys then Thr. The third amino acid released from **C** upon treatment with carboxypeptidase is Ala.

- (b) (i) What two possible conclusions could you draw about the structure of **A** if no amino acid is released upon treatment of **A** with carboxypeptidase? How might you determine which of your two conclusions is the correct?
- (ii) What is the overall charge on **A** at physiological pH?

Footnote: Amino acid abbreviations separated by commas and given in brackets indicate the peptide *composition*, not necessarily the *sequence*.

