

**A Level Chemistry B (Salters)**  
**H433/01** Fundamentals of chemistry

**Question Set 12**

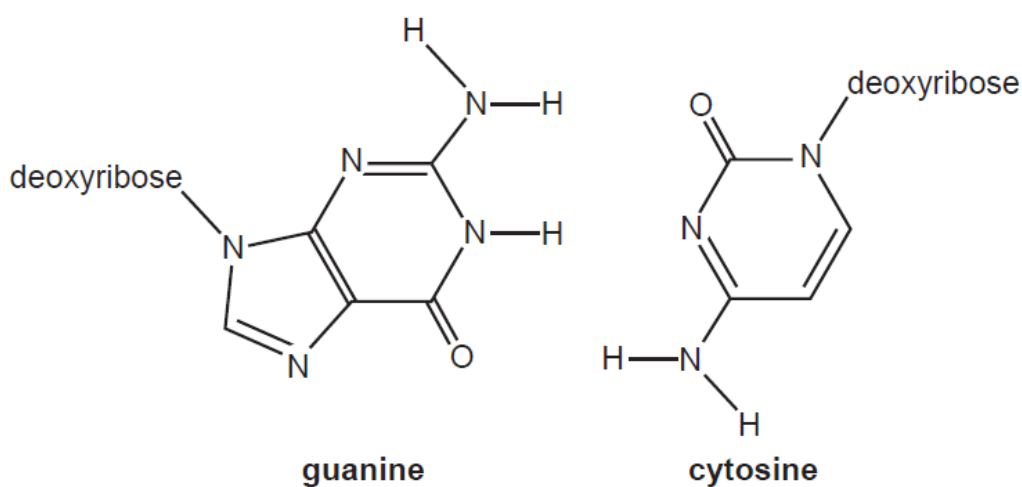
- 1 (a) DNA carries the instructions for synthesising the primary structures of protein molecules. Its backbone consists of alternating phosphate and deoxyribose sugar units. Bases are attached to the sugar units.

Use the Data Sheet to draw a section of DNA.

The section of DNA must consist of two phosphate units, one deoxyribose sugar unit and one thymine unit, all joined by condensation reactions. [3]

- (b) The double helix of DNA is formed by the bases pairing using hydrogen bonds.

Complete the diagram to show all the hydrogen bonds between guanine and cytosine. Show the relevant lone pairs and partial charges.



[3]

- (c) The sequence of bases in DNA determines the primary structure of the protein synthesised.

Draw the structural formula for a section of a protein molecule formed from one each of the amino acids shown in Fig. 32.1.

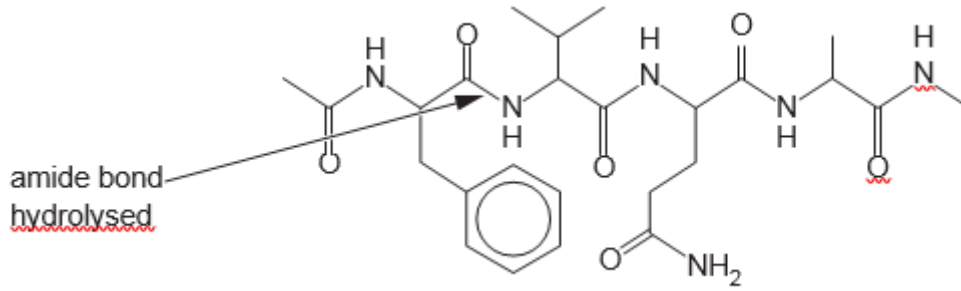
<b>Phenylalanine</b>	<b>Valine</b>

Fig. 32.1

[2]

(d) An HIV protease enzyme acts on the protein substrate shown in **Fig. 32.2**.

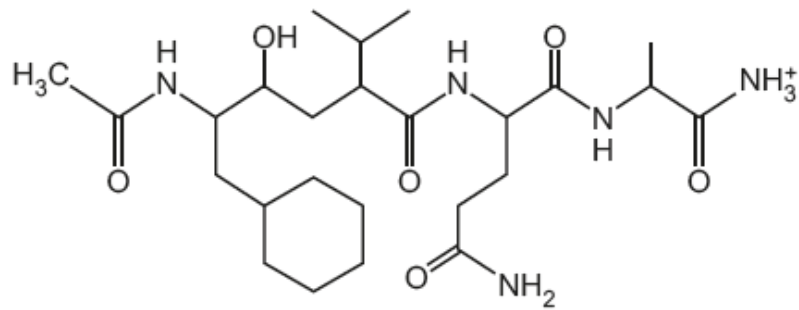
**Protein substrate**



**Fig. 32.2**

The substrate in **Fig. 32.3** acts as an inhibitor to the HIV protease enzyme.

**HIV protease inhibitor**



**Fig. 32.3**

Explain how an enzyme works and suggest how the HIV protease inhibitor affects the function of the protease enzyme.

[6]

**Total Marks for Question Set 12: 14**

---

# OCR

Oxford Cambridge and RSA

## **Copyright Information**

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website ([www.ocr.org.uk](http://www.ocr.org.uk)) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact The OCR Copyright Team, The Triangle Building, Shaftesbury Road, Cambridge CB2 8EA.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge