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CCEA A2

# BIOLOGY EXAM PRACTICE

COLOURPOINT EDUCATIONAL

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# Introduction

As with the *Biology for CCEA AS Exam Practice* workbook, this A2 version gives students the opportunity to practise typical examination questions and check their answers against a mark scheme available on the Colourpoint website www.colourpointeducational.com. In this book, answer space is provided for all questions, except for the Section B essays which appear in the A2 1 and A2 2 sections.

The workbook is divided into three units, there being a unit for each of A2 1, A2 2 and A2 3. Within the A2 1 and A2 2 units the questions are arranged by topic in chapters that mirror the content of the textbook *Biology for CCEA A2,* by the same author and publisher.

The content covered at A2 is different from AS and therefore the A2 papers are different. However, there are other differences with A2 papers. They are longer, they contain more marks, and there is a different Assessment Objective (AO) balance. Additionally, there is synoptic assessment with core knowledge from AS required in some questions. These points will be covered in the next few paragraphs, as will some other features unique to the A2 examination papers.

As with the AS course, it is important that students have an excellent understanding of all the specification, including the mathematical skills required (Section 4.7) and the common command terms used in written examinations (Appendix 1).

### Types of questions

As with the AS papers, questions can be divided into three broad categories:

- **Assessment Objective 1 (AO1)** questions test knowledge and understanding of specification content. Command terms such as 'define' or 'describe' are typically used in AO1 questions.
- **Assessment Objective 2 (AO2)** questions involve application of knowledge. They include calculations and those which are set in unfamiliar contexts. Typically, AO2 questions involve a more rigorous testing of understanding and transferable skills than that required in AO1 questions.
- **Assessment Objective 3 (AO3)** questions are those questions in which students analyse, interpret and evaluate information and make judgements and/or reach conclusions. AO3 questions often involve candidates interpreting data in tables or graphs, or even in text.

However, what is different is that in A2 examinations the relative proportions of the question types are different. Across the A2 suite of examinations, there is proportionally more testing of AO2 and AO3 skills. This means that A2 papers have a greater emphasis on skills such as answering questions based on unfamiliar settings, data handling and evaluating data. Consequently, there will be proportionally fewer questions requiring the relatively straightforward recall of information.

### Mathematical skills

Mathematical skills required in GCE Biology, and in A2 examinations in particular, are clearly outlined in the specification (**Section 4.7**). If you refer to the specification, you will notice that some of the mathematical skills are highlighted in bold – these skills are required for A2 only (not required at AS) and therefore, are likely to be tested in A2 papers. While the use of logarithmic scales could be tested in any of the three A2 papers, statistics questions (questions involving chi-square, the t-test and/or 95% confidence limits) will only appear in A2 2 or A2 3 papers. For many of the questions involving statistics in this workbook you will require access to statistics tables (sheets), and these can be found in **Appendix 2** of the specification.

### Synoptic knowledge and assessment

A2 papers can test synoptic knowledge, understanding and skills – this means that content covered earlier in the course can be required in A2 papers. Students should not be concerned about this as synoptic assessment will primarily focus on the core concepts that are crucial to a good all-round understanding of 'A' level Biology. For example,

students cannot fully understand ultrafiltration from the glomerulus into the Bowman's capsule and reabsorption from the proximal convoluted tubule unless they have a solid understanding of osmosis and active transport (which are covered in AS 1). Similarly, an understanding of mitochondrial structure (also covered in AS 1) is necessary in understanding the biochemistry of respiration. However, synoptic assessment will normally only involve those topics and skills which are necessary in understanding A2 content.

**Other ways to maximise marks**

By reviewing the online Chief Examiner's Reports in the GCE Biology area at www.ccea.org.uk , the most frequent misconceptions, the topics which are poorly understood and examples of poor examination techniques are highlighted. Useful guidance is also disseminated in the webinars and other support material. The wise student is a student who is familiar with areas where marks are typically lost in questions and papers and avoids making the mistakes that many others do.

**Mark schemes**

As stated in the *Biology for CCEA AS Exam Practice* workbook, mark schemes are not finalised until examiners have had a chance to review the range of answers provided by candidates. Sometimes, unexpected answers appear which deserve credit but were not in the initial draft mark scheme. Answers such as these can then be added as alternatives to the mark scheme before the marking begins if appropriate.

The same principle applies to the mark schemes for the questions in this book. While a range of alternative answers are provided for many questions, it is probable that some creditworthy answers are not included for some of the question parts. Additionally, for some questions the phrase 'other appropriate response' is given as an alternative, particularly for those questions where a wide range of creditworthy answers are possible.

The mark scheme (the answers) for this workbook are available online. Visit www.colourpointeducational.com and search for *Biology Exam Practice for CCEA A2*. The page for this book will contain instructions for downloading the mark scheme. If you have any difficulties please contact Colourpoint.

Good luck!

# Unit A2 1: Physiology, Co-ordination and Control, and Ecosystems

# Chapter 1 – Homeostasis and the Kidney

**1** The two functions of the kidney are excretion and osmoregulation.

**(a)** Define the term 'excretion'.

_____

_____ [1]

**(b)** Describe the role of the following structures in kidney function.

basement membrane _____

_____

_____

_____ [2]

collecting duct _____

_____

_____

_____ [2]

**2** The structure, position and arrangement of the glomeruli blood vessels ensure that they are highly adapted for the ultrafiltration of blood into the Bowman's capsule. State **three** of these adaptations.

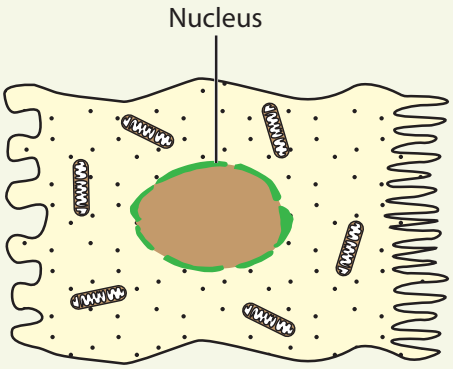
1. _____

2. _____

3. _____ [3]

**3** In the kidney, glucose is filtered from the glomerulus into the nephron before being reabsorbed back into the blood. The reabsorption of glucose takes place in the proximal convoluted tubule.

**(a)** The diagram below represents an epithelial cell in the wall of the proximal convoluted tubule.




**(i)** Add an arrow to the diagram to show the direction of glucose reabsorption into the cell. [1]

**(ii)** Using the diagram, state and explain **one** way in which the cell is adapted for glucose reabsorption.

_____

_____

_____

_____ [2]

**(iii)** Glucose reabsorption involves both facilitated diffusion and active transport. Explain why each method is involved.

_____

_____

_____

_____

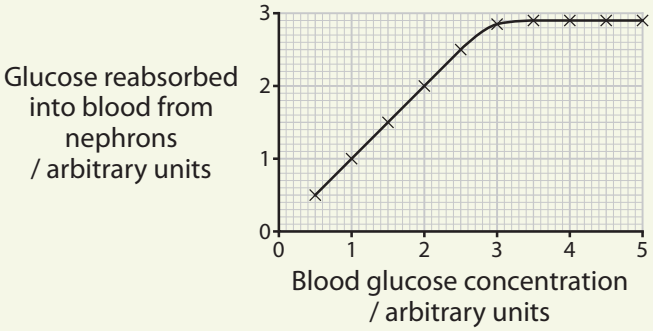
_____

_____

_____

_____ [3]

**(b)** The graph below shows the relationship between blood glucose concentration and the amount of glucose reabsorbed by nephrons in the human kidney.




**(i)** Suggest why the graph shows no values less than 0.5 arbitrary units.

_____

_____ [1]

**(ii)** Describe fully the results for a blood glucose concentration of 0.5 – 2.5 arbitrary units.

_____

_____

_____

_____

_____

_____ [2]

**(iii)** In terms of cell membrane structure and function, suggest **one** reason for the results shown for blood glucose concentrations above 3 arbitrary units.

_____

_____

_____ [1]

**(c)** Around 70% of the total water reabsorbed in the kidney is reabsorbed in the proximal tubule. Name the process involved in water reabsorption and explain how the reabsorption of glucose aids this process.

_____

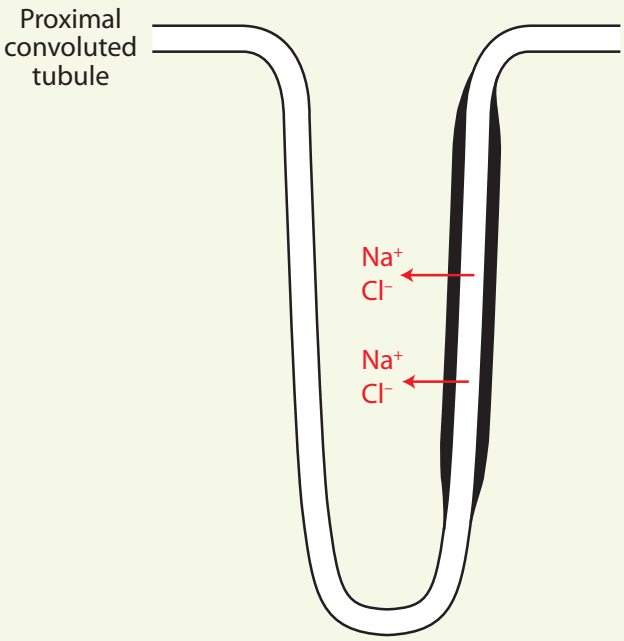
_____

_____

_____

_____ [2]

**4** **(a)** The diagram below represents part of a nephron.




**(i)** Identify the part of the nephron shown.

_____ [1]

**(ii)** Name the region of the kidney within which this structure is found.

_____ [1]