

# Topic Tests

for A Level Year 2 Edexcel Biology B

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# Contents

<b>Thank You for Choosing ZigZag Education.....</b>	<b>ii</b>
<b>Teacher Feedback Opportunity .....</b>	<b>iii</b>
<b>Terms and Conditions of Use .....</b>	<b>iv</b>
<b>Teacher's Introduction .....</b>	<b>1</b>
<b>Questions.....</b>	<b>2</b>
Aerobic and Anaerobic Respiration (5.1, 5.2, 5.3, 5.4, 5.5) .....	2
Photosynthesis (5.6, 5.7).....	4
Bacteria and Antibiotics (6.1, 6.2, 6.3, 6.4, 6.5) .....	6
Controlling Disease (6.6, 6.7) .....	7
Genome Sequencing and Gene Expression (7.1, 7.2).....	8
Stem Cells and Gene Technology (7.3, 7.4).....	10
Origins of Genetic Variation (8.1, 8.2, 8.3).....	12
Homeostasis and Chemical Control (9.1, 9.2, 9.3).....	15
Mammalian Nervous System (9.4, 9.5, 9.6) .....	17
Sensation and Regulation (9.7, 9.8, 9.9) .....	19
Osmoregulation and Temperature Control (9.9) .....	21
Understanding Ecosystems (10.1, 10.2).....	23
Changes in Ecosystems (10.3, 10.4).....	25
<b>Mark Scheme .....</b>	<b>27</b>
Aerobic and Anaerobic Respiration (5.1, 5.2, 5.3, 5.4, 5.5) .....	27
Photosynthesis (5.6, 5.7).....	28
Bacteria and Antibiotics (6.1, 6.2, 6.3, 6.4, 6.5) .....	29
Controlling Disease (6.6, 6.7) .....	30
Genome Sequencing and Gene Expression (7.1, 7.2).....	31
Stem Cells and Gene Technology (7.3, 7.4).....	32
Origins of Genetic Variation (8.1, 8.2, 8.3).....	34
Homeostasis and Chemical Control (9.1, 9.3, 9.3).....	35
Mammalian Nervous System (9.4, 9.5, 9.6) .....	36
Sensation and Regulation (9.7, 9.8, 9.9) .....	37
Osmoregulation (9.9).....	38
Understanding Ecosystems (10.1, 10.2).....	39
Changes in Ecosystems (10.3, 10.4).....	41

# Teacher's Introduction

These topic tests have been designed to help you and your students assess their knowledge of a topic after you have taught each section of the **A Level Year 2 AQA Edexcel Biology B specification**. Each topic test is closely tied to the Edexcel specification, ensuring all aspects of the course will be covered. The units covered in these tests include Units 5–10. A separate resource contains topic tests for the AS / A Level Year 1 content.

Topic Tests contain the following question types:

- **Quick-testing questions** – these test basic understanding, knowledge of terminology, and allow immediate identification of weaker topics.
- **Long-answer questions** – these are exam-style questions that require use of comprehensive knowledge and aid practice of writing skills and exam technique.
- **Missing-information questions** – these allow key knowledge to be tested without being time-consuming and provide context for further questions.
- **Diagram- and graph-dependent questions** – these require identification of features, interpretation of data and application of knowledge, as well as testing mathematical skills.
- **Practical questions** – test students on concepts and technique used in required practicals and allow practice of maths skills.
- **Context-dependent questions** – these push students to apply their knowledge to unfamiliar situations, spot key points within provided information and draw on multiple aspects of the course.

Tests have been designed to take approximately 45 minutes and contain on average around 40–50 marks, though please note that this has not been possible where topics are brief and introductory or require more detailed knowledge and assessment. Please note that some tests are shorter and others have been combined where appropriate.

All information for a question is provided within the test; however, some questions will require the use of a calculator and ruler.

Students are able to see the number of marks allocated for each question, allowing them to judge the detail required in their answers, as in exam conditions. Full answers are at the end of the resource and are accompanied with marker instructions, providing quick guidelines on what answers would and would not be accepted in an exam situation.

All diagrams and graphs have been designed with black-and-white photocopying in mind, so key features will not be lost.

We hope you find these tests useful during your teaching.

	Topic Numbers	Number of Marks
Test 1	5.1/5.2/5.3/5.4/5.5	49
Test 2	5.6/5.7	44
Test 3	6.1/6.2/6.3/6.4/6.5	42
Test 4	6.6/6.7	40
Test 5	7.1/7.2	49
Test 6	7.3/7.4	50
Test 7	8.1/8.2/8.3	49
Test 8	9.1/9.2/9.3	49
Test 9	9.4/9.5/9.6	53
Test 10	9.7/9.8/9.9	32
Test 11	9.9	45
Test 12	10.1/10.2	48
Test 13	10.3/10.4	37

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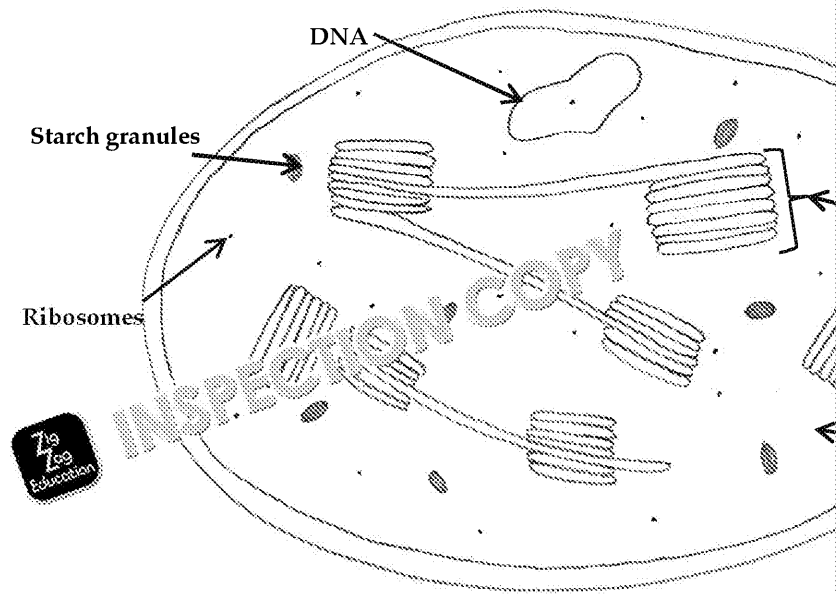
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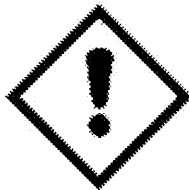
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## Photosynthesis (5.6, 5.7)

1. Label the features of a chloroplast on the diagram below:



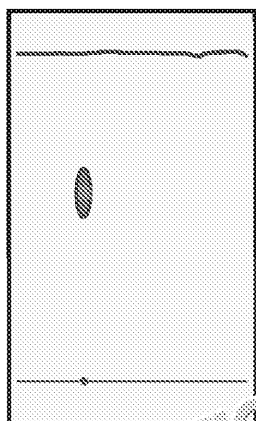
2. Where do the light-dependent and light-independent reactions of photosynthesis take place?
3. The environmental factor that limits the slowest process in photosynthesis is the overall rate.
  - a) How does an increase in carbon dioxide affect photosynthesis?
  - b) Explain how variations in temperature affect photosynthesis.
  - c) Explain why increasing light intensity increases photosynthesis, but only up to a point.
4. Explain why farmers cannot simply increase the availability of all factors to limit photosynthesis.
5. There are several different types of chlorophyll pigments.
  - a) What use would a plant have for different types of pigments?
  - b) Describe the difference between the absorption spectrum and the action spectrum.
6.
  - a) What technique could be used to separate pigments from leaves?
  - b) This technique requires use of a solvent. Solvents are labelled with hazard symbols. Identify the hazard symbols associated with solvent use and explain how you would create a safe environment.



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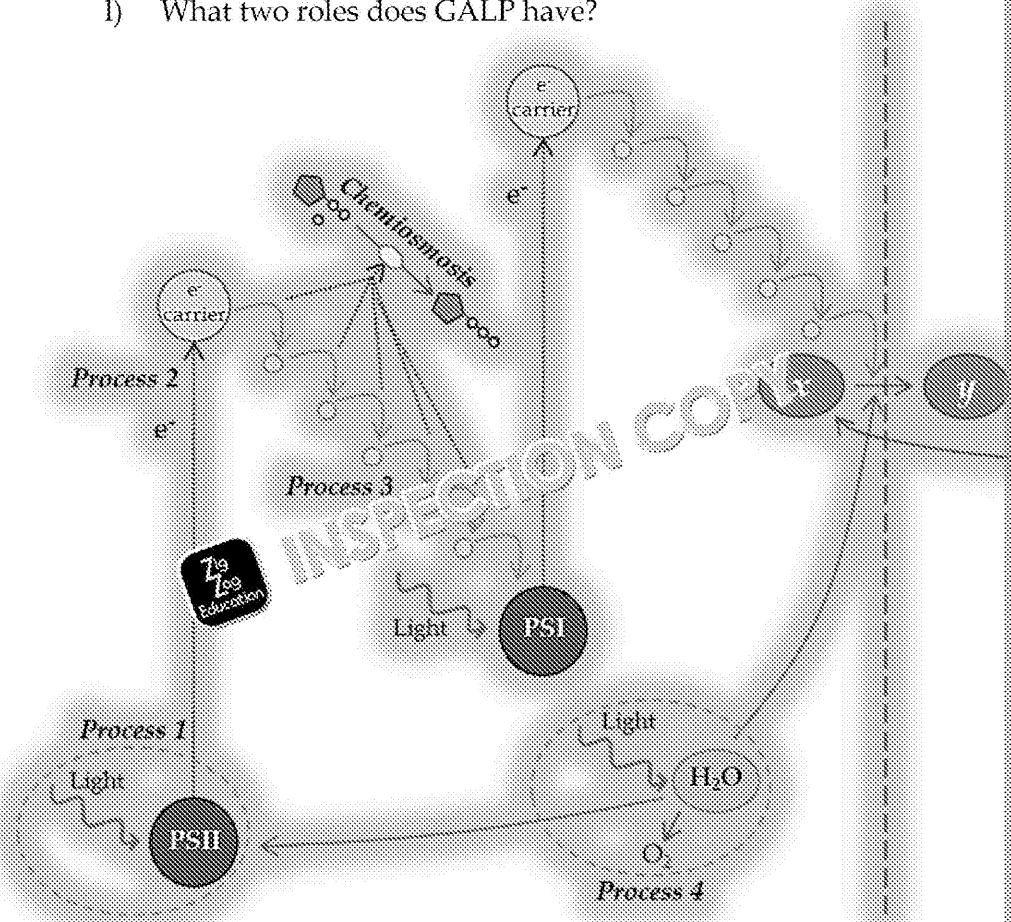


- d) Calculate the R<sub>f</sub> value of the pigment below and identify the pigment using the R<sub>f</sub> values.



Pigment
Carotene
Chlorophyll a
Chlorophyll b
Pheophytin
Xanthophyll
Xanthophyll

7. Answer the following questions using the diagram of photosynthesis.
- Which side of the diagram is the light-dependent reaction and which is the light-independent reaction?
  - What is the name of **Process 1**, where chlorophyll is oxidised by light?
  - What is happening in **Process 2**?
  - Describe what happens to the electron during **Process 3**.
  - Describe how chemiosmosis uses electron transfer to make ATP.
  - What are molecules **x** and **y**?
  - What is the name of **Process 4**?
  - How does **Process 4** help convert molecule **x** into molecule **y**?
  - How are the electrons of Photosystem I (PSI) and Photosystem II (PSII) related?
  - What is the name of **Process 5**?
  - Explain how **Process 5** creates (glyceraldehyde 3-phosphate) GALP.
  - What two roles does GALP have?



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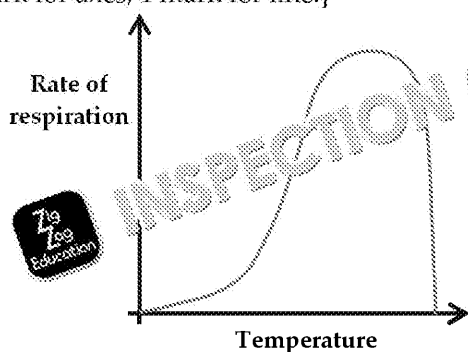
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## Mark Scheme

### Aerobic and Anaerobic Respiration (5.1, 5.2, 5.3, 5.4, 5.5)

1.
  - a) Glycolysis (1)
  - b) Cytoplasm (1)
  - c) Both (1)
  - d) Glucose undergoes phosphorylation using ATP (1) to form a phosphorylated glucose (1)
  - e) 'The molecule produced by phosphorylation splits (1) to form glycerate 3-phosphate (1). This is then oxidised (1) to produce pyruvate (1), hydrogen protons, two ATP (1) [1 mark for each]
2. Pyruvate travels to the mitochondrial matrix (1) by active transport (1)
3. Pyruvate is oxidised to acetate (1) which combines with coenzyme A (1) and forms the process NAD is reduced (1) and CO<sub>2</sub> is produced (1)
4.
  - a) Krebs' cycle (1)
  - b) a = coenzyme A (1)  
b = reduced NAD (1)  
c = reduced FAD (1)
  - c) At point x the molecule contains 6 C molecules (1)  
At point y the molecule contains 4 C molecules (1)
  - d) Substrate-level phosphorylation (1) [Do not accept only phosphorylation]
5.
  - a) Electron transfer / electron transport chain (1)
  - b) Reduced NAD (1) and reduced FAD (1)
  - c) Oxygen acts as the terminal electron acceptor (1)
6.
  - a) Process is called chemiosmosis (1), where hydrogen ions enter the mitochondrion (1), therefore stimulating ATP synthase to form ATP / convert ADP to ATP (1)
  - b) Oxidative phosphorylation (1) [Do not accept only phosphorylation]
7.
  - a) Aerobic produces a lot more ATP due to the electron transfer / electron transport chain (1) while anaerobic respiration produces little ATP because it only has glycolysis (1) and inefficient ATP production and can produce a lot of energy in optimal conditions (1) provides a survival advantage to produce ATP when oxygen is limited, away from a predator / dive underwater to find prey (1) [Accept any correct answer]
  - b) Plants: Pyruvate + rNAD (1) → ethanol (1) + carbon dioxide (1) + NAD<sup>+</sup> (1)  
Animals: Pyruvate + rNAD (1) → lactate (1) + NAD<sup>+</sup> (1)
  - c) 31 ATP are produced in aerobic respiration (1) while only 2 ATP are produced in anaerobic respiration (1)
8. [1 mark for axes, 1 mark for line:]



As temperature increases, the enzymes involved in respiration get closer to their optimum temperature, therefore, respiration rate increases (1), so movement of fluid in the manometer increases (1). Once optimum temperature is reached, enzymes denature so respiration rate decreases (1) and fluid stops moving (1).

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## **Preview of Answers Ends Here**

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