

Unit Code J257/03

Qual Name GCSE Biology B (Twenty First Century Science)

Qual Title Breadth in biology (Higher)

Tier Higher

| Question Set | Q. No | Total Marks | AO | Spec Ref. | Topic | Question Subject, If required | Additional Notes/Comments | Maths Skills | Practical Assessment Skills |
|--------------|-------|-------------|----|---------------------------|--|--|--|--------------|-----------------------------|
| 1 | 1ai | 2 | 1 | 6.1.7, 6.18, 6.1.9, 1.2.7 | Development fo the theory of evolution. | This question is about natural selection. | This is an overlap question. | | |
| 1 | 1aai | 1 | 1 | 6.1.5 | Development fo the theory of evolution. | This question is about natural selection. | This is an overlap question. | | |
| 1 | 1bi | 1 | 1 | 3.1.2 | What happens during photosynthesis? | This question is about plant organelles. | This is an overlap question. | | |
| 1 | 1bii | 1 | 1 | 3.1.4a | What happens during photosynthesis? | This question is about photosynthesis. | This is an overlap question. | | |
| 1 | 1ci | 2 | 2 | 3.3.5 | Interdependence in ecosystems. | This question is about interdependence. | This is an overlap question. | | |
| 1 | 1cii | 2 | 2 | 3.4.1 | How conditions affect populations. | This question tests maths skills: using a scale bar. | The scale on this item may have changed which may alter the answer. This is an overlap question. | Y | |
| 1 | 1ciii | 1 | 2 | 3.4.1 | How conditions affect populations. | This question tests maths skills: using percentages. | The scale on this item may have changed which may alter the answer. This is an overlap question. | Y | |
| 1 | 1civ | 2 | 3 | 3.4.1 | How conditions affect populations. | This questions tests the ability to draw conclusions from data. | This is an overlap question. | Y | |
| 2 | 1a | 4 | 2 | 3.4.2 | How conditions affect populations. | This question is about sampling techniques. | This is an overlap question. | | Y |
| 2 | 1b | 2 | 2 | 5.4.4 | Maintaining a constant internal environment. | This question is about water loss. | This is an overlap question. | | |
| 3 | 1ai | 2 | 1 | 5.2.4 | Nervous system | This question is about the functions of the parts of the brain. | | | |
| 3 | 1aai | 1 | 1 | 5.2.5 | Nervous system | This question is about investigating brain function. | | | |
| 3 | 1aiii | 1 | 1 | 5.2.5 | Nervous system | This question is about investigating brain function. | | | |
| 3 | 1b | 2 | 1 | 5.2.2 | Nervous system | This question is about the structure of neurons. | | | |
| 3 | 1ci | 1 | 2 | 5.2.1 | Nervous system | This question is about neurotransmitters released from synapses. | | | |

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| 3 | 1cii | 1 | 1 | 5.2.2 3.2.2a | Nervous system | This question is about neurotransmitters released from synapses | This question is synoptic and has links to diffusion. | | |
| 3 | 1ciii | 1 | 1 | 4.5.1 | Stem cells | This question is about the potential uses of stem cells. | | | |
| 4 | 1ai | 1 | 1 | 4.4.1a | Controlling plant growth | This question is about phototropisms. | | | |
| 4 | 1aaii | 2 | 1 | 4.4.1a | Controlling plant growth | This question is about the role of auxins in phototropisms. | | | |
| 4 | 1aiii | 4 | 3 | 4.4.1b | Controlling plant growth | This question is about investigating phototropisms. | | | Y |
| 4 | 1b | 2 | 1 | 2.2.3, 2.2.6 | Protection against pathogens. | This question is about plant hormones. | | | |
| 4 | 1c | 2 | 1 | 2.2.3, 2.2.6 | Protection against pathogens. | This question is about chemical and physical plant defences. | | | |
| 4 | 1d | 1 | 1 | 3.2.6a, 3.1.1 | Plant needs. | This question is about the function of stomata. | | | |
| 5 | 1ai | 2 | 1 | 4.3.2 | Growth and development | This question is about cancer. | | | |
| 5 | 1aii | 1 | 1 | 2.5.1a | Factors affecting health. | This question is about risk factors associated with cancer. | | | |
| 5 | 1aiii | 2 | 1 and 2 | 4.3.2 | Growth and development | This question test math skills. | | Y | |
| 5 | 1aiv | 1 | 2 | 2.1.1 | Causes of disease | This question tests understanding of estimations. | This question relies on (a) (iii). | | |
| 5 | 1bi | 1 | 2 | 4.3.2 | Growth and development | This question is about risk in the context of surgery. | | | |
| 5 | 1bii | 2 | 2 | 2.2.5 | Protection against pathogens | This question is about white blood cell counts during chemotherapy. | | Y | |
| 5 | 1biii | 1 | 2 | 2.2.5 | Protection against pathogens | This question is about the role of white blood cells in dealing with infections. | | | |
| 5 | 1biv | 3 | 1 and 2 | 2.2.5, 3.1.3a | Protection against pathogens | This question is about symptoms of infection. | This question is synoptic and links ideas about enzymes and metabolic reactions to the need for homeostatic mechanisms. | | |
| 5 | 1ci | 4 | 3 | 2.6.4 | Treating disease. | This question is about drug trials. | | | |
| 5 | 1cii | 2 | 3 | 2.6.4 | Treating disease. | This question is about drug trials. | | | |
| 5 | 1ciii | 1 | 1 | 2.6.4 | Treating disease. | This question is about communicating findings to others. | | | |
| 5 | 1d | 3 | 1 | 2.6.5 | Treating disease. | This question is about monoclonal antibodies. | | | |
| 6 | 1ai | 2 | 1 and 2 | 2.1.3 2.3.1 | Causes of disease | This question is about communicable diseases and reducing spread. | | | |
| 6 | 1aii | 2 | 1 and 2 | 2.3.1 | Preventing the spread of infections. | This question is about communicable diseases and reducing spread. | | | |

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| 6 | 1bi | 3 | 2 | 6.1.2, 6.1.3, 1.1.10 | Theory of evolution | This question is about mutations. | This question has synoptic links to natural selection. | | |
| 6 | 1bii | 3 | 1 | 1.3.3 | Gene technology | This question is about genetic engineering. | | | |
| 6 | 1biii | 1 | 2 | 1.1.9 | The genome | This question is about genetic engineering. | | | |
| 6 | 1biv | 3 | 1 and 2 | 3.4.1, 1.3.4 | Populations in ecosystems | This question is about genetic engineering. | | | |
| 7 | 1ai | 3 | 2 | 1.1.5, 1.2.1 | The genome | This question is about genotypes. | | | |
| 7 | 1aii | 2 | 2 and 3 | 1.2.3, 1.2.5 | Inheritance of genetic information | This question is a genetic cross. | | Y | |
| 7 | 1b | 1 | 2 | 1.2.3, 1.2.5 | Inheritance of genetic information | This question is about inheritance of characteristics. | | | |
| 8 | 1a | 4 | 1 | 1.1.9, 1.1.10 | The genome | This question is about protein synthesis. | | | |
| 8 | 1b | 2 | 1 | 1.1.8 | The genome | This question is about the impact of mutations on protein structure. | | | |
| 8 | 1c | 2 | 3 | 6.1.3 | Theory of evolution. | This question is about evolution. | | | |
| 9 | 1a | 3 | 1 | B5.2.1, B5.2.3a | Nervous system and response to change. | This question is about reflex arcs. | Fig 1.1 is needed to answer this question. | | |
| 9 | 1b | 1 | 1 | B5.2.3.a | Nervous system and response to change | This question is about reflex arcs. | | | |
| 9 | 1ci | 1 | 3 | B5.2.3b | Nervous system and response to change | This question is about reflex actions. | Fig 1.2 is needed to answer this question. | | Y |
| 9 | 1cii | 2 | 3 | B5.2.3b | Nervous system and response to change | This question is about reflex actions. | Fig 1.2 is needed to answer this question. | | Y |
| 9 | 1ciii | 1 | 3 | B5.2.3b | Nervous system and response to change | This question is about reflex actions. | | | Y |
| 9 | 1di | 1 | 1 | B5.2.2 | Nervous system and response to change | This question tests maths skills: standard form. | | Y | |
| 9 | 1dii | 1 | 1 | B5.2.2 | Nervous system and response to change | This question is about the structure of a neuron. | | | |
| 10 | 1a | 1 | 1 | B2.1.3 | Causes of disease. | This question tests an understanding of the symbol >. | | Y | |
| 10 | 1b | 2 | 3 | B2.1.3 | Causes of disease. | This question tests the ability to make conclusions from data. | | | |
| 10 | 1c | 1 | 2 | B2.1.3 | Causes of disease. | This question tests maths skills: percentage increase. | | Y | |
| 10 | 1di | 2 | 2 | B2.1.3 | Causes of disease. | This question is about reducing disease transmission. | | | |
| 10 | 1dii | 1 | 2 | B2.6.1 | Treating disease. | This question is about assessing risk in relation to side effects of drugs. | | | |
| 10 | 1diii | 1 | 1 | B2.1.4 | Causes of disease. | This question is about diseases caused by bacteria. | | | |

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| 11 | 1ai | 1 | 1 | B4.1.1 B4.1.3 | Cellular respiration. | This question is about the location of cell structure and the location of aerobic respiration. | | | |
| 11 | 1aii | 1 | 1 | B4.1.1 B4.1.3 | Cellular respiration. | This question is about the location of cell structure and the location of aerobic respiration. | The answer to this question requires (a) (i) to be answered. | | |
| 11 | 1b | 3 | 1 | B4.1.1, B4.1.4 | Cellular respiration. | This question is about the similarities and differences in anaerobic respiration in plant and animal cells. | | | |
| 11 | 1c | 2 | 1 | B4.1.2 | Cellular respiration. | This question is about the uses of ATP. | | | |
| 12 | 1ai | 2 | 3 | B6.4.1 | Biodiversity. | This question is about reasons to protect biodiversity. | | | |
| 12 | 1aii | 2 | 2 | B3.3.9 B3.3.10 | Interdependence in ecosystems. | This question is about the role of trees in absorption of carbon dioxide and the impact of deforestation. | | | |
| 12 | 1bi | 1 | 1 | B3.3.10 B3.2.6a | Interdependence in ecosystems. | This question is about transpiration and the water cycle. | | | |
| 12 | 1bii | 1 | 2 | B3.3.10 B3.2.6a | Interdependence in ecosystems. | This question is about the effect of deforestation on the amount of transpiration. | | | |
| 12 | 1ci | 3 | 2 | B3.4.3b | Populations in ecosystems. | This question tests maths skills: percentage calculation | This question relies on the information in part (c) to generate an answer. | Y | |
| 12 | 1cii | 1 | 3 | B3.4.2 | Populations in ecosystems. | This question is about estimating population numbers. | | | |
| 12 | 1di | 1 | 3 | B6.3.1 | Classification. | This question is about evolutionary relationships. | | | |
| 12 | 1dii | 1 | 1 | B6.3.1, B1.2.7 | Classification. | This question is about the use of DNA in determining how closely related species are. | This question is synoptic. | | |
| 13 | 1a | 2 | 1 | B2.2.2 | Protection against pathogens. | This question is about the role of platelets in healing wounds. | | | |
| 13 | 1bi | 3 | 1 | B2.4.2 | Identifying the causes of infections. | This question is about aseptic techniques. | | | Y |
| 13 | 1bii | 3 | 1 | B2.4.1b | Identifying the causes of infections. | This question test maths skills: calculating magnification. | Please note: images are not to scale as they may vary in colour, density, shade, and size when reproduced using different printers and photocopiers. | Y | Y |
| 14 | 1a | 1 | 1 | B1.1.9 | The genome. | This question is about protein synthesis. | | | |
| 14 | 1b | 1 | 1 | B1.1.4, B1.1.5 | The genome. | This question is about phenotypes. | | | |
| 14 | 1c | 1 | 1 | B1.1.7 | The genome. | This question is about DNA nucleotides. | | | |

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| 14 | 1d | 1 | 1 | B1.1.12 | The genome. | This question is about mutations in non coding DNA. | | | |
| 15 | 1ai | 1 | 2 | B6.1.3, B6.1.5 | Theory of evolution. | This question is about natural selection. | | | |
| 15 | 1aii | 1 | 1 | B6.1.5 | Theory of evolution. | This question is about natural selection. | | | |
| 15 | 1b | 1 | 1 | B6.2.1 | Sexual and asexual reproduction. | This question is about the advantages of sexual reproduction. | | | |
| 15 | 1c | 1 | 1 | B6.1.9 B1.2.7 | Theory of evolution. | This question is about genome sequencing | | | |
| 16 | 1 | 3 | 1 | B3.3.1a | Interdependence in ecosystems. | This question is about the monomers that make polymers (carbohydrates, proteins and lipids) | | | |
| 17 | 1ai | 2 | 2 | B3.3.7 | Interdependence in ecosystems. | This question is about pyramids of biomass. | | | |
| 17 | 1aii | 2 | 1 | B3.3.7 | Interdependence in ecosystems. | This question is about loss of biomass in food chains. | | | |
| 17 | 1bi | 3 | 2 | B3.4.1 | Populations in ecosystems. | This question is about bioaccumulation. | | | |
| 17 | 1bii | 1 | 3 | B3.4.1 | Populations in ecosystems. | This question is about bioaccumulation. | | | |
| 17 | 1biii | 2 | 3 | B3.4.1 B3.3.5 | Populations in ecosystems. | This question is about bioaccumulation. | | | |
| 17 | 1c | 2 | 1 | B3.3.11, B3.3.5 | Interdependence in ecosystems. | This question is about decomposition. | | | |
| 18 | 1a | 1 | 2 | B5.5.2 | Hormones in human reproduction. | This question is about the hormones involved in the menstrual cycle. | | | |
| 18 | 1bi | 1 | 2 | B5.5.1 | Hormones in human reproduction. | This question is about the hormones involved in the menstrual cycle. | | Y | |
| 18 | 1bii | 1 | 3 | B5.5.2 | Hormones in human reproduction. | This question is about the hormones involved in the menstrual cycle. | | | |
| 18 | 1ci | 2 | 2 | B6.1.6 | Theory of evolution. | This question is about selective breeding. | | | |
| 18 | 1cii | 1 | 2 | B5.5.2 | Hormones in human reproduction. | This question is about the hormones involved in the menstrual cycle. | | | |
| 18 | 1ciii | 1 | 1 | B4.3.1a | Growth and development. | This question is about mitosis. | | | |
| 18 | 1di | 2 | 3 | B6.1.6 B6.2.1 B4.3.1a | Theory of evolution. | This question is about the role of mitosis in developing embryos that are genetically the same. | This question is synoptic, it uses ideas about the genetic variation that results from sexual reproduction to explain the benefit of using embryos (in farming) created from one embryo. | | |
| 18 | 1dii | 1 | 2 | B4.3.4 B4.3.5 | Growth and development. | This question is about stem cells and cell specialisation. | | | |
| 18 | 1diii | 2 | 1 and 2 | B4.3.4 B4.3.5 | Growth and development. | This question is about the hormones involved in the menstrual cycle. | | | |
| 19 | 1ai | 2 | 2 | B1.2.1 B1.1.5 B1.2.2 | Inheritance of genetic information. | This question is about determining genotypes. | | | |

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| 19 | 1aii | 4 | 2 | B1.2.2 B1.2.5 | Inheritance of genetic information. | This question is about using the concept of probability in predicting the outcome of a genetic cross. | | Y | |
| 19 | 1b | 1 | 2 | B1.3.4 | Gene technology. | This question is about genetic testing. | | | |
| 19 | 1c | 3 | 1 | B1.1.10 B1.1.11 | The genome. | This question is about how mutations give rise to genetic variants and how these variants can go on to impact phenotype. | | | |
| 20 | 1a | 2 | 2 | 5.1.3 | Moving substances into, out of and around our bodies. | This question is about the human circulatory system | | | |
| 20 | 1b | 4 | 1 | 5.1.4 | Moving substances into, out of and around our bodies. | This question is about the structure of the heart. | | | |
| 20 | 1c | 1 | 2 | 5.1.4 | Moving substances into, out of and around our bodies. | This question is about the structure of the heart. | | | |
| 20 | 1d | 3 | 1 | 5.1.5 | Moving substances into, out of and around our bodies. | This question is about the structure and function of arteries veins and capillaries | | | |
| 21 | 1a | 1 | 2 | 3.4.3d 3.4.2 | Populations in ecosystems | This question is about estimating population size. | This question is overlap. | | |
| 21 | 1b | 1 | 3 | 3.4.3d 6.4.5 | Populations in ecosystems | This question is about factors that affect population size. | This question is an overlap question. This question is synoptic and relies on an understanding of interdependence to explain why biodiversity is threatened | | |
| 21 | 1c | 2 | 3 | 3.3.5 | Interdependence in ecosystems | This question is about factors that affect population size. | | | |
| 21 | 1d | 1 | 3 | 3.4.3d, 6.4.1 | Populations in ecosystems | This question is about estimating population size. | This question is an overlap question. This question is synoptic and relies on an understanding of interdependence to explain why biodiversity is threatened | | |
| 21 | 1e | 3 | 1 and 2 | 3.4.3d | Populations in ecosystems | This is a calculation to determine time taken using the speed equation. | | Y | |
| 22 | 1a | 2 | 1 | 2.2.3 2.2.6 | Protection against pathogens. | This question is about plant defences to pathogens. | | | |
| 22 | 1b | 2 | 1 | 4.4.1a 4.4.2 | Controlling plant growth. | This question is about the role of plant hormones. | | | |
| 22 | 1c | 1 | 1 | 5.6.1 | When organs and systmes stop working. | This question is about insulin. | | | |
| 23 | 1a | 2 | 1 | 4.3.1a | Growth and development. | This question is about the cell cycle. | | | |
| 23 | 1b | 3 | 1 | 4.3.1b | Growth and development. | This question is about how to use a light microscope. | | | Y |

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| 23 | 1c | 1 | 3 | 4.3.1b | Growth and development. | This question is about the use of stains in microscopy. | | | Y |
| 24 | 1a | 3 | 3 | 6.4.6 | Biodiversity. | This question is about genetic engineering and selective breeding. | | | |
| 24 | 1b | 2 | 1 | 1.3.2 | Gene technology. | This question is about genetic engineering. | | | |
| 24 | 1c | 1 | 2 | 1.3.4 | Gene technology. | This question is about genetic engineering. | | | |
| 25 | 1a | 3 | 1 | 3.2.2a 5.1.1, 5.1.1.2 | Moving substances into, out of and around the body. | This question is about the movement of substances into and out of cells. | This question is synoptic it relies on knowledge of diffusion, osmosis and active transport and cellular respiration. | | |
| 25 | 1bi | 1 | 2 | 4.2.1 | Electron microscopy. | This question is about electron microscopy. | | | |
| 25 | 1bii | 2 | 1 | 4.2.1 | Electron microscopy. | This question is about electron microscopy. | | | |
| 25 | 1biii | 1 | 2 | 4.2.1 | Electron microscopy. | This question is about the role of mitochondria in the production of ATP. | | | |
| 25 | 1c | 2 | 2 | 4.2.2b | Electron microscopy. | This question tests maths skills: using percentages. | | Y | |
| 26 | 1a | 2 | 2 | 6.2.1 | Sexual and asexual reproduction. | This question is about sexual and asexual reproduction. | | | |
| 26 | 1bi | 1 | 2 | 3.1.3a | Photosynthesis. | This question is about root hair cells. | | | |
| 26 | 1bii | 3 | 2 | 3.1.3a | Photosynthesis. | This question is about enzymes. | | | |
| 26 | 1c | 1 | 2 | 6.1.6 | Theory of evolution. | This question is about selective breeding. | | | |
| 27 | 1ai | 3 | 3 | 3.1.4, 3.1.7b, 3.1.7d | Photosynthesis. | This question is about photosynthesis. | | Y | |
| 27 | 1aii | 2 | 1 | 3.1.4a, 3.1.3a | Photosynthesis. | This question is about factors that affect the rate of photosynthesis. | This question is synoptic, it requires knowledge of the effect of temperature on enzymes. | | |
| 27 | 1b | 4 | 1 | 3.1.1a 3.1.2 | Photosynthesis. | This question is about the main stages of photosynthesis. | | | |
| 28 | 1a | 3 | 2 | 5.6.4b | When organs and systems stop working. | This question tests practical skills. | | | Y |
| 28 | 1b | 3 | 2 | 5.6.4b | When organs and systems stop working. | This question tests maths skills: percentage decrease. | Fig 9.1 and 9.2 are needed to generate an answer for this question. Fig 9.1 and Fig 9.2 no longer to original scale so MS may need adjusting to reflect this. | Y | |
| 28 | 1c | 3 | 1 | 5.2.2 | Nervous system. | This question is about the adaptations of neurons. | | | |

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| 29 | 1a | 3 | 1 | 2.3.2 | Preventing the spread of infections. | This question is about the role of vaccinations in preventing the spread of disease. | | | |
| 29 | 1b | 3 | 3 | 2.5.3a | Factors affecting health. | This question is about vaccinations. | | | |
| 29 | 1ci | 1 | 2 | 2.3.2 | Preventing the spread of infections. | This question is about vaccinations. | | | |
| 29 | 1cii | 1 | 2 | 2.3.2 | Preventing the spread of infections. | This question is about vaccinations. | | | |
| 29 | 1ciii | 1 | 2 | 2.3.2 | Preventing the spread of infections. | This question is about vaccinations. | | | |
| 29 | 1d | 3 | 1 | 2.6.4 | Treating disease. | This question is about drug trials. | | | |
| 30 | 1a | 2 | 2 | 1.1.7 | The genome. | This question is about the structure of DNA. | | | |
| 30 | 1b | 3 | 1 | 1.1.12 | The genome. | This question is about the effect of genetic variants in non- coding DNA. | | | |
| 31 | 1a | 2 | 2 | 1.3.1 | Gene technology. | This question is about genetic testing. | | | |
| 31 | 1bi | 1 | 1 | 6.1.2, 1.1.10 | Theory of evolution and The genome. | This question is about gene mutations. | | | |
| 31 | 1bii | 1 | 3 | 1.2.8 | The genome. | This question is about sex determination. | | | |