Biology GCSE Year 10 Mock Examination

Instructions:

- Answer all questions in the spaces provided.
- ☐ at the end of each question.
- You are advised to show all your working out where necessary.
- A calculator may be used.
- The total number of marks for this paper is 45.

Time allowed: 45 minutes

Section A: Cell Biology

1. **Question 1.1** Draw a diagram of a typical animal cell and label three organelles. [3 marks]
2. **Question 1.2** Describe two differences between a plant cell and an animal cell. [2 marks]
3. **Question 1.3** Explain the function of the nucleus within a eukaryotic cell. [2 marks]

Section B: Organisation

1. **Question 2.1** Complete the following hierarchy of organisation: Cell > Tissue > _____ > Organ system > Organism [1 mark]
2. **Question 2.2** Describe the role of the circulatory system in the human body. [3 marks]
3. **Question 2.3** Explain how the small intestine is adapted for efficient absorption of digested food. [3 marks]

Section C: Infection & Response

1. **Question 3.1** Name two types of pathogens that can cause disease. [2 marks]
2. **Question 3.2** Describe how white blood cells protect the body from pathogens. [3 marks]
3. **Question 3.3** Explain the principle behind vaccination in preventing infectious diseases. [3 marks]

Section D: Bioenergetics

1. **Question 4.1** Write the word equation for photosynthesis. [2 marks]
2. **Question 4.2** Explain why respiration is an essential process for all living organisms. [3 marks]
3. **Question 4.3** Describe how light intensity affects the rate of photosynthesis. [3 marks]

Appendix: Sample Answers and Marking Scheme

Section A: Cell Biology

Question 1.1 *Sample Answer:* (Diagram showing a roughly circular shape with a **nucleus**, **cytoplasm**, and **cell membrane** clearly labelled). *Marking Scheme:*

- 1 mark for a reasonable diagram of an animal cell.
- 1 mark for each correctly labelled organelle (max 3 labels). (e.g., nucleus, cytoplasm, cell membrane, mitochondrion, ribosome).

Question 1.2 *Sample Answer:*

1. **Plant cells** have a **cell wall**, while **animal cells** do not.
2. **Plant cells** have **chloroplasts** (for photosynthesis), while **animal cells** do not. (Also acceptable: Plant cells have a large permanent vacuole, animal cells have small temporary ones or none). *Marking Scheme:*

- 1 mark for each correct difference. [2 marks]

Question 1.3 *Sample Answer:* The **nucleus** controls all the activities of the cell. It contains the **genetic material (DNA)** organized into **chromosomes**, which dictate protein synthesis and therefore cell function and characteristics. *Marking Scheme:*

- 1 mark for stating it controls cell activities.
- 1 mark for mentioning it contains genetic material/DNA/chromosomes. [2 marks]

Section B: Organisation

Question 2.1 *Sample Answer:* Cell > Tissue > **Organ** > Organ system > Organism *Marking Scheme:*

- 1 mark for "**Organ**". [1 mark]

Question 2.2 *Sample Answer:* The **circulatory system** transports substances around the body. It carries **oxygen** from the lungs to the body cells, and **carbon dioxide** from the cells back to the lungs. It also transports **nutrients** from the digestive system to cells and **waste products** away from cells, as well as hormones. *Marking Scheme:*

- 1 mark for stating transport of substances.
- 1 mark for mentioning transport of oxygen and carbon dioxide.
- 1 mark for mentioning transport of nutrients/waste products/hormones. [3 marks]

Question 2.3 *Sample Answer:* The **small intestine** has a very large surface area due to its length and the presence of folds, **villi**, and **microvilli**. It also has a very good **blood supply (capillary network)** to quickly transport absorbed nutrients away, maintaining a steep concentration gradient. The villi walls are also only **one cell thick**, providing a short diffusion distance. *Marking Scheme:*

- 1 mark for large surface area (due to folds/villi/microvilli).
- 1 mark for good blood supply/capillary network.
- 1 mark for thin walls/one-cell thick walls. [3 marks]

Section C: Infection & Response

Question 3.1 *Sample Answer:*

1. **Bacteria**
2. **Viruses** *Marking Scheme:*

- 1 mark for each correctly named pathogen (e.g., bacteria, viruses, fungi, protists). [2 marks]

Question 3.2 *Sample Answer:* **White blood cells** protect the body by **engulfing pathogens (phagocytosis)** and destroying them. Some white blood cells (**lymphocytes**) produce **antibodies** which are specific to particular pathogens and help to destroy them. Others produce **antitoxins** which neutralise toxins produced by pathogens. *Marking Scheme:*

- 1 mark for engulfing/phagocytosis.
- 1 mark for producing antibodies.
- 1 mark for producing antitoxins. [3 marks]

Question 3.3 *Sample Answer:* **Vaccination** involves introducing a small amount of a **weakened, dead, or inactive form of a pathogen** (or parts of it) into the body. This stimulates the **immune system to produce antibodies and memory cells** against that specific pathogen. If the real pathogen then enters the body, the immune system can **rapidly produce a large number of antibodies**, preventing the disease from developing. *Marking Scheme:*

- 1 mark for introducing weakened/dead/inactive pathogen/antigens.
- 1 mark for stimulating antibody production/immune response.
- 1 mark for rapid response upon re-exposure/prevents disease. [3 marks]

Section D: Bioenergetics

Question 4.1 *Sample Answer:* **Carbon dioxide + Water $\xrightarrow{\text{light energy}}$ Glucose + Oxygen** *Marking Scheme:*

- 1 mark for correct reactants (Carbon dioxide + Water).
- 1 mark for correct products (Glucose + Oxygen) and indicating light energy. [2 marks]

Question 4.2 *Sample Answer:* **Respiration** is essential for all living organisms because it **releases energy from glucose**. This energy is then used for all **metabolic processes**, such as muscle contraction, active transport, maintaining body temperature, protein synthesis, and growth. Without this continuous supply of energy, cells and organisms cannot function. *Marking Scheme:*

- 1 mark for stating it releases energy.
- 1 mark for stating the energy is used for metabolic processes/named process (e.g., movement, growth, active transport).
- 1 mark for explaining that organisms cannot function without energy. [3 marks]

Question 4.3 *Sample Answer:* As **light intensity increases**, the rate of **photosynthesis** also **increases**, up to a certain point. This is because light provides the energy for the photosynthesis reaction. Beyond this point, the rate will **plateau**, indicating that another factor (like CO2 concentration or temperature) has become limiting. If light intensity is too low, photosynthesis will be slow or not occur at all. *Marking Scheme:*

- 1 mark for stating that increasing light intensity increases the rate.
- 1 mark for explaining that light provides energy for the reaction.

- 1 mark for mentioning that it can become a limiting factor or that the rate will plateau at high light intensities due to other limiting factors. [3 marks]