Biology GCSE Year 10 Mock Examination (Paper 2)

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** Describe the main function of the cytoplasm in a cell. [1 mark]
2. **Question 1.2** State one difference between a prokaryotic cell and a eukaryotic cell. [2 marks]
3. **Question 1.3** Explain the process of diffusion and provide an example of where it occurs in a biological system. [3 marks]

Section B: Organisation

1. **Question 2.1** Give an example of an organ and name two different tissues that make up this organ. [3 marks]
2. **Question 2.2** Describe the path of food through the human digestive system, naming at least three organs involved. [3 marks]
3. **Question 2.3** Explain how the alveoli in the lungs are adapted for efficient gas exchange. [3 marks]

Section C: Infection & Response

1. **Question 3.1** Define the term 'antibody'. [2 marks]
2. **Question 3.2** Describe the stages of a typical viral infection within the body. [3 marks]
3. **Question 3.3** Explain what is meant by 'herd immunity' and why it is important. [3 marks]

Section D: Bioenergetics

1. **Question 4.1** What is the main product of anaerobic respiration in human muscle cells? [1 mark]
2. **Question 4.2** Compare aerobic and anaerobic respiration in terms of oxygen requirement and energy yield. [4 marks]
3. **Question 4.3** Describe the role of chlorophyll in photosynthesis. [2 marks]

Appendix: Sample Answers and Marking Scheme

Section A: Cell Biology

Question 1.1 *Sample Answer:* The cytoplasm is where most chemical reactions of the cell take place. *Marking Scheme:*

- 1 mark for stating it's where most chemical reactions occur/site of metabolic reactions. [1 mark]

Question 1.2 *Sample Answer:* Eukaryotic cells have a true nucleus and membrane-bound organelles, while prokaryotic cells do not. *Marking Scheme:*

- 1 mark for mentioning presence/absence of nucleus.
- 1 mark for mentioning presence/absence of membrane-bound organelles. [2 marks]

Question 1.3 *Sample Answer:* Diffusion is the net movement of particles from an area of higher concentration to an area of lower concentration. An example is the movement of oxygen from the alveoli in the lungs into the bloodstream. *Marking Scheme:*

- 1 mark for definition of diffusion (net movement, higher to lower concentration).
- 1 mark for mentioning particles/molecules.
- 1 mark for a correct biological example (e.g., oxygen into blood, CO2 out of blood, digested food into cells, water uptake by roots). [3 marks]

Section B: Organisation

Question 2.1 *Sample Answer:* Organ: Stomach. Tissues: Muscular tissue, Glandular tissue. *Marking Scheme:*

- 1 mark for a correct organ (e.g., heart, lung, stomach, liver, kidney).
- 1 mark for each correctly named tissue found in that organ (e.g., epithelial, muscular, nervous, glandular, connective). [3 marks]

Question 2.2 *Sample Answer:* Food enters the **mouth**, where it is chewed and mixed with saliva. It then travels down the oesophagus to the **stomach**, where it is churned and mixed with digestive juices. From the stomach, it moves into the **small intestine** where most digestion and absorption occur, then to the large intestine, and finally undigested waste is expelled from the anus. *Marking Scheme:*

- 1 mark for correct order of at least three organs (e.g., mouth, oesophagus, stomach, small intestine, large intestine, anus).
- 1 mark for a brief description of what happens in one of the named organs.
- 1 mark for another brief description of what happens in a different named organ. [3 marks]

Question 2.3 *Sample Answer:* The **alveoli** have a very large total **surface area** for gas exchange. Their walls are only **one cell thick**, providing a very short diffusion distance. They also have a rich **capillary network**, maintaining a steep concentration gradient for gases. *Marking Scheme:*

- 1 mark for large surface area.
- 1 mark for thin walls/one-cell thick.
- 1 mark for good blood supply/capillary network. [3 marks]

Section C: Infection & Response

Question 3.1 *Sample Answer:* An **antibody** is a protein produced by white blood cells (lymphocytes) in response to the presence of a specific antigen (from a pathogen), which helps to neutralise or destroy the pathogen. *Marking Scheme:*

- 1 mark for stating it's a protein/produced by white blood cells.
- 1 mark for stating it's specific to an antigen/helps destroy pathogens. [2 marks]

Question 3.2 *Sample Answer:* A typical **viral infection** involves the virus first **entering host cells**. Once inside, the virus takes over the cell's machinery to **replicate** its genetic material and produce new viral components. These new virus particles then **assemble** and are **released** from the host cell, often destroying it, and then go on to infect other cells. *Marking Scheme:*

- 1 mark for entering host cells.
- 1 mark for replication/using cell machinery to make new viruses.
- 1 mark for release/spreading to other cells. [3 marks]

Question 3.3 *Sample Answer:* **Herd immunity** occurs when a sufficiently large proportion of the population is **vaccinated** (or immune from prior infection), making it difficult for an infectious disease to spread. This protects those who cannot be vaccinated (e.g., very young, immunocompromised), as the chain of transmission is broken. *Marking Scheme:*

- 1 mark for definition: large proportion of population immune/vaccinated.
- 1 mark for explaining it makes it difficult for disease to spread.
- 1 mark for mentioning protection of vulnerable/unvaccinated individuals. [3 marks]

Section D: Bioenergetics

Question 4.1 *Sample Answer:* Lactic acid. *Marking Scheme:*

- 1 mark for "Lactic acid". [1 mark]

Question 4.2 *Sample Answer:* **Aerobic respiration** requires **oxygen**, whereas **anaerobic respiration** does **not** require oxygen. Aerobic respiration produces a **large amount of energy** (e.g., 30-32 ATP molecules per glucose), while anaerobic respiration produces a **much smaller amount of energy** (e.g., 2 ATP molecules per glucose). *Marking Scheme:*

- 1 mark for oxygen requirement difference (aerobic needs, anaerobic doesn't).
- 1 mark for energy yield difference (aerobic large, anaerobic small).
- 1 mark for stating specific energy yields (e.g., "many" vs "few" or approximate ATP numbers).
- 1 mark for linking energy yield to efficiency/completeness of glucose breakdown. [4 marks]

Question 4.3 *Sample Answer:* **Chlorophyll** is the green pigment found in chloroplasts that **absorbs light energy** from the sun. This absorbed light energy is then used to power the process of photosynthesis, converting carbon dioxide and water into glucose and oxygen. *Marking Scheme:*

- 1 mark for stating it absorbs light energy.
- 1 mark for linking absorbed light energy to its use in photosynthesis. [2 marks]