

UNIT 1 ANSWERS

CHAPTER 1

- 1 ► B 2 ► A 3 ► A 4 ► D
- 5 ► a Diagram should show each part of a plant cell and its function, e.g. cell wall (maintains shape of cell), cell membrane (controls entry and exit of substances), cytoplasm (where metabolism/reactions take place), vacuole (stores dissolved substances), nucleus (controls activities of cell), chloroplasts (photosynthesis), mitochondria (respiration).
- b An animal cell lacks a cell wall, a large permanent vacuole and chloroplasts.
- 6 ► Description, in words or diagrams, should include the following points:
- enzymes are biological catalysts
 - they speed up reactions in cells without being used up
 - each enzyme catalyses a different reaction
 - the production of enzymes is controlled by genes
 - enzymes are made of protein
 - the substrate attaches to the enzyme at the active site
 - the substrate fits into the active site like a key in a lock
 - this allows the products to be formed more easily
 - intracellular enzymes catalyse reactions inside cells
 - extracellular enzymes are secreted out of cells (e.g. digestive enzymes)
 - they are affected by changes in pH and temperature.
- 7 ► a About 75°C.
- b At 60°C the molecules of enzyme and substrate have more kinetic energy and move around more quickly. There are more frequent collisions between enzyme and substrate molecules, so more reactions are likely to take place.
- c The microorganism lives at high temperatures, so it needs 'heat-resistant' enzymes with a high optimum temperature.
- d It is denatured.
- 8 ► Diffusion is the net movement of particles (molecules or ions) from a high to low concentration. It does not need energy from respiration. Active transport uses energy from respiration to transport particles against a concentration gradient.
- 9 ► The function of the motor neurone is to send nerve impulses to muscles and glands. It has a long axon, which conducts these impulses. It has a cell body with many extensions called dendrons and dendrites, which link with other neurones at synapses. At the other end of the neurone, the axon branches and forms connections with muscle fibres, called neuromuscular junctions.
- The palisade cell's function is photosynthesis. Palisade cells are near the top surface of the leaf, where they are close to the sunlight. They have thin cell walls, so the light can easily reach the many chloroplasts that the cell contains.

- 10 ► a They carry out most of the reactions of respiration in the cell, providing it with energy.
- b Active transport. This uses the energy from the mitochondria.
- c Diffusion. The removal of glucose at A lowers the concentration inside the cell, so that the concentration at B is higher than inside the cell. Therefore glucose can diffuse down a concentration gradient.
- d Increases the surface area for greater absorption.

CHAPTER 2

- 1 ► D 2 ► A 3 ► B 4 ► C
- 5 ► a i Fungi ii Protoctists
iii Plants iv Bacteria
- b Like most protoctists, *Euglena* is a microscopic, single-celled organism. It has features of both plant and animal cells: like plants, it contains chloroplasts; like animals, it can move.
- 6 ► a Diagram should show a core of DNA or RNA surrounded by a protein coat. (It may also have an outer envelope or membrane derived from the host cell.)
- b A virus can be considered either as living or as a chemical. It does not have any of the normal characteristics of living things, except that it is able to reproduce.
- c Viruses can reproduce only inside a host cell, by taking over the cell's genetic machinery to make more virus particles. So viruses are all parasites.
- 7 ► a An animal that does not have a vertebral column (backbone).
- b Fine, thread-like filaments forming the feeding network of cells of a fungus.
- c A type of nutrition used by most fungi and some bacteria, where the organism feeds on dead organic material by digesting it using extracellular enzymes.

END OF UNIT 1 QUESTIONS

- 1 ► a i nucleus, mitochondrion (both needed for 1)
ii nucleus, chloroplast, mitochondrion (all needed for 1)
iii nucleus, mitochondrion (both needed for 1).
- b The cells in a root have no chloroplasts because they don't receive any light and so can't carry out photosynthesis (1)
- c Nucleus controls the activities of the cell (1); chloroplast absorbs light energy for photosynthesis (1); mitochondrion carries out some reactions of respiration to release energy (1).
- 2 ► a The artery is an organ because it is made of several tissues (1); the capillary is made up of only one type of cell (1).
- b i Two from: Breaks down large insoluble molecules (1) into smaller soluble molecules (1) that can be absorbed (1)