

IGCSE Biology 0610 Paper 3 Practice Paper

(Core)

Total: 80 marks · 1 hour 15 minutes · 6 questions · 33 parts

Question 1 · Cells and movement in and out of cells [14]

- (a) Name the part of a cell that controls the movement of substances into and out of the cell. [1]
- (b) A photomicrograph of a cell structure has an image length of 30 mm. The actual length of the structure is 0.06 mm. Calculate the magnification. Show your working. [2]
- (c) Two cubes of plant tissue have sides of 3 mm and 6 mm. Calculate the surface area to volume ratio of each cube, and explain which cube takes in oxygen faster by diffusion. [3]
- (d) Explain how the long extension and the many mitochondria of a root hair cell help it to absorb water and mineral ions. [3]
- (e) Define diffusion. [2]
- (f) State one difference between diffusion and osmosis. [3]

Question 2 · Enzymes and digestion [13]

- (a) Define the term enzyme and state its chemical nature. [2]
- (b) In a catalase experiment, 24 cm³ of oxygen was collected in 30 s. Calculate the mean rate of reaction in cm³ per second. [2]
- (c) Catalase works fastest at pH 7. Explain why the rate is very low at pH 2. [3]
- (d) State two ways in which bile helps in the digestion of fats. [3]
- (e) An enzyme solution is boiled for 5 minutes and then cooled to its optimum temperature. The rate stays at zero. Explain why. [3]

Question 3 · Plant nutrition and transport [14]

- (a) Write the word equation for photosynthesis. [2]
- (b) Pondweed 20 cm from a lamp produces 36 bubbles in 3 minutes. Calculate the bubbles per minute, predict the value at 40 cm where the light intensity falls to one quarter, and explain. [3]

- (c) State two mineral ions needed by plants and their use. [2]
- (d) A plant transpires 18 g of water in 4 hours. Calculate the mean rate of transpiration in g per hour, and state one environmental condition that increases it. [3]
- (e) Explain how water moves up the xylem to the leaves. [2]
- (f) State two advantages of having more stomata on the lower surface of a leaf. [2]

Question 4 · Human transport and gas exchange [14]

- (a) Name the blood vessel that carries blood away from the heart, and state which type of blood vessel contains valves. [2]
- (b) A person has a heart rate of 70 beats per minute and a stroke volume of 65 cm³. Calculate the cardiac output per minute in cm³ and in dm³. [3]
- (c) A person breathes 12 times per minute, taking in 0.45 dm³ of air each breath. Calculate the ventilation rate per minute. [2]
- (d) State three features of alveoli that make gas exchange efficient, and explain each. [3]
- (e) Explain why the wall of the left ventricle is thicker than that of the right ventricle. [2]
- (f) State two components of blood and their functions. [2]

Question 5 · Coordination and homeostasis [13]

- (a) Define homeostasis. [2]
- (b) Write the order of the nervous pathway in the withdrawal reflex, from stimulus to response, and explain why a reflex is faster than a conscious action. [3]
- (c) Body temperature is kept near 37 °C. When it rises, state two responses of the skin and explain how they cool the body. [3]
- (d) After a meal raises blood glucose, name the hormone, its gland and its action. [3]
- (e) Explain why negative feedback is important in keeping the internal environment stable. [2]

Question 6 · Inheritance and ecology [12]

- (a) A plant of genotype Tt is crossed with a plant of genotype tt (T = tall, dominant). Give the genotype ratio of the offspring and the percentage that are tall. [3]
- (b) Two Tt plants are crossed and produce 400 seeds. Using a 3 : 1 ratio, predict how many seedlings are tall and how many are short. [2]

(c) A quadrat of 0.5 m² contains 12 plants of one species. Estimate the number per square metre and the total in a 500 m² field. **[3]**

(d) Explain why food chains usually have only four or five trophic levels. **[2]**

(e) State two features of an insect-pollinated flower that attract insects. **[2]**