This is the **Foundation Separate** version. Higher Tier (★) questions have been removed. All remaining questions are Foundation-level.

Organisation Hierarchy (4.2.1)

Specification reference: 4.2.1

Q1. Arrange the following in order from smallest to largest: organ system, tissue, cell, organism, organ.

[1 mark]

Q2. The stomach is an organ. Explain what this means, naming the types of tissue found in the stomach.

[3 marks]

Digestive System and Enzymes (4.2.2.1–4)

Specification reference: 4.2.2

Q3. Complete the following table showing enzyme name, substrate and product(s).

[3 marks]

Q4. Explain why amylase in the stomach does not function effectively. Use the terms optimum, active site and denaturation in your answer.

[4 marks]

Q5. Bile is produced in the liver. Describe its role in the digestion of fats.

[2 marks]

The Heart and Blood Vessels (4.2.2.6–7)

Specification reference: 4.2.2.6

Q6. Explain why the left ventricle has a thicker muscular wall than the right ventricle.

[3 marks]

Q7. Compare the structure of arteries and veins, linking each feature to its function.

[4 marks]

Q8. Explain how coronary heart disease develops and describe TWO treatments available.

[4 marks]

Blood and its Components (4.2.2.7)

Specification reference: 4.2.2.7

Q9. Describe how red blood cells are adapted for carrying oxygen. State THREE adaptations.

[3 marks]

Q10. Describe the roles of phagocytes and lymphocytes in defending the body against pathogens.

[4 marks]

Plant Tissues and Transport (4.2.3)

Specification reference: 4.2.3

Q11. Describe the differences between xylem and phloem in terms of structure and function.

[4 marks]

Q12. Explain how root hair cells are adapted for absorbing water and mineral ions.

[3 marks]

◆ SEPARATE SCIENCE

Q13. ◆ Explain how the structure of the leaf is adapted for efficient photosynthesis.

[3 marks]

Total: 41 marks

Organisation Hierarchy (4.2.1)

Q1 (1 mark)

Arrange the following in order from smallest to largest: organ system, tissue, c…

• Cell → tissue → organ → organ system → organism [1]

Q2 (3 marks)

The stomach is an organ. Explain what this means, naming the types of tissue fou…

• An organ is a group of DIFFERENT tissues working together to perform a function [1]

• Stomach contains: muscle tissue (churning food) [1]

• Glandular tissue (producing enzymes and acid) and epithelial tissue (lining) [1] — accept any two tissues correctly named with function

Digestive System and Enzymes (4.2.2.1–4)

Q3 (3 marks)

Complete the following table showing enzyme name, substrate and product(s).

• Amylase: starch → sugars [1]

• Protease: protein → amino acids [1]

• Lipase: lipids/fats → fatty acids and glycerol [1]

Q4 (4 marks)

Explain why amylase in the stomach does not function effectively. Use the terms …

• Amylase has an optimum pH of approximately 7 (neutral) [1]

• The stomach has a pH of approximately 2 (very acidic) [1]

• The acid causes the active site of amylase to change shape permanently (denaturation) [1]

• The substrate (starch) can no longer fit the active site — amylase cannot catalyse the reaction [1]

Q5 (2 marks)

Bile is produced in the liver. Describe its role in the digestion of fats.

• Bile emulsifies fats — breaks large fat globules into smaller droplets [1]

• This increases the surface area of fat available for lipase to act on → faster digestion [1]

The Heart and Blood Vessels (4.2.2.6–7)

Q6 (3 marks)

Explain why the left ventricle has a thicker muscular wall than the right ventri…

• The left ventricle pumps blood around the entire body (systemic circulation) [1]

• This is a much longer distance requiring higher pressure [1]

• Thicker muscle wall generates greater force/pressure to push blood further [1]

Q7 (4 marks)

Compare the structure of arteries and veins, linking each feature to its functio…

• Arteries: thick muscular/elastic walls — can withstand and smooth out high pressure blood from heart [1]

• Arteries: narrow lumen — maintains high blood pressure [1]

• Veins: valves — prevent backflow of blood as pressure is low [1]

• Veins: large lumen — reduces resistance to slow-moving blood [1]

Q8 (4 marks)

Explain how coronary heart disease develops and describe TWO treatments availabl…

• Fatty deposits (plaques/atherosclerosis) build up inside coronary arteries over time [1]

• This narrows the arteries → reduces blood flow and O■ supply to heart muscle [1]

• Treatment 1: stents — metal mesh tube inserted to hold artery open [1]

• Treatment 2: statins — drugs that reduce blood LDL cholesterol, slowing plaque formation [1] — accept bypass surgery

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Blood and its Components (4.2.2.7)

Q9 (3 marks)

Describe how red blood cells are adapted for carrying oxygen. State THREE adapta…

• Biconcave disc shape — increases surface area for O■ diffusion [1]
• No nucleus — more space for haemoglobin/more O■ carried per cell [1]
• Contain haemoglobin — binds O■ reversibly in lungs, releases in tissues [1]

Q10 (4 marks)

Describe the roles of phagocytes and lymphocytes in defending the body against p…

• Phagocytes engulf and digest pathogens by phagocytosis [1]
• This is a non-specific response — works against any pathogen [1]
• Lymphocytes produce antibodies that are complementary to specific antigens on the pathogen [1]
• Memory lymphocytes remain in the body — rapid response on re-exposure to the same pathogen [1]

Plant Tissues and Transport (4.2.3)

Q11 (4 marks)

Describe the differences between xylem and phloem in terms of structure and func…

• Xylem: dead hollow cells with lignified walls; phloem: living cells with sieve plates [1]
• Xylem: transports water and mineral ions from roots upwards (transpiration stream) [1]
• Phloem: transports dissolved sugars (sucrose) from leaves to all parts of plant (translocation) [1]
• Xylem flow is one-way upward; phloem can transport in both directions [1]

Q12 (3 marks)

Explain how root hair cells are adapted for absorbing water and mineral ions.

• Long extension creates large surface area [1]
• Water absorbed by osmosis (soil water potential > root cell water potential) [1]
• Mineral ions absorbed by active transport (against concentration gradient, requires ATP) [1]

Q13 (3 marks) [◆ Sep]

◆ *Explain how the structure of the leaf is adapted for efficient photosynthesis.*

• Palisade cells near top of leaf packed with chloroplasts — maximise light absorption [1]
• Spongy mesophyll has air spaces — allows CO■ to diffuse to palisade cells [1]
• Stomata in lower epidermis control gas exchange (CO■ in, O■ and water vapour out) [1]