

1. Dissect specimen S₁ provided in the usual way. Displace the gut to the left hand side of the specimen and display fully both the digestive and reproductive systems.
 - (a) Draw a large diagram of your dissection and label only the required structures.
 - (b) State the sex of your specimen and give one external feature you used to determine the sex of specimen S₁.
 - (c) Mention the structure in specimen S₁ which performs the same function as rumen in mammals, for example goat.
 - (d) LEAVE YOUR DISSECTION PROPERLY DISPLAYED FOR ASSESSMENT.
(20 marks)

2. You have been provided with a 2% hydrogen peroxide solution, some fresh liver and soaked peas. Carry out the following activities to investigate the interactions of substance X present in the liver and peas, with hydrogen peroxide.
 - (i) Label 7 test-tubes 1, 2, 3, 4, 5, 6 and 7.
 - (ii) Cut 1cm³ of fresh liver and place it in test-tube 1.
 - (iii) Add about 4cm³ of hydrogen peroxide solution into the test-tube containing the liver. Observe and record.
 - (iv) Cut off another 1cm³ of liver and grind it in a mortar.
 - (v) Place the ground liver in test-tube 2.
 - (vi) Repeat step (iii)
 - (vii) Repeat step (iv)
 - (viii) Place the ground liver in test-tube 3 then boil and allow it to cool.
 - (ix) Repeat step (iii)
 - (x) Remove the seed coats from 3 soaked peas, place them (seed coats) in test-tube 4 and add a few drops of hydrogen peroxide solution. Observe and record.
 - (xi) Place the naked cotyledons from step (x) in test-tube 5 and add a few drops of hydrogen peroxide solution. Observe and record.
 - (xii) Boil 3 peas in a test-tube and cool.
 - (xiii) Remove the seed coats from the 3 boiled seeds and place them (seed coats) in test-tube 6. Add a few drops of hydrogen peroxide solution. Observe and record.
 - (xiv) Place the naked cotyledons (from step (xiii)) in test-tube 7 and add a few drops of hydrogen peroxide solution. Observe and record.

- (a) Record your observations in a table as shown below:

Table 1

Test-tube No.	Observations
1	
2	
3	
4	
5	
6	
7	

- (b)
 - (i) Suggest the name of substance X.
 - (ii) Mention the cellular organelles in which substance X is found.
 - (iii) Name the biochemical process catalysed by X which takes place in liver cells.

- (c) What were the purposes of
- (i) grinding the liver?
 - (ii) Boiling the liver and peas?
- (d) (i) Write a balanced equation of the reaction between substance X and hydrogen peroxide.
- (ii) What is the biological significance of this reaction in living organisms?
- (e) In which part of the pea is X most abundant?

(15 marks)

3. (a) Observe specimens S₂, S₃ and S₄ carefully and then copy and complete table 2 below.

Table 2

Specimen	Common name	Phylum	Two adaptations to its mode of life
S ₂			
S ₃			
S ₄			

- (b) Carefully study specimen S₅.
- (i) Write its floral formula
 - (ii) Draw a floral diagram of the specimen.
 - (iii) To which class does specimen S₅ belong?
 - (iv) Which observable feature(s) of S₅ place it in the class you have named in (b) (iii)?
 - (v) Giving reasons suggest its mode of pollination.
- (c) (i) You are provided with specimens S₆, S₇, S₈, S₉, S₁₀, S₁₁ and S₁₂. Observe them carefully and then construct a simple numbered dichotomous key which could be used to identify the seven specimens. Base your key on body parts, legs and wings characteristics only.
- (ii) Give the common names of specimens S₆, S₇, S₈, S₉, S₁₀, S₁₁ and S₁₂ and state the class to which each of them belongs.

(15 marks)