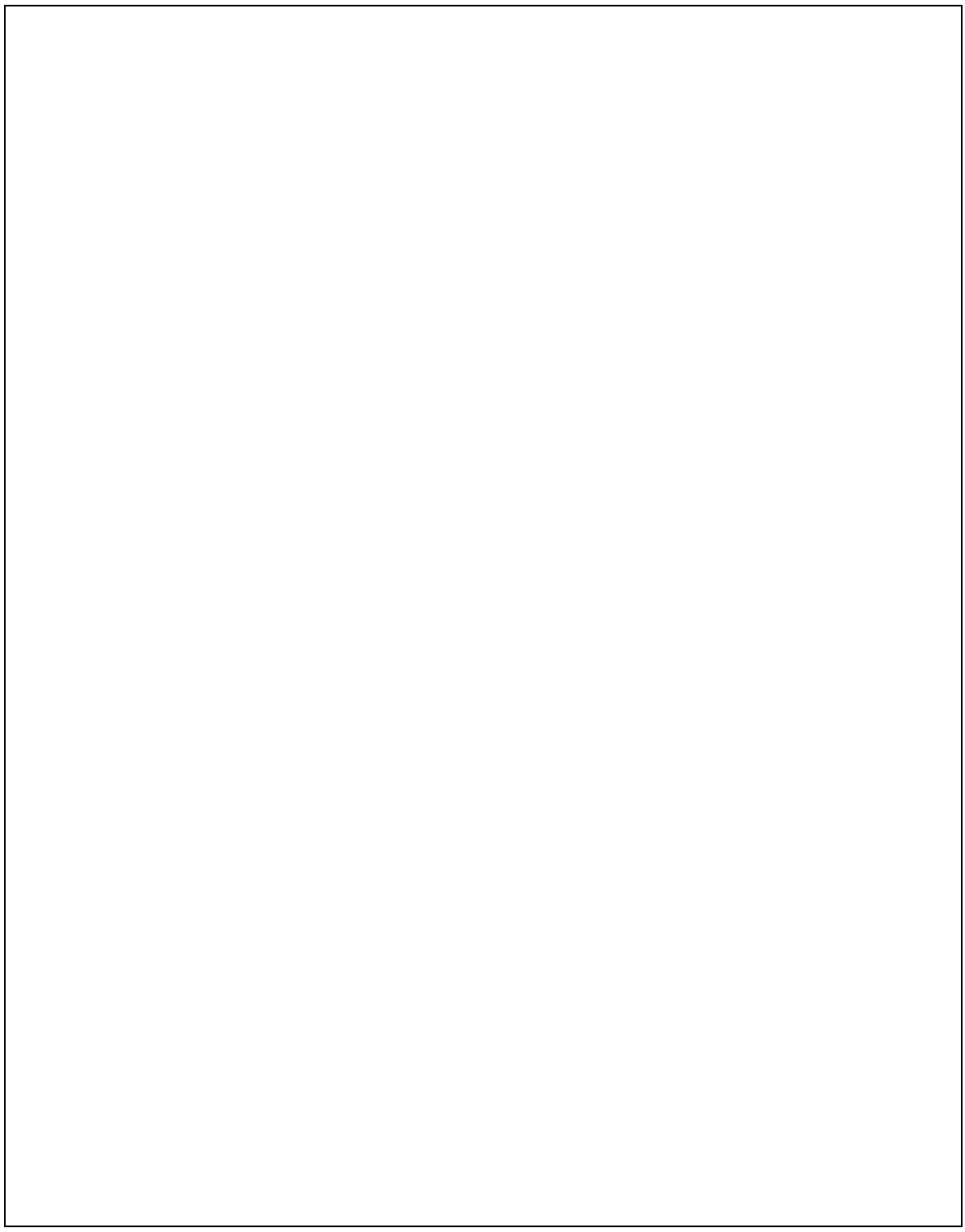
Question 1(a).

(i) Study specimen **X-1** carefully. Dissect the specimen if necessary and complete the table given below using semi-technical terms. **[5]**

CHARACTERISTICS	DESCRIPTION IN SEMI TECHNICAL TERMS
Aestivation of petals	
Cohesion of sepals	
No. of stamen	
Cohesion of stamen	
Position of ovary	
Attachment of anther to the filament	
Placentation	

(ii) Take a flower of specimen **X-1**, remove the gynoecium and draw a neat labeled diagram.



(iii) Cut the T.S of the ovary of the specimen **X-1** and draw a neat labeled diagram.

(iv) Cut the L.S of a fresh specimen of **X-1**. Display the L.S. *Show the L.S. to the* ***Visiting Examiner.***

(v) Draw a neat labeled diagram of the L.S of specimen **X-1**.

Question 1 (b)

(i) Make a temporary stained mount of a transverse section of the given specimen **X-2**. **[5]**

Show it to the ***Visiting Examiner*** under low power objective of a compound microscope.

(ii) Draw a neat labelled cellular diagram of the T.S. as seen under the low power objective of the compound microscope.

(iii) Write in proper sequence the procedure you followed while performing the experiment.

(iv) Identify the specimen **X-2**. Give ***two*** points of identification to support your answer.

Question 2. (a).

(i) Conduct the experiment as per the instructions given below: **[6]**
You are provided with a fleshy scale leaf of specimen **X-3**. Remove a peel from the concave side of the specimen. Cut it into small square strips. Stain the cut strips. Put 2-3 drops of solution **P** on a slide**.** Place the strip on it and cover it with cover slip. Keep it for 30 minutes and examine under low power objective of a compound microscope.

(ii) *Show it to the **Visiting Examiner.***

(iii) Draw a labelled diagram of the cells as seen under the microscope.

(iv) Drain out the solution **P** from the slide with the help of a blotting paper. Add 2-3 drops of solution **Q** from the side of the cover slip. Leave it for 30 minutes. Draw a labelled diagram of the cells as seen under the low power objective of compound microscope.

(v) Name the physiological process which occurs when the strip is placed in solution **P**.

(vi) Explain the physiological process mentioned in (v).

(vii) Give ***one*** importance of the physiological process to plants.

(viii) Mention ***two*** practical applications of the physiological process.

(ix) Name the physiological process which occurs when the strip is placed in solution **Q.**

(x) Explain the physiological process mentioned in (ix).

`

(xi) State the tonicity of solutions **P** and **Q** with respect to the cell sap of the original cells of the strip.

Name of the solution	Tonicity with respect to the cell sap of the original cells of the strip
P	
Q	

Question 2. (b)

Observe carefully specimens **A** and **B** provided for spotting. You will be given three minutes to observe each specimen. Take back your answer script to your working table and complete the rest of the work as instructed below. **[4]**

(i) Identify the type of underground stem modification in A and sub-aerial stem modification in B. Draw neat labelled diagrams for each of the specimen.

Name of the specimen	Type of stem modification
A	
B	

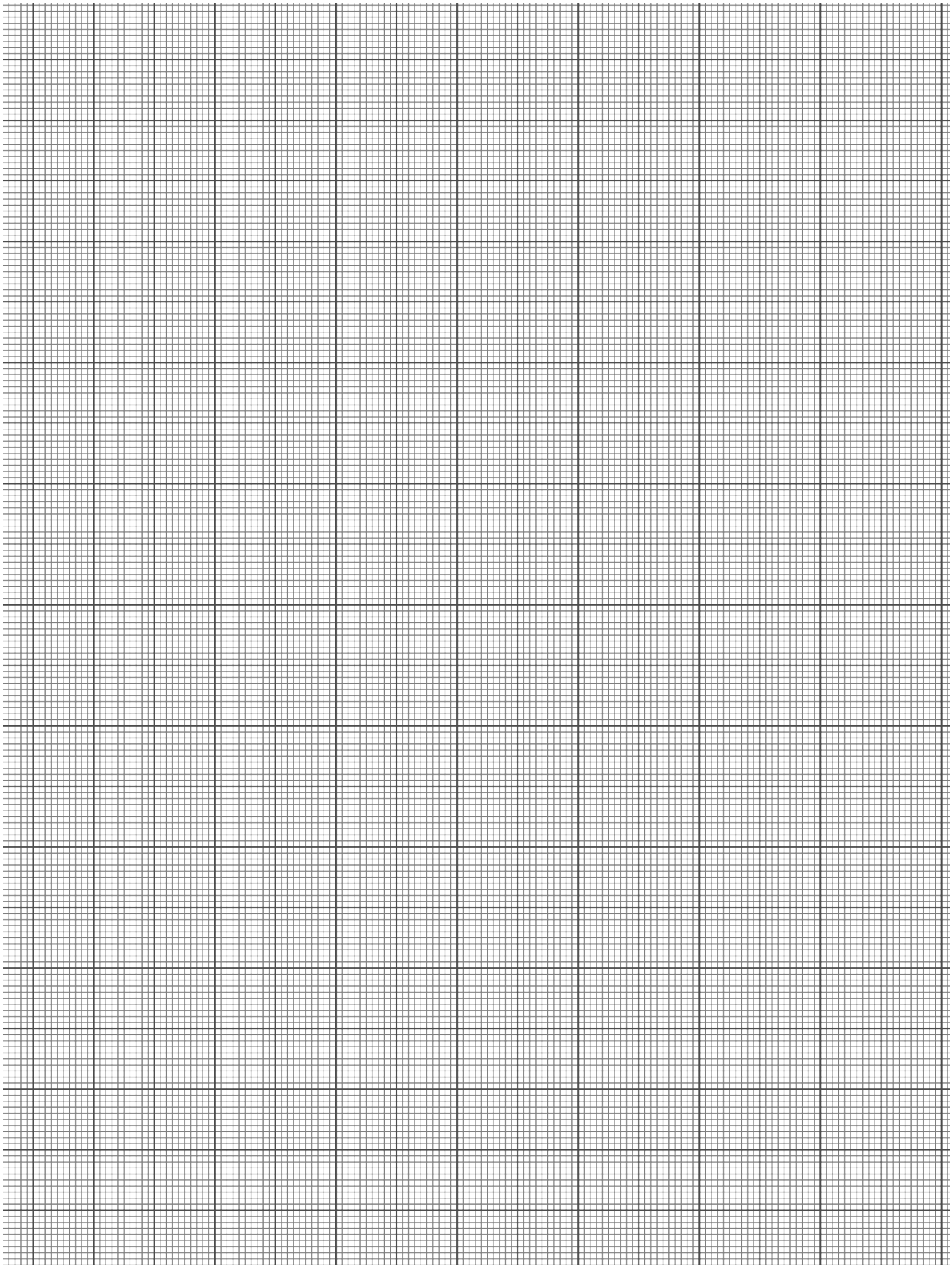
Diagram of Specimen A:

Diagram of Specimen B

(ii) State ***one*** important feature each which helps to identify the specimens as stem modifications in the table given below.

Specimen	Features
A	
B	

(iii) Mention ***two*** purposes of stem modification which is common to both Specimen A and B.



For rough work

For rough work

Question 1 (a) **[6]**

(i) Dissect the given specimen **P-1.** Observe the parts carefully and complete the table given below.

No. of stamens	
Arrangement of stamens	
Number of lobes	
Dehiscence of anther	
Nature of corolla	
Arragement of sepals	
Position of ovary	

(ii) Cut the L.S. of a fresh specimen **P-1**. Display the L.S. of **P-1**. *Show it to the* ***Visiting Examiner*****.**

(iii) Draw a neat labeled diagram of the L.S of specimen **P-1.**

(iv) Draw the diagrammatic representation of the aestivation of the sepals of **P-1**.

(v) Remove the corolla. Take a petal and draw a labelled diagram.

(vi) Write the floral formula of the specimen **P-1**.

(vii) Name the family to which the specimen belongs. Mention ***two*** features that are peculiar to the family.

(viii) Give the scientific name of ***one*** economically important plant of this family.

Question 1. (b) **[4]**

Make a temporary stained mount of a transverse section of the given specimen **P-2**

(i) *Show it to the* ***Visiting Examiner*** under low power objective of a compound microscope.

(ii) Draw a neat labelled cellular diagram of the T.S. as seen under the low power objective of the compound microscope.

(iii) Write in proper sequence the procedure you followed while performing the experiment.

(iv) Identify the specimen. Give ***two*** points of identification to support your answer.

Question 2. (a) **[6]**

Set-up an experiment to demonstrate that the specimen **P-3** produces oxygen during photosynthesis**.**

(i) *Show the initial set-up to the* ***Visiting Examiner*****.**

(ii) Make a list of the materials required for this experiment.

(iii) Draw a neat labeled sketch of your initial experimental set-up.

(iv) A curious student performed a similar experiment and obtained the data as given below. All the set-up was kept under the same conditions of temperature and light intensity.

Sl.no	**Set-up**	**Amount of $NaHCO_3$ added (in grams) to the pond water in the beaker**	**Number of bubbles evolved within 10 minutes of the set-up**
1	A	Nil	2
2	B	0.5	4
3	C	1	10
4	D	1.5	16
5	E	2	20
6	F	2.5	20
7	G	3	20

Study the data carefully and answer the questions given below.

1. Plot a graph on the graph paper provided to draw a relationship between mass of $NaHCO_3$ and number of bubbles evolved.
2. What can you conclude from the graph?

3. What is the purpose of using $NaHCO_3$ in this experiment?

4. What would happen if ice cubes are added to the water in the beaker?

5. Why can't we perform the same experiment using a mesophyte instead of **P-3**?

6. Mention one chemical test to prove that the gas released in the experiment is oxygen.

Question 2. (b) **[4]**

Identify the given permanent slides, **A** and **B**. Give ***two*** reasons for each to support your identification. Draw neat labeled diagrams of **A** and **B.**

A =

Reasons for identification
1.
2.

B =

Reasons for identification
1.
2.

Diagram of A

Diagram of B

For rough work

For rough work

Question 1. (a) **[5]**

i) Remove the calyx and corolla of the specimen **Z-1**. Study them carefully and complete the table given below.

Calyx	
Number of sepals	
Arrangement of sepals	
Aestivation of sepals	
Corolla	
Number of petals	
Arrangement of petals	
Aestivation of petals	

(ii) Take one flower of the specimen **Z-1**, remove the androecium and draw a neat labelled diagram of the androecium.

(iii) Study the androecium carefully and complete the table given below.

Androecium of Z-1	
Number of stamens	
Number of anther lobes	
Relative lengths of stamens	
Attachment of anther to filament	

(iv) Cut T.S of the ovary of the specimen **Z-1**and *show it to the* ***visiting examiner.***

(v) Draw a neat labeled diagram of the T.S. of the ovary.

(vi) Name the family of the specimen **Z-1** and list down **two** unique features of this family.

(vii) Name one economically important plant of this family [write the scientific name].

Question 1. (b) **[5]**

Make a temporary stained mount of the T.S of the specimen **Z-2**.

(i) *Show it to the* ***visiting examiner*** under a low power of compound microscope.

(ii) List down the procedure for conducting the experiment in stepwise manner.

(iii) Draw a neat labeled cellular diagram of the mount as seen under the low power objective of compound microscope.

(iv) Identify the specimen and give **TWO** points of identification to support your answer.

Question2. (a) **[5]**

You are provided with the following materials:

- Potato tuber
- Test tube with cork (3 Nos.)
- Test tube rack (1 No)
- Dropper (1 No.)
- Borosil beaker 100ml
- Water
- Splint
- Bunsen burner or spirit lamp (1 No.)
- Tripod stand
- Wire guaze
- Ice cubes (few) and petri dish (2 Nos.)
- H_2O_2

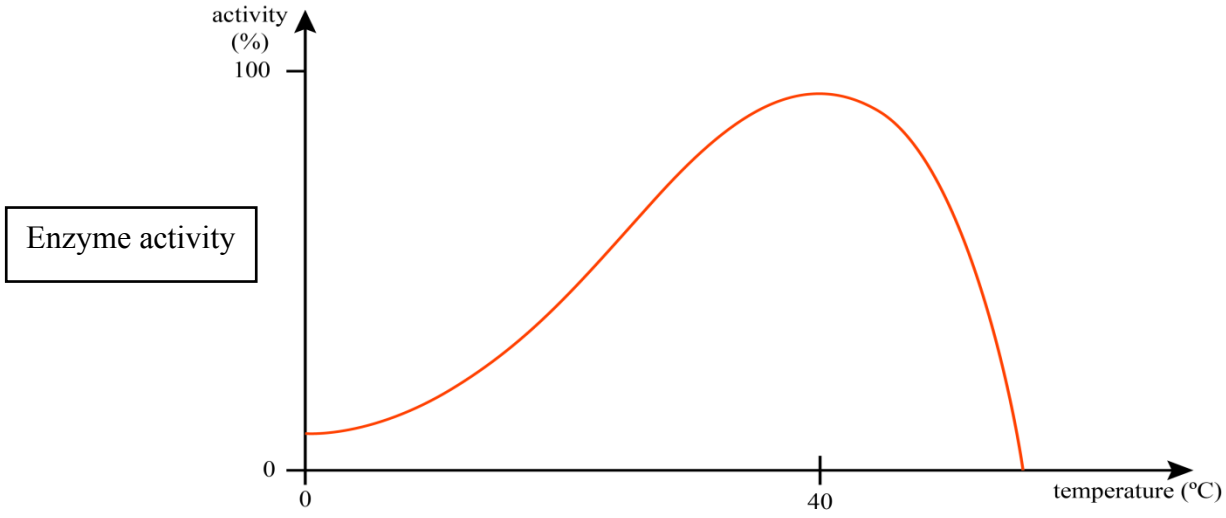
Conduct an experiment using these materials to demonstrate the effect of catalase on hydrogen peroxide and to explain the effect of temperature on catalase activity.

(i) Write down the procedure to conduct the experiment.

(ii) Write down the observation and inference from the experiment in the table below:

Sl.no	Test tube	Observation	Inference about enzyme activity
1	A		
2	B		
3	C		

(iii) Pema conducted a similar experiment and plotted a graph from her data and observation as shown below.



Study the graph and answer the following questions.

1. At which temperature, the enzyme activity is the best?

2. State the reasons for variation in the activity of the enzyme

3. Apart from temperature, name any **two** factors which affect the rate of reaction of enzymes.

Question 2. (b)

Observe carefully specimens **M** and **N** provided for spotting. You will be given three minutes to observe each specimen. Take back your answer script to your working table and complete the rest of the work as instructed below. **[5]**

(i) Identify the type of underground stem modification of specimens M and N.

Name of the specimen	Type of stem modification
M	
N	

(ii) Draw neat labelled diagram of M and N.

Diagram of Specimen M:

Diagram of Specimen N:

(iii) State ***one*** important feature each which help to identify the specimens as stem modifications in the table given below:

Specimen	Feature
M	
N	

(iv) Mention ***two*** purposes of stem modification which is common to both M and N.