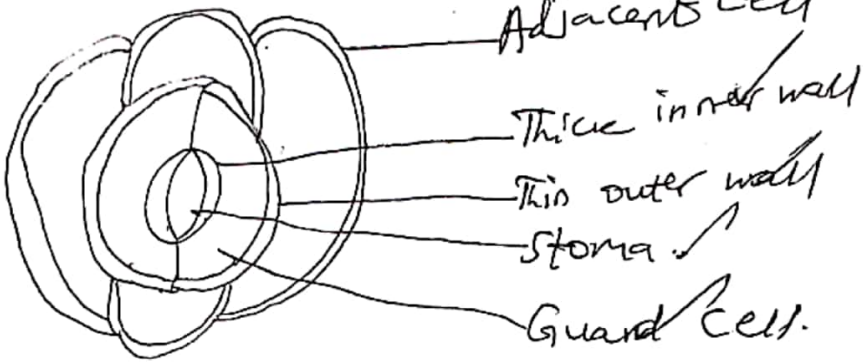
(e) Drawing of Stoma from Specimen H observed under low power of the Microscope.



x 100 — x 800

X300

T — 0½
M — 0½
O — 0½
N — 0½
D — 0½ max
[— 0½ max

07

30

10

Reasons Classification

3(a)

Classification	Reasons
Phylum	Presence of flowers ✓ Angiospermatophyta / Spermatophyta ✓
Class	* Parallel leaf veins * Leaf sheath ✓ Dicotyledoneae / Monocotyledoneae ✓

Award only one

(b)

H (Open)	I (Shade)
- Narrower leaves	- Broader leaves ✓
- Shorter leaves	- Longer leaves ✓
- more hairy leaves	- Less hairy leaves ✓
~~Thin stems~~	~~Thick stems~~
- Shorter stems	- Longer stems ✓
- Thin leaf lamina	- Thick leaf lamina ✓
- Light / pale green	- Dark green ✓

Award first 3

(c)

Specimen	Surface	Number of stomata
G	Upper	> 1000 ✓
	Lower	0 0 ✓
H	Upper	~~120 – 150~~ ✓
	Lower	~~150 – 400~~ ✓ 250 – 500
I	Upper	50 100 – 200 – 150 ✓
	Lower	~~250 – 500~~ 150 – 400 ✓

Open

Shade

OK

d(i) G — Water/Aquatic habitat

H — Dry terrestrial habitat

I — humid/shade terrestrial habitat.

(ii) Specimen G. (water lily)

- Has many stomata on the upper surface so as to get rid of excess water.
- No stomata on lower surface of the leaf since its submerged.
- Large leaf lamina to increase surface area for evaporation.
- Long Leaf stalk for floatation
- Hollow Leaf Stalk for floatation.

Specimen H. (Grass)

- Fewer number of stomata on upper surface to reduce water loss.
- More hairy to reduce rate of water loss
- Narrow leaf surface to reduce surface area to minimize water loss.

Specimen I (Shade)

- Few stomata on upper surface to reduce water loss.
- Dark green leaves to maximize capture of light for photosynthesis
- Longer leaves to increase surface area exposed to sunlight.

8

(c) The acidic medium provides unsuitable medium for decomposition of substrate in A by the active substance in pieces of B.

* ~~The neutral medium provides a suitable medium for the decomposition of substrate in A by the active substance in the pieces of B.~~ No bubbles formed because boiling/excessive heat denatured the active substance in the pieces of B.

The alkaline medium provides very suitable medium for the decomposition of substrate in A by the active substance in B.

03

(d) The active substance in B is catalase enzyme / organic catalyst / biological catalyst

Reason:
- works in specific pH medium 02
- Its action is affected by substrate concentration
- Affected by enzyme concentration.
- It is denatured by boiling / excessive heat.

31 30 Max

2(a) (iii) Expts (4) and (5) were carried out to determine the effect of substrate concentration on the rate of enzyme reaction.

07

(iv) Expt 4:

Few bubbles were produced due to few substrate molecules providing few chances of collision between enzyme and substrate molecules.

Expt 5.

Many bubbles were produced due to many substrate molecules providing many chances of collision between enzyme and substrate molecules.

(b)	Experiment	observations	Deduction
(i)	To 1 cm³ of A_2 in a test tube add an unboiled piece of tissue B followed by 2 cm³ of HCl.	Few bubbles formed.	Little decomposition of substrate in A_2.
* (ii)	To 3 cm³ of A_2 in a test tube, add a boiled piece of B.	No/Many bubbles formed No effervescence	Much/No decomposition of substrate
(iii)	To 1 cm³ of A_2 in a test tube, add unboiled piece of B followed by 2 cm³ of NaOH	Very many/Many bubbles formed	very much decomposition of substrate in A_2.

* Accept ✗ Many

6

5 → 1 → 4 → 3 → 2

a(i)

Expt	Observations	Deductions
1	fast effervescence Many bubbles formed/foam ✓	Much decomposition of substrate in A_1
2.	No bubbles formed/ foam/effervescence/foam ✓	No decomposition of substrate in A_1
3.	few bubbles formed ✓ slow effervescence/ very few	Little decomposition of substrate in A_1
4.	Moderate bubbles formed/ Few bubbles formed	moderate decomposition of substrate in A_1
5.	very many bubbles formed ✓ Many bubbles formed fastest effervescence very fast effervescence	very much decomposition of substrate in A_2

10

Test tube 1:

Many bubbles formed because the liver piece of B contains many molecules of active substance catalase enzyme which increases chances of collision between substrate and enzyme molecules, leading to high rate of reaction.

Test tube 2

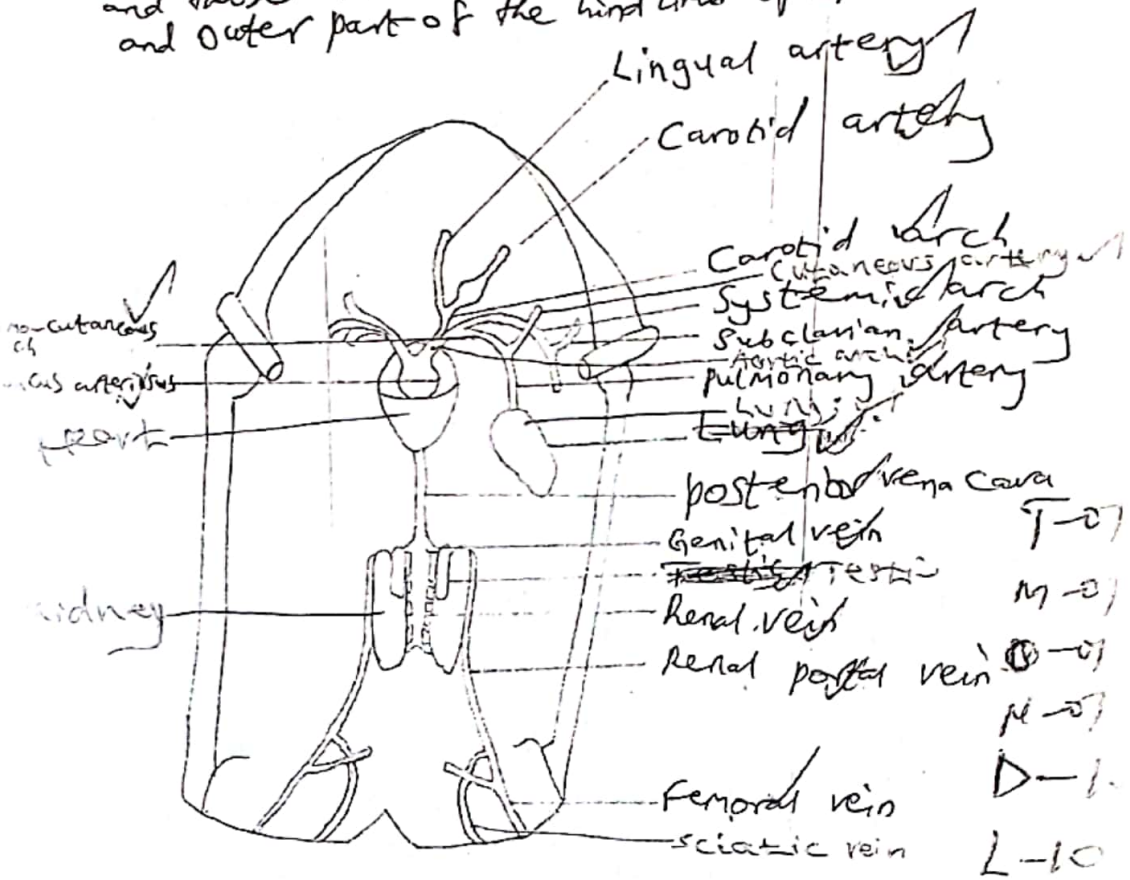
Boiling denatures the enzyme catalase the active substance pieces of B, which destroys the active sites, hence no reaction

Test tube 3

bubbles are formed because piece of D has few active substance molecules catalase enz. few chances of collision between enzyme substrate molecules. hence low rate of reaction.

5

Drawing showing blood vessels that supply blood to the left hand side of the head, fore limb and lung and those that drain blood from the urinogenital system and outer part of the hind limb of specimen F.



X1 — X3

24

1A Arterial:
if veins included
arteries on right side drawn & labelled
arteries of lower trunk included

1A. Veins
if veins near from urinogenital & hind limb drawn & labelled
if arteries in lower trunk drawn & labelled.

40

2. if only veins on the upper trunk &
only arteries in lower trunk drawn & labelled
* if imaginary drawing.

4

* generation of propulsive to push against

(a)(iii) - webbed digits of the hind limbs to increase surface area for swimming.
- five digits on hind feet to increase S.A for firm grip
- well developed digits for support attachment for more webbing
- longer digits of the hind foot for firm gripping.
- Hind foot is longer to increase S.A to generate propulsive force for jumping/swimming/firm grip

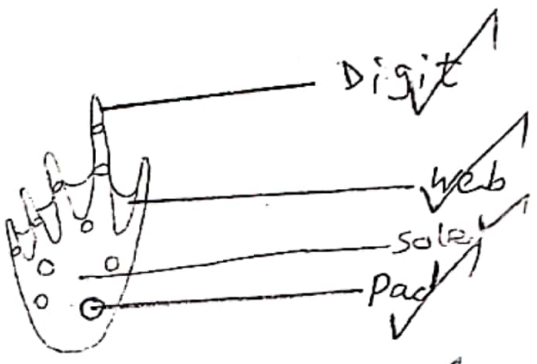
* Eye:
(v) - Larger protruding eyes for a wide field of view.
- dorso-laterally flattened

- Large mouth opening for ingesting/capturing large size prey.
- External nares/nostrils are open for passage of respiratory air
- A pair of nares/nostrils located at the tip of the head to ease breathing on land/when submerged in water.
- Circular eardrum/tympanic membrane to provide a large surface area for receiving sound waves to make hearing easy.
- large poison gland which secrete alot of poison for defence
- Skin: large/broad to increase S.A for sensitivity
- soft/thin to increase sensitivity

* Mark any first 3

3

1 (c) (i) Drawing of the ventral side of the hind foot of ~~the hind limb~~ of Specimen F.



X1 – X3

T – 01/2
M – 01/2
O – 01/2
N – 01/2
1) – 01/2
L – 01/2

05

Fore digits	Hind digits
1- No web between the digits. 2- ~~end~~ in four (well developed) digits; 3- Shorter digits;	- Have web between the digits - end in five well developed digits. - Longer digits

03

Rej Short/ long

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