

FISH LIVER - H₂O₂

1. You are provided with specimen W and X, and solutions P which is a common laboratory reagent and distilled water. You are to carry out tests on specimen W and X, using solution P to investigate action of contents of specimen W and X on solution P.

(a) -Label four test tubes as A, B, C, and D. Add solution P and distilled water test tubes A, B, C and D as instructed in table 1.

Table 1

Test tube	Add Solution P	And add distilled water
A	3 cm ³	0
B	1 cm ³	2 cm ³
C	0	3 cm ³
D	3 cm ³	0

- Cut 6 cubes from specimen W each of dimensions 1 cm x 1 cm x 1 cm. Also cut 2 cubes from specimen X each of dimensions 1 cm x 1 cm x 1 cm.
- Carry out the tests in table 2, record all your observations and deductions in table 2.

Table 2

Test	Observations	Deductions
(i) To test tube A, add 2 cubes from specimen W <i>Accept moderately</i>	<i>fast bubbling of gas occurs.</i> Bubbles of colourless gas given off rapidly/fast. (0.1mk x 2) = 2 mks	<i>Rapid evolution of gas bubbles</i> Rapid effervescence occurs. breakdown Rapid/fast decomposition of solution p; (0.1mk x 1) = 0.1 mk
(ii) To test tube B, add 2 cubes from specimen W <i>Accept slowly</i>	Bubbles of colourless gas; given off slowly; (0.1mk x 2) = 2 mks	slow decomposition of solution p; (0.1mk x 1) = 0.1 mk
(iii) To test tube C, add 2 cubes from specimen W	No bubbles of colourless gas given off; (0.1mk x 1) = 0.1 mk	No decomposition of water; (0.1mk x 1) = 0.1 mk
(iv) To test tube D, add 2 cubes from specimen X <i>Accept rapidly/fast</i>	Bubbles of colourless gas; given off very rapidly/ very fast; (0.1mk x 2) = 2 mks	Very rapid/very fast decomposition of solution p; (0.1mk x 1) = 0.1 mk

Effect of substrate conc. on enzyme activity

(b) Explain the results obtained in test tube A, B, and C.

(6 marks)

(i) test tube A

High concentration of solution P; causes fast decomposition of solution P by active substance/ enzyme catalase in specimen W; (01mk x2)=2 mks

breakdown

Reg. changes
Hydrolysis

02

(i) test tube B

Low concentration of solution P; causes slow decomposition of solution P by active substance/ enzyme catalase in specimen W; (01mk x2)=2 mks

Substrate

02

(ii) test tube C

No solution P; hence no decomposition by active substance/ enzyme catalase in specimen W. OR active substance/ enzyme catalase in W only/specifically catalyses decomposition of solution P; and not water; (01mk x2)=2 mks

No substrate

02

(c) Explain the difference between results obtained in test tube A and D. (03 marks)

Decomposition of solution P is higher/faster in test tube D than in test tube A; because specimen X is more metabolically active than specimen W; and so has higher concentration of active substance/ enzyme catalase; (01mk x3)=2 mks

Pectoral fin

20

2. You are provided with Specimen M and N which are animal parts.

(a) (i) Describe the structure of specimen M.

Quill feather

(03 marks) any 3

Large/broad/wide; slippery; with many /sharp /pointed/rigid ray spines; in thin /tough skin/horny fibre; adjacent ray spines linked by a tough skin; (01mk x3)

web

Vane

flexible.

Reg. spiracles

3

(ii) Describe the airtight structure of Specimen N. (03 marks)

Long

Large/broad/wide /elongated vane; with long/ tapering /rigid rachis/shaft; numerous/ parallel/ interlocked barb; (01mk x3)

any 3.
3

(b) From the structure described in (a), explain how each specimen is adapted for its function. (0.4 marks)

(i) Specimen M (01mk x2)

Fin

correct
any 2

- many rigid ray spines support the fin;
- slippery surface reduce resistance in swimming;
- Large/broad/wide to increase surface area for generating propulsion/swimming forces;
- adjacent ray spines linked by tough skin/web to make specimen water-tight;
- ray spines are sharp pointed for protection from natural enemies;

(ii) Specimen N (01mk x2)

feather

- elongated/wide vane provides large surface area for generating flight forces/propulsion;
- long rigid rachis for supporting the barbs;
- numerous interlocked barbs make the structure airtight;

Ref. feature along
correct
any 2

(c) Put specimen N under water in a beaker then remove and shake it.

(i) Record your results.

remains dry/does not get wet (01mk x1) / water runs off / water flows off!
Does not get soaked

(01 marks)

Ref. No
observa
Change

(ii) What is the importance of the results in c(i)

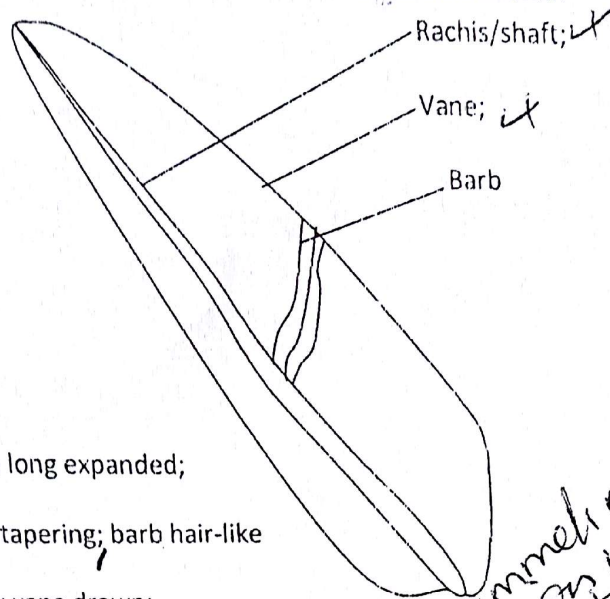
(02 marks)

is water-tight and water proofed; to prevent wetting and keep it light; to prevent water loss; to prevent cooling the body; prevent; (01mk x2)

To keep the bird/body wa

(d) In the space below, draw and label the airtight structure of specimen N (05 marks)

Drawing of the airtight structure/vane of specimen N



D=vane long expanded;

Rachis tapering; barb hair-like

A=only vane drawn;

Reg. Diagram

T
L
M.
D
N

M
A
O

T=0.5

D=1mkx2

L=0.5x2

M=0.5

A=0.5

N=0.5

T=0.5mks

common with stem
onion leaves
Lam. and Camara stem
Pumpkin stem with leaves
Accept shaft & label

3. You are provided with specimen P, Q, R and S, which are parts of different plants. Cut specimen Q longitudinally. Examine the specimens as you answer the following questions.

(a) Examine the leaves on specimen P, and state the class of plants from which specimen P, was obtained. Give two reasons for the class stated. (2mark)

(i) Class eae family

Monocotyledonae (01mk x1)=01 mk

Reg. Any other spelly

(ii) Reasons

-leaf sheath; parallel veins; (0.5mk x2)=01 mk

Accept Parallel Venation

(b) Examine specimen R, and explain how the specimen adapts the plant to survive on

land.

Has axillary buds for vegetative propagation during photo.

-hard/rigid internodes for supporting leaves/flowers/fruit in air;

Leaves are green, hence contain chlorophyll for sunlight absorption

-many green leaves absorb sunlight and carbon dioxide for photosynthesis;

Leaves have a broad lamina to provide a large SA for sunlight absorption

-rough internodes and leaves for protection from herbivores/browsers;

Leaves have hairy lamina to reduce the rate of transpiration

-many sharp/pointed curved prickles for protection from herbivores/browsers; natural enemies; accept thorns for prickles (01mk x3)=3 mks

Thin lamina/leaves to reduce the diffusion distance for CO₂ absorption and sunlight absorption.

Accept thorns any spines spikes prickles

(c) Examine the leaves of specimen S and the inner leaves of specimen Q. Give three differences between specimen S and specimen Q, basing on their leaves, in table 3.

Table 3

(0.1mk x3) = 3 mks

specimen S	specimen Q
<i>laminar</i> Thin leaves	<i>laminar</i> Thick/swollen leaves
<i>Not Swollen</i>	
Hairy leaves	Non-hairy leaves
Rough leaves	Smooth leaves
Leaves have green pigment	<i>green</i> Leaves lack pigment
Leaves loosely packed/ spaced	<i>^</i> Leaves closely/tightly packed/compacted

(d)(i) Examine the stem of specimen P, Q, R and S, and state three descriptive features of the stems in table 4. (Don't consider leaves)

(6 marks)

Table 4; reject leaf features

(1.5mk x4) = 6 mks

specimen	Descriptive feature
<i>Pumpkin</i> P	Ring/circular nodes; smooth; buds at nodes/axillary buds; cylindrical/elongated internodes; parallel veins/stripped (0.5mk x3) = 1.5 mks
<i>Onion</i> Q	Short; flattened; <i>disc-shaped</i> ; tiny buds in axil of leaves /axillary buds; hard; condensed; (0.5mk x3) = 1.5 mks
<i>Lantana</i> R	Rough; hairy; with numerous/sharp/curved prickles; nodes dotted here and there; elongated; buds; hard; (0.5mk x3) = 1.5 mks
<i>Pumpkin</i> S	Rough; hairy; parallel veins/stripped; tendrils; buds; soft; hollow; cylindrical; elongated; (0.5mk x3) = 1.5 mks

internodes
nodes

internodes
nodes

internodes
nodes

any 3@

Terminal bud
at the top of
stem tip

at regular interval

19

15 24

Common
Onions
Lentils
Pumpkin

(ii) From the descriptive features stated in table 4, construct a dichotomous key for identifying specimens P, Q, R, and S.

Opposite/contrasting statements in a couplet; each couplet 1 mk x 3 = 3 marks

Reject flow chart alone.

1 (a) specimen with hairy stem 3

(b) specimen with non-hairy stem 2

2 (a) specimen with short stem Q

(b) specimen with elongated stem P

3 (a) specimen with prickles R

(b) specimen without prickles S

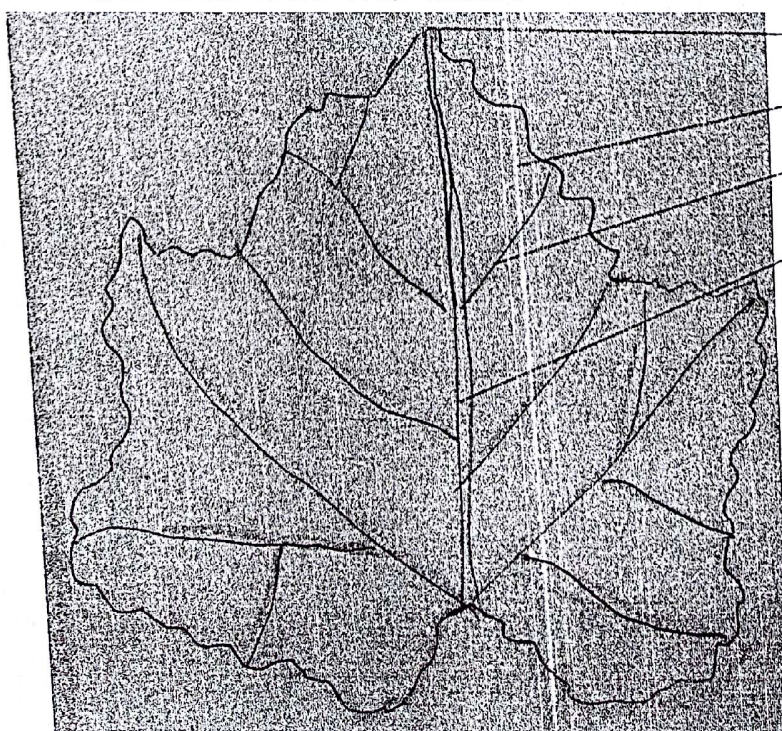
Reject if both the key and flow chart constructed.

Accept any correct key. Failure of step 2 like in the key above, doesn't automatically lead to failure of step 3; provided 1 is correct.

(e) Draw and label the lamina of a leaf of specimen S.

(05 marks)

Drawing of lamina of leaf of specimen S



Tip/apex

Margin

Vein

Mid-rib/main vein

$X^1/2 - x2$

D-mult-tipped lamina; midrib; vein; apex

A=only lamina; 3 midribs at base

$T = 0.5$

$D = 1.5$

$L = 1.5$

$M = 0.5$

$A = 0.5$

$N = 0.5$

$T = 0.5 mks$

any 3 each
tapping double li

END