

BIOLOGY PAPER 3
FORM 4
END TERM 2 2024
MARKING SCHEME

1. You are provided with a visking tubing, a solution labeled **K**, Iodine solution labeled solution **H**, Benedict's solution labeled solution **J** and a piece of thread.

(a) Using the reagents provided, put 2ml of the solution K in a test - tube in each case, test for the food substance present. (6mks)

Food substance	Procedure	Observations	Conclusion
Starch	Add a few drops of iodine solution to solution K.	Turns blue black; Acc. blue/black	Starch present;
Reducing sugars	Add equal amount of Benedicts solution to solution K in a test tube and heat;	Turns orange; Acc: yellow/brown	Reducing sugars present;

Tie one end of the visking tubing tightly using the thread provided. With the help of a dropper, put 10ml of the solution labeled K into the visking tubing. Tie the other end of the visking tubing tightly.

Ensure that there is no leakage at both ends of the visking tubing.

Wash the outside of the visking tubing with water. Place the visking tubing upright in a 100ml beaker. Add distilled water into the beaker to reach the level of the liquid in the visking tubing. Allow the set up to stand for 30 minutes or more.

(b) Using 2ml in a test - tube in each case, test for the food substance in the liquid outside the visking tubing: (2mks)

Food substance	Procedure	Observations	Conclusion
----------------	-----------	--------------	------------

NB:- Mark the procedure only once in table (a). If it is wrong in (a) award at (b) if correct.
 -Award observation and conclusion for reducing sugar test at (a) only. If wrong at (a) award at (b).

Starch	Add a few drops of iodine solution to distilled water (from the beaker) in a test tube.//	Retains the brown colour of iodine/ turns brown;	Starch absent;
Reducing sugars	Add equal amount of Benedicts solution to distilled water (from the beaker) in a test tube and heat//	Turns orange//	Reducing sugars present//

(c) Account for your results in (a) and (b) above. (3mks)

The visking tubing is semipermeable / selectively permeable; hence allowed the small molecules of reducing sugars to diffuse / pass through; but not the large molecules of starch ; (c) tied to (a) and (b)
11 max. 10.

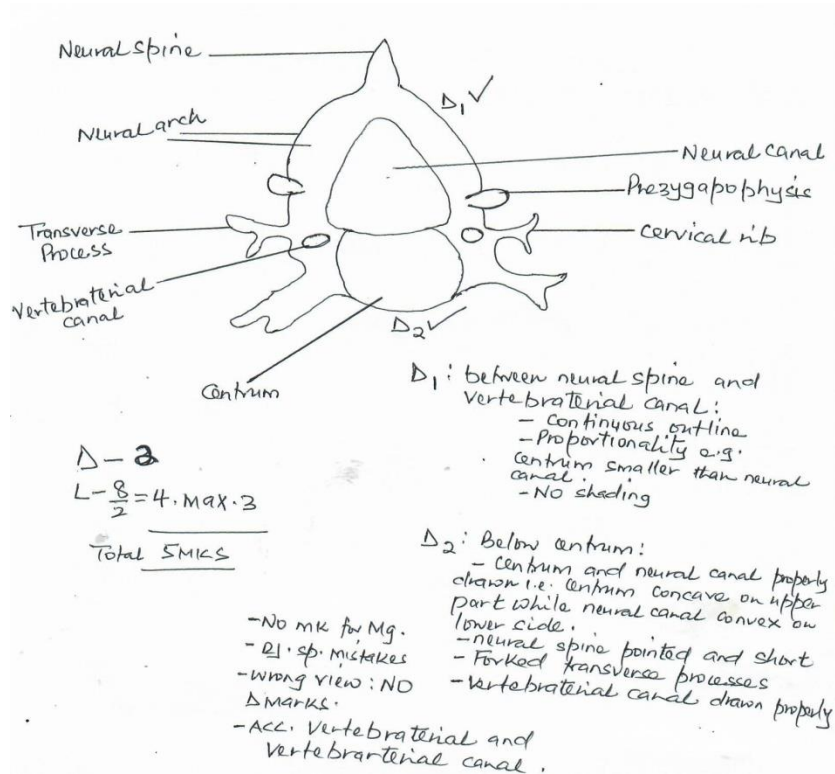
2. You are provided with specimens labelled P and Q and a photograph labelled L in two views. All are bones obtained from a mammal. Examine them.



(a) Identify the bones and name the part of the mammalian body from which each was obtained. (6mks)

Bone	Identity of the bone	Where found
P	<i>Lumbar vertebra;</i>	<i>Abdominal/Lumbar region;</i>
Q	<i>Cervical/Normal cervical 3rd /4th/5th/6th/7th cervical verterbra</i>	<i>Neck/cervical region;</i>
L	<i>Femur;</i>	<i>Hind limb/leg/upper hindlimb/leg/ thigh; Acc. Leg alone</i>

(b) Draw and label the anterior view of specimen Q. (5mks)



(c) State two differences between specimen P and Q. (2mks)

P	Q
<ul style="list-style-type: none"> - Vertebral canal absent - Large/long /unforked/unbranched transverse process - Neural spine broad/large/wide - Presence of metapophysis/Anapophysis neural canal - Narrow neural canal - Cervical ribs absent 	<ul style="list-style-type: none"> - Vertebral canal present - Small-short/forked transverse process. - Neural spine small/narrow - Absence of metapophysis/Anapophysis - Wide neural canal - Cervical ribs present(1st 2)

(d) Name the bone(s) that form a joint with bone L at its anterior and posterior end and in each case name the type of joint they form. (4mks)

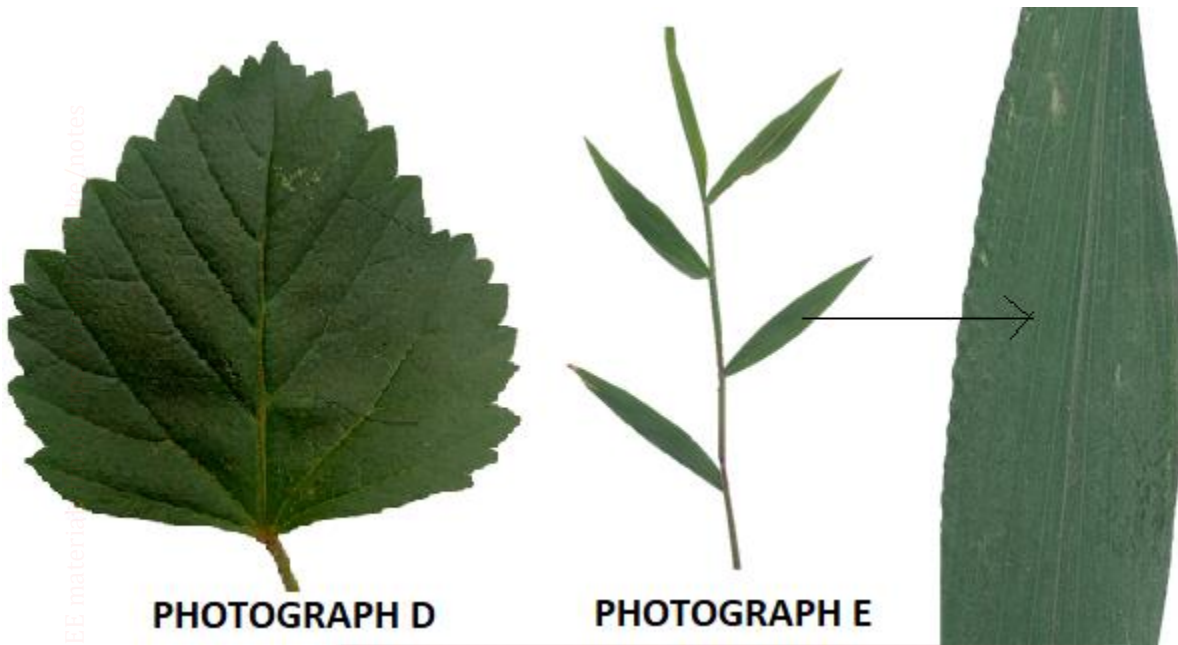
Anterior end

- (i) Bone(s) - **Pelvic girdle/innominate bone; Acc. Ischium**
- (ii) Type of joint - **Ball and socket:**

Posterior end

- (i) Bone(s)- **Tibia - Fibula/Tibia and Fibula; acc. Tibia alone**
- (ii) Type of joint. **Hinge joint;**

3. The photograph labelled D and E show two types of leaves



a) i) with a reason, state the class of plants from which the leaf in photograph E was obtained. (2mks)

Class monocotyledonae;

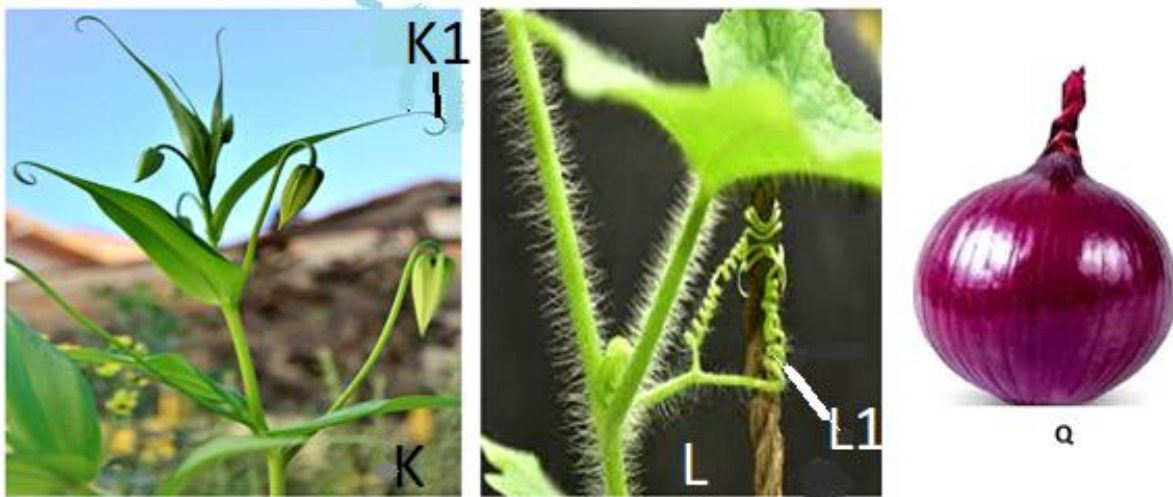
Reason

Parallel venation/presence of leaf sheath;

ii) State two features in the leaf shown in photograph D that adapt it to its functions. (2mks)

- Broad and flat to offer large surface area for photosynthesis;
- Thin to reduce distance over which carbon (IV) oxide diffuse to reach the mesophyll /photosynthetic cells;
- Rich supply of veins to supply water to the photosynthetic cells;
- Presence of chlorophyll to absorb light for photosynthesis;(1st 2)

b) Study photographs K,L, N, P, and Q provided below and then answer the questions that follow.



- i. Identify the part of photograph labelled K1 and L1. (2mks)

K1 –leaf tendrils;

L1-stem tendrils;

- ii. State the role played by parts K1 and L1 in a plant (1mk)

Mechanical support;

- iii. Name the type of response used by the structures K1 and L1 to play the role you have mentioned in (ii) above(1mk)

Thigmotropism/haptotropism

- iv. Name the hormone involved in the response you mentioned in (iii) above(1mk)

Auxin/ IAA

C

- i. Name the type of evolution demonstrated by photograph K and Q (1mk)

Divergent evolution;

- ii. what type of structures are represented by your answer in c(i) above (1mk)

homologous structures

- iii. give reasons for your answer in c(ii) above. (2mk)

Both are leaves modified to serve different functions;

K is modified for support/photosynthesis, while Q is modified for food storage;

