1 You are provided with specimens **F** and **G**, obtained from different plant species. Observe them together with photographs **E** and **H** and answer the questions that follow.

Note: Do not destroy specimens **F** and **G** as you will need them for question 2.

F - A twig of thorny lemon.

G - A twig of Mango.



E



H

(a) (i) State how plants represented by specimen **F** and photographs **E** and **H** protect themselves. (feature helps to function) Eg. Predation | Predators.

Specimen F

- Has thorns | spines | prickles | needle-like structures that prick | injure | inhibit | harm | prevent | herbivores | mammals | animals. (1 mark)
- Shiny | glossy to reflect light to reduce water loss | transpiration.
- Leaves fold to reduce transpiration | water loss. Eg. folding alive

Photograph E

- Plant normally produce a (white) unpleasant | poisonous | distasteful | unpalatable fluid (latex, substance, mixture, sap). (1 mark)
- Succulent (stem) to reduce water loss | transpiration | dehydration.
- Has tiny | small | absence of leaves to reduce transpiration | water loss.

Photograph H

- Plant has thorny | prickles | pricks | spines on leaves that prot herbivores | mammals | animals.
- Produces unpleasant | poisonous | irritating | bitter | harmful | distasteful | unpalatable fluid. (1 mark)

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(ii) State the likely habitat of each of the plants in (a) (i), giving a reason in each case.

Specimen **F** (put or omission sign if candidate write terrestrial alone.) (2 marks)

Habitat Terrestrial habitat with adequate | moderate | average rain | water availability | well-weathered soil.

Reason
- Leaves hold (to conserve water during drought | dry season).
- Has medium | average sized leaves.
- Glossy | shiny to reflect away light hence reducing water loss.

Photograph **E** (2 marks)

Habitat Arid | semi-arid | dry land | desert | semi-desert | habitat with inadequate water supply. Reg. dessert.

Reason
- Thick | succulent | fleshy stem (that stores water | fluid | mucilage)
- Leaves reduced in size | number | abscence of leaves | tiny leaves. Reg. needle-like leaves.

Photograph **H** (2 marks)

Habitat Arid | semi-arid | dry land | desert | semi-desert.

Reason
- Plant leaves thick | fleshy | succulent (for storing water | mucilage).
- Plant leaves with thick cuticle.

(b) Examine the leaves of specimen **G**.

(i) Describe **two** observable features of these leaves that help the plant conserve water. (2 marks)

- Shiny | glossy leaf surface that reflect light reducing water loss | dehydration | dessication
- Thick | waxy cuticle to reduce (the rate of cuticular) transpiration | water loss | dehydration | drying.

(ii) Besides leaf structure, explain **two** mechanisms that help the plant in (b) (i) above **not** to dry up during the dry season. (2 marks)

- Has long tap roots | deep rooted | deep roots to reach more water down the surface.
- Plant shed leaves during drought | dry season (to reduce the surface area exposed for) transpiration.

Accept → Leaf fall Reg. Shedding of all the leaves.

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2. You are provided with specimens labelled **J** and **K** in addition to **F** and **G** and photographs **E** and **H** (used in question 1).

(a) Follow the dichotomous key below to identify **E, F, G, H, J** and **K**.

1.	(a)	Leaf margin smooth	Go to 2
	(b)	Leaf margin serrated/rugged	Go to 3
2.	(a)	Leaf parallel-veined	**K**
	(b)	Leaf net-veined or veins not showing	Go to 4
3.	(a)	Leaf with thorny edges	**H**
	(b)	Leaf edges not thorny	Go to 5
4.	(a)	Leaf large	**G**
	(b)	Leaf tiny	**E**
5.	(a)	Leaf on thorny stem	**F**
	(b)	Leaf not on stem	**J**

Fill the table below, indicating the steps used to identify the leaves of each specimen or photograph. (6 marks)

Leaf	Steps followed
E	1a, 2b, 4b ;
F	1b, 3b, 5a ;
G	1a, 2b, 4a ;
H	1b, 3a ;
J	1b, 3b, 5b ;
K	1a, 2a ;

(b) (i) Besides leaf features found in the dichotomous key above, state **two** other features that can be used to identify leaves. (2 marks)

Leaf apex (tip) ; Leaf type ;
Leaf base ; Leaf Lamina (blade) ;
Leaf texture ; Leaf thickness ;
Leaf colour ; Nature of leaflets ;
Leaf attachment ; Arrangement of leaflets ;
Nature of leaf surface ;

Mark the first two ; = three

ref: Leaf arrangement / Phyllotaxy.
Leaf structure.

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Attachment of leaflets. | Nature of leaflets - Annate | Pinnate | opposite | alternate
Leaf attachment ⇒ with a petiole | without a petiole | sessile.
Leaf shape ⇒ narrow | broad or any other shape.

(ii) State the complementary characteristics that define the leaf features stated in (b) (i). (2 marks)

Leaf apex (tip) ⇒ Pointed or rounded | blunt | Absence of tip.
Leaf base ⇒ Absence of petiole | petiole | smooth
Leaf texture ⇒ smooth | rough | hairy (thinsure) | not hairy.
Leaf colour ⇒ Green or any other colour of leaves
Leaf thickness ⇒ thin | thin | fleshy | succulent | not fleshy | not succulent
Leaf type ⇒ simple or compound.

(c) The habit of a plant in its environment is referred to as being a tree, shrub or herb, depending on its height.

Suggest the habits of the plants from which specimen **F** and photograph **H** were obtained. (2 marks)

F - A tree.

H - A herb.

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3. You are provided with specimens **L** and **M** which are types of teeth from the same mammal. Observe these specimens together with photographs **N** and **P** and answer the questions that follow.

(a) (i) With a reason in each case, name the type of tooth represented by specimens **L** and **M**.

Specimen **L** (2 marks)

Name: Incisor (tooth) rej wrong spelling by underlining

Reason Chisel-Shaped | chisel-like | Wedge-Shaped | Sharp edged. rej. Sharp alone.

Has one root

Specimen **M** (2 marks)

Name: Molar (tooth)

Reason Have three | four roots.

Broad | ridged surface | with cusps | with ridges.

Or

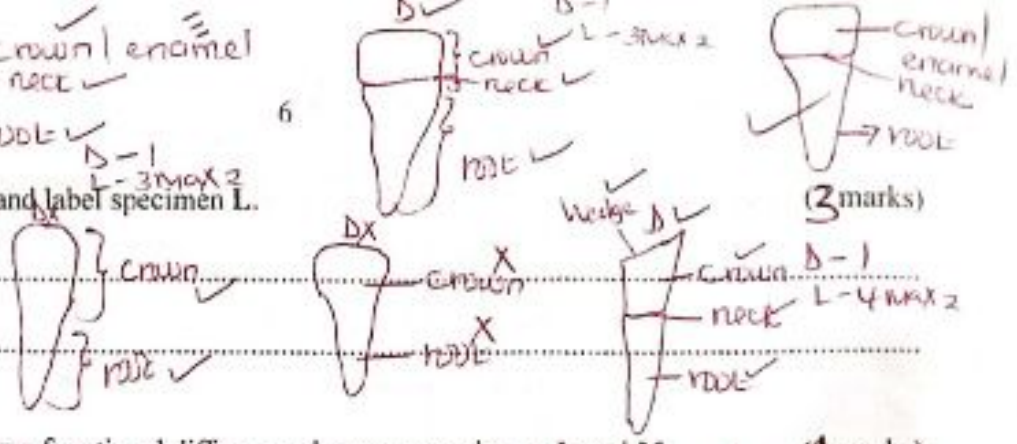
M - premolar (tooth)

Reasons
- Has two roots.
- Broad | ridged surface | surface with cusps | with ridges.

Mark only the first reason if two are correct. Accept plurals eg incisors, premolars, Molars.

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(ii) Draw and label specimen **L**. (3 marks)



Drawing mark (1 mark)
- Crown should be wider and shorter than root.
- Continuous outline
- Neck must be shown
- No shading

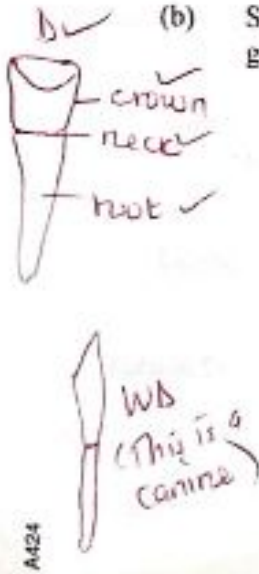
(iii) State **two** functional differences between specimens **L** and **M**. (4 marks)

Label mark (2)
- Label lines should not cross each other.
- No arrows used but accept arrow pointing away.
- No use of brackets

L (Incisor)	M (Molar / Premolar)
• Is used for cutting / ripping / biting food / vegetation / cutting (against the horny pad on the upper jaw)	• Is for crushing / chewing / grinding food / vegetation into smaller pieces before swallowing
• For holding prey / shearing meat from the bones	• for chewing / grinding / crushing bones / flesh.

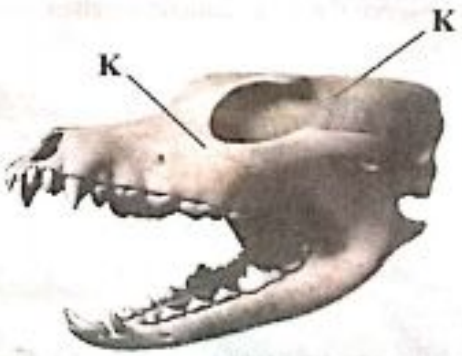
* Award second if correct but first is wrong

(b) State the diet of the mammals from which photographs **N** and **P** below were obtained, giving a reason in each case.





N



P

(i) **Photograph N** (2 marks)

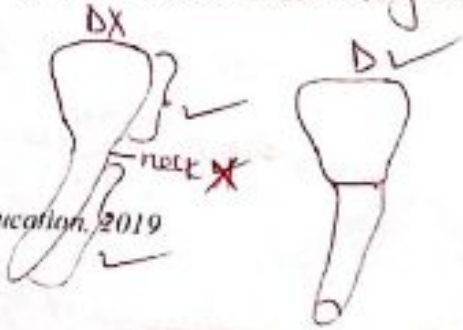
Diet: vegetation / grass / plant materials / vegetable. ONITE

Diet → Accept; vegetation (herbivore)

Reason: • has (horny / hard) pad in the upper jaw / No incisor in the upper jaw (upon which vegetation is cut)
• has diastema / absence of canines for the tongue to easily manipulate grass / food / plant materials.
• Absence of canines to (facilitate sideways movement)

reject by underlining herbivore (vegetation)

* Reason tied to identity of food; No feature on reason without accompanying function. 919381



Diastema
reject wrong spelling for diastems

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; Accept flesh (Carnivore).
Underline carnivore (flesh) then mark the reason. (2 marks)

(ii) Photograph P

Diet flesh / Meat

Reason (Large / long / curved) sharp / sharp-pointed / Pointed canine

Presence of Camassial teeth

(c) (i) Name the joint labelled **K** on photograph **P**. (1 mark)

Sutaire (s) reject wrong spelling by underlining then mark (i)

(ii) Explain **two** features of the joint named in (c) (i) above that makes it adapt to its function. (2 marks)

(ii) well b(i)

- Bones interlock forming strong joints that form a hard cranium / skull that protect the (delicate) brain
- Bones interlock / fits into each other forming / making strong joints to protect the (delicate) brain.
- Immovable / fixed joints / tightly holding bones in place to protect the brain.

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