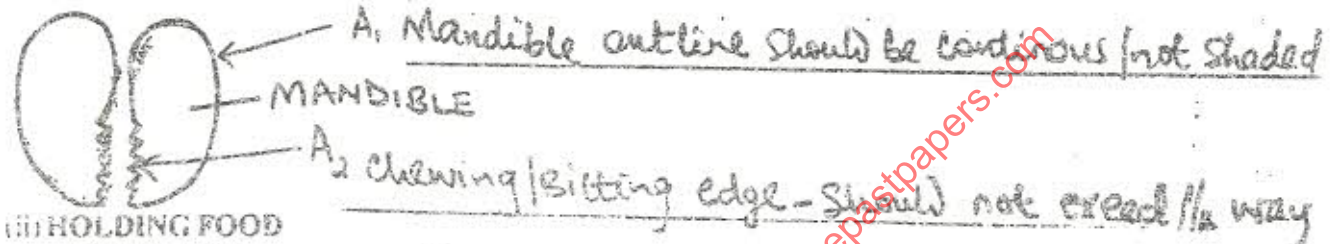


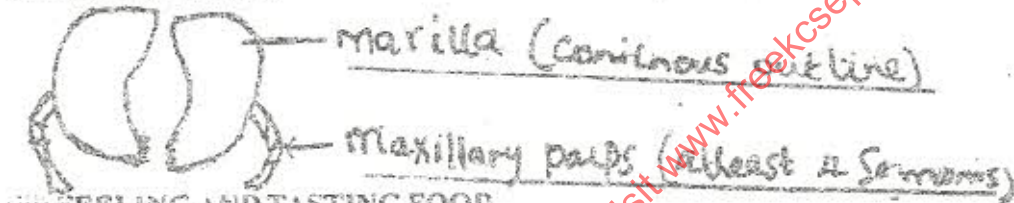
**Speciment (Mature Cockroach)**

- (a) (i) **ARTHROPODA**  
 (ii) - Presence of exoskeleton/Ectoskeleton  
 - Jointed limbs/appendages/legs  
 - Segmented body parts
- (b) (i) **INSECTA**  
 (ii) - Body divided into 3 parts (head, thorax, abdomen)  
 - Three pairs (six legs)  
 - One pair (2 antennae)  
 - Presence of spiracles/breath through spiracles  
 - Compound eyes (one pair)

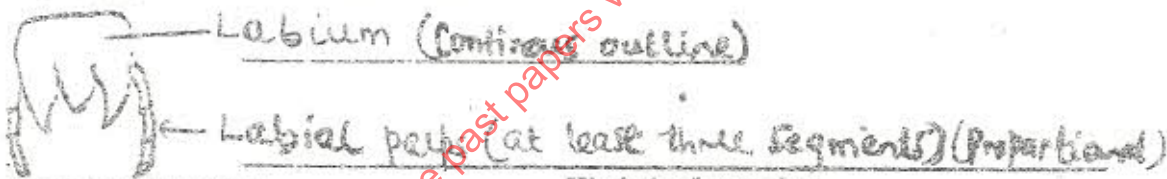
**(c) (I) BITTING AND CHEWING**



(ii) HOLDING FOOD



(iii) FEELING AND TASTING FOOD



Forewing/outerwing	Hindwing/innerwing
-Hard	-Soft/membraneous
-Narrow/small surface/small	-Wide/Broad/Large surface area
-Stiff/rigid/inflexible	-Flexible/can fold
-Opaque	-Translucent

**Specimens**

2. (a) **E** carrot < root hairs      **F** Irish Potato Tuber      **G** Onion Bulb (sprouting)  
 - E- Taproot/Taproot tuber/swollen tap root/main root

**Reasons**

- Presence of lateral roots
- Short stem : swollen worth food

**F-** stem tuber

**Reasons**

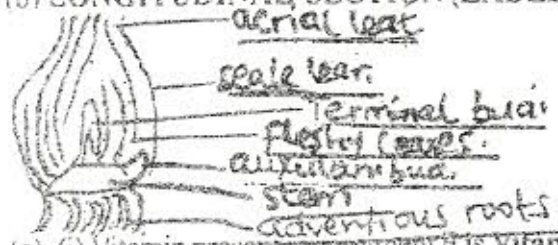
- Presence of lateral buds/auxillary buds/axillary buds
- Presence of scale leaves
- Swollen with food

G Bulb/Onion bulb/onion plant bulb

Reasons

- Scale leaves/scaly leaves
- Short stem/flattened stem
- Fleshy leaf bases/leaves swollen with food

(b) LONGITUDINAL SECTION (LABELLED)



2. (c) (i) Vitamin present in specimen E is Vitamin A Retinol

- (ii) Functions of the vitamin above
- Protection of skin and corner from drying
  - Synthesis of Rhodopsin pigment
  - Improves night vision/vision in poor light

(d) Differences between specimen F and G

F	G
<ul style="list-style-type: none"> <li>- Food stored in stem</li> <li>- Swollen stem</li> <li>- Rudimentary/not well developed scaly leaves</li> <li>- Small/inconspicuous scale leaves</li> <li>- Absence of adventitious roots</li> </ul>	<ul style="list-style-type: none"> <li>- Food stored in leaves</li> <li>- Small/short flattened stem</li> <li>- Dry/papery/well developed scale leaves</li> <li>- Presence of adventitious roots</li> </ul>

Residue

Food substance	Procedure	Observations	Conclusion
Starch	Add A drop of Iodine	Colour of Iodine/yellow/orange/brown/reddish brown. No colour change	Starch absence
Proteins	Add NaOH then a drop of 1% CuSO <sub>4</sub> and shake	Purple/violet colour	Presence of proteins
Reducing and Simple sugars	Add Benedict's solution and heat in warm water bath	Green colour/yellow/orange/red/brown colour	Traces of reducing sugars if colour change is greenish Reducing/simple sugars present

<b>FILTRATES</b>			
<b>Food substance</b>	<b>Procedure</b>	<b>Observations</b>	<b>Conclusions</b>
Starch	Add a drop of iodine	No colour change/colour of iodine/ yellow/brown/orange/reddish brown colour	No starch Produced
Protein	Add NaOH then $\text{CuSO}_4$ and shake	Blue colour/lightblue/No colour change/Colour of copper Sulphate retained. Purple colouration	Absence of ppt. presence of ppt. according to colourations
Reducing and simple sugars	Add benedicts solution and heat/soil in a warm water bath	Green/yellow/orange/ red/brick red ppt.	- Greenish observation - Traces of red ppt. - Simple sugars

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