Student's FOOT NOTES

You are provided with specimen G (COCKROAH), which is freshly killed.

1. Habit And Habitat.

- State; **(i)** the habitat of the specimen and its adaptation to living in this habitat. **(ii)** The habits of the specimen and its adaptations to these habits.

2. Classification, External Anatomy Of Head And Thorax.

- Classify it into the following groups, in each case give reason(s) for your answer.
  (i) Kingdom **(ii)** Phylum **(iii)** class **(iv)** order **(3mks @)**
- With the help of a hand lens, using any four observable features on the head, explain how each of them enables the animal to survive in its habitat. **(4mks)**

Using a hand lens examine one antenna and draw. Do not label. **(2mks)**; describe how they are adapted to their function**. (3mks)**; Measure and record the length of the antenna and the rest of the body. **(2mks);** What is the significance of the ratio in promoting the survival of the features? **(2mks)**

- View the anterior part of the head using a hand lens. Draw and label. **(10mks**)
- Using a hand lens examine the dorsal view of the head. Draw and label. **(7mks)**
- Using a hand lens provided. Make a labeled drawing of the lateral view of the head region showing the features of biological significance to the specimen.
- Cut off the head of the specimen then cut one eye with as little tissue under it as possible. Place the eye on the slide with the cut side facing downwards. View under the low power of a microscope. Describe the arrangement of the eye units; **(5mks)**. Draw four adjacent eye units. Do not label; **(6mks)** What is the significance of the arrangement of the units? **(2mks)**
- Using a hand lens examine the compound eye, fenestra, antennary pit and antenna. Describe their structural features. **(6mks)**
- Place the specimen ventral side uppermost and cut off its antennae limbs, observe the head and the first thoracic segment. Draw and label. **(6mks)**
- Using a hand lens, examine right compound eye including the first four segments of the antenna, from the base. Draw the structures observed. Do not label. **(5mks)**
- Turn the specimen dorsal side uppermost and examine the wings when pulled outwards. Describe their structure. **(i)** Outer wings. **(ii)** Inner wings. **(2mks@)**
- Cut off limbs completely to expose the thoracic segments clearly. Turn the specimen so as it faces you. Draw and label the anterior half of the specimen. **(10mks)**

3. Mouth Parts.

- Using razorblade, remove the head of the specimen, boil it in a caustic soda in order to macerate its muscle tissues. Remove the tube from the flame at frequent intervals and observe the head. When it sinks quickly and remains at the bottom of the test tube it has been boiled enough. Wash the head with water.

(a) **(i)** Remove the labium by using fine forceps by holding it near its base and pull gently. Be careful not to damage other mouths parts. Put it on a microscope slide and observe. Draw and labeled. **(ii)** What is the function of the labium to the specimen? **(iii)** How is the labium adapted to its function?

(b) Remove the maxilla using a fine forceps by holding it near its base and pull gently. Place it on a slide. Observe it under a microscope. Draw and labeled.

(c) **(i)** State the function of the maxilla to the specimen. **(ii)** How is the maxilla adapted to its function

(d) **(i)** In the same way remove the mandible. Put it on a microscope slide. Observe it under a microscope, draw and label **(ii)** What is the function of the mandible? **(iii)** How is it adapted to its function?

- Examine the mouth parts describe their relative positions and describe the structural features of the mouth parts. **(10mks)**

4. Limbs.

- Using a scalpel cut off the third leg of the specimen. Examine the inner view of the leg using a hand lens. Draw and label **(10mks)** b) i) Examine the tarsus, draw and label. **(4mks)** ii) Outline the adaptations of the tarsus to its functions. **(04mks)**
- Measure and cut off 0.5cm length of the fore limb from the end towards the foot. Observe from the inner view under low power magnification of a microscope. **i)** Draw, but don't label. **(5mks) ii)** State three ways the part of the limb drawn in **b) i)** is structurally adapted for its function. **(3mks)**
- Observe the structures posterior to the trochanter of the hind limb. Draw and label. **(10mks)**
- Using a low power microscope, examine the ventral view of the pretarsus. **i)** Describe the structure of the pretarsus. **(3mks) ii)** Draw and label **(4mks).**
- Remove the hind limb of the specimen and from it obtain a portion from the tibia to the claws. Mount this portion on a slide and view it under a microscope. **(i)** Describe any three observable features of the limb stating how they are adapted to carry out their functions in the specimen. **(ii)** Make a well labeled drawing of showing the features stated (i) as shown under the low power microscope.

5. External Anatomy Of Abdomen And Sex Identification.

- Draw and label the end of the abdomen. **(5mks)**
- **iii)** Place the animal ventral side uppermost. Draw and label the posterior end of the abdomen together with its associated structures. **(3mks)**
- From your observation of the external features, state with reasons the sex of the specimen. **(2mks)**
- Carefully cut off the last tergal segment. Examine the exposed last sternum structures and those associated on the lateral side. Draw and label. **(6mks)**
- Cut off appendages at their proximal ends; remove all the wings including the tegmina. Describe the structure of the animal's body. **(10mks)**
- Lay the specimen dorsal side uppermost cut off the elytra and wings close to their base. Lift the 10th abdominal tergum. Draw and label the visible structures of the specimen. Describe the structures on the ventral cuticle. **(4mks)**
- Search for the spiracles. (**i**) Describe their location and structures. **(3mks) (ii)** Draw a thoracic spiracle **(4mks) iii)** Outline the difference between the thoracic and abdominal spiracle. **(3mks)**

6. Internal Anatomy

- Dissect along the lateral line and remove the dorsal cuticle completely from the specimen. Turn this cuticle so that the internal structures are seen. Draw and label structures on the dorsal and ventral cuticles ***without displacing any*****. (12mks)**
- Pin the specimen with its dorsal side uppermost. Dissect to completely remove the dorsal cuticle in the abdomen. Carefully clear off any unnecessary tissue. Draw and label the visible structure at this stage of dissection. **(13mks)**
- Cut off wings. Cut along the right lateral line of the body from the anterior part of the thorax up to the 8th segment. Turn the dorsal cuticle to the left and clear any fat tissues. Carefully displace only exposed structures on the ventral cuticle. Draw and label your dissection showing; **(i)** all internal structures on both cuticles. **(ii)** Parts of the ***digestive system*** use for ***storage, digestion and absorption*****.**
- Place the specimen dorsal side uppermost and dissect to expose the structures within the abdominal and thoracic cavity. **(i)** Displace the structures to display the salivary glands on the left of the specimen. **(ii)** Displace the alimentary canal to the right of the specimen. Remove all the unnecessary tissue to display all the parts of the alimentary canal and structures on the ventral cuticle. Draw and label. **(24mks)**.
- With the dorsal side uppermost, dissect the specimen to remove the digestive system. Display the structures remaining on the ventral cuticle. Draw and label. **(12mks)**
- Place the specimen dorsal side uppermost. Cut along the left lateral line of the specimen to display the heart. Draw and label ***circulatory system***. **(8mks) (i**) Remove both the crop and the gizzard related to the function of the two organs. **(4mks)**. Describe the appearance of the inner surface of: Crop; Gizzard **(ii)** How are the inner surface of the crop and gizzard related to the functions of the two organs? **(4mks)** Carefully ***make a transverse section of gizzard*** and mount in balsam. Remove section from balsam, place on glass slide and cover with a cover slip. Mount it on a microscope and view under both low and high power. Draw and label.
- Lay the animal dorsal side uppermost. Cut through the left lateral line of the abdomen and thorax, leaving the anterior most segment of the specimen intact. Lift the dorsal cuticle and displace it on one side of the specimen. Cover the dissection with water and clear away the fat bodies and displace the alimentary canal to the right of the specimen. Draw and label the structures on both cuticles. **(18mks)**
- Display the animal on the dissecting board with the dorsal side uppermost. Cut along one lateral line of the abdomen, except its three anterior most segments and displace the dorsal terga to the left and the alimentary canal to the right. Draw and label the structures exposed on the ventral and dorsal tergum that are used for removal of ***insoluble nitrogenous waste products, sexual reproduction, coordination, breakdown and absorption and transport of the digested nutrients and oxygen*** **(22mks)**
- Cut out the gut and remove unnecessary tissue to display the structures in the thoracic region. ii) Cut off the wings, legs and antennae of the specimen. Pin the specimen with the dorsal side uppermost. Dissect the specimen to remove the dorsal cuticle on the abdomen and display

structures on the ventral cuticle that are associated with ***reproduction*** and the posterior half of the gut displaced to your left. Draw and label your dissection. **(16mks)**

- Dissect the specimen to display the ***reproductive system***. Make a well drawing of your dissection.