

**2914/306**  
**APPLIED BIOLOGY**  
**PRACTICAL III**  
**Oct. / Nov. 2022**  
**Time: 4 hours**



**THE KENYA NATIONAL EXAMINATIONS COUNCIL**

**DIPLOMA IN APPLIED BIOLOGY**

**MODULE III**

**APPLIED BIOLOGY PRACTICAL III**

**4 hours**

**INSTRUCTIONS TO CANDIDATES**

*You should have the following for this examination:*

*Answer booklet;*

*Non-programmable scientific calculator.*

*Answer ALL the questions.*

*Maximum marks for each question are indicated.*

*Candidates should answer the questions in English.*

**This paper consists of 7 printed pages.**

**Candidates should check the question paper to ascertain that  
all the pages are printed as indicated and that no questions are missing.**

1. You are provided with two permanent slides of the same parasite in different stage forms labelled  $P_1$  and  $P_2$ .
- (a) Observe each of the slides using a microscope at X40. Draw labelled diagrams of  $P_1$  and  $P_2$ . (8 marks)
- (b) Specimen labelled  $P_3$  and  $P_4$  are different forms of the same parasite from where  $P_1$  and  $P_2$  are drawn from.
- (i) Using a hand lens, observe and draw labelled diagrams of  $P_3$  and  $P_4$ . (6 marks)
- (ii) State the distinguishing features of  $P_3$  and  $P_4$ . (2 marks)
- (iii) Identify specimens  $P_1$ ,  $P_2$ ,  $P_3$  and  $P_4$ . (4 marks)
- (iv) Name the sample from which specimen  $P_1$  and  $P_2$  were obtained. (1 mark)
- (c) State the treatment given to specimen  $P_1$  to prevent it from further development. (2 marks)
- (d) State the danger of handling specimens  $P_3$  and  $P_4$  with bare hands. (2 marks)
2. (a) You are provided with the following materials and reagents:
- Antibody coated sheep red blood cells.
  - Guinea pig complement
  - Known antigen
  - Inactivated serum
  - Plastic microtitre plate
  - Water bath set at 56 °C
- (i) Describe the principles of the test that can be carried out using the provided materials and reagents. (13 marks)
- (ii) Interpret the expected results. (2 marks)
- (iii) List any **two** advantages of the test described in a(i). (2 marks)

(b) You are provided with the following reagents and samples:

- Blood samples labelled X and Z.
- Anti A
- Anti B
- Anti D

Carry out blood grouping on the two blood samples using the reagents provided.

- (i) Tabulate the results. (6 marks)
- (ii) Determine the blood groups of samples X and Z based on the results obtained in b(i). (2 marks)

3. (a) You are provided with photographs labelled figure 1, figure 2 and figure 3, each representing a specific horizon of the soil.

- (i) Identify soil horizons represented by figure 1, figure 2 and figure 3. (3 marks)
- (ii) Describe characteristics of each of the soil horizons represented by figures 1, 2 and 3. (7 marks)

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Fig. 1



Fig. 2



Fig. 3

- (b) You are provided with three types of soils labelled specimen A, specimen B and specimen C.
- (i) Take about four spatulas of specimen A in a petri dish and add a little amount of water to moisten. Using your fingers, knead the soil to break down all aggregates. Fill the texture and record observation in table I.
  - (ii) Using the moist sample in (b)(i) form a ball and squeeze it. Record your observation in the table.
  - (iii) Place the ball of soil between the thumb and the fore finger of your hand and gently push the soil with the thumb against the finger. Squeeze it upward and form a ribbon of at least 1 mm thick. Record your observation in the table.
  - (iv) Wet the ribbon formed between your fingers and feel the texture. Record your observation in the table.
- (c) Repeat the procedure in (b) for soil types B and C.

Sample	Observation			
	Feel of texture	Ball formation and squeezing	Ribbon formation	Wet Ribbon Texture
Sample A				
Sample B				
Sample C				

(12 marks)

- (d) Using the observations, identify each of the soil types labelled A, B and C.

(3 marks)

4. You are provided with photographs of mouth parts of insects in figure 4 and photographs of insects in figure 5.

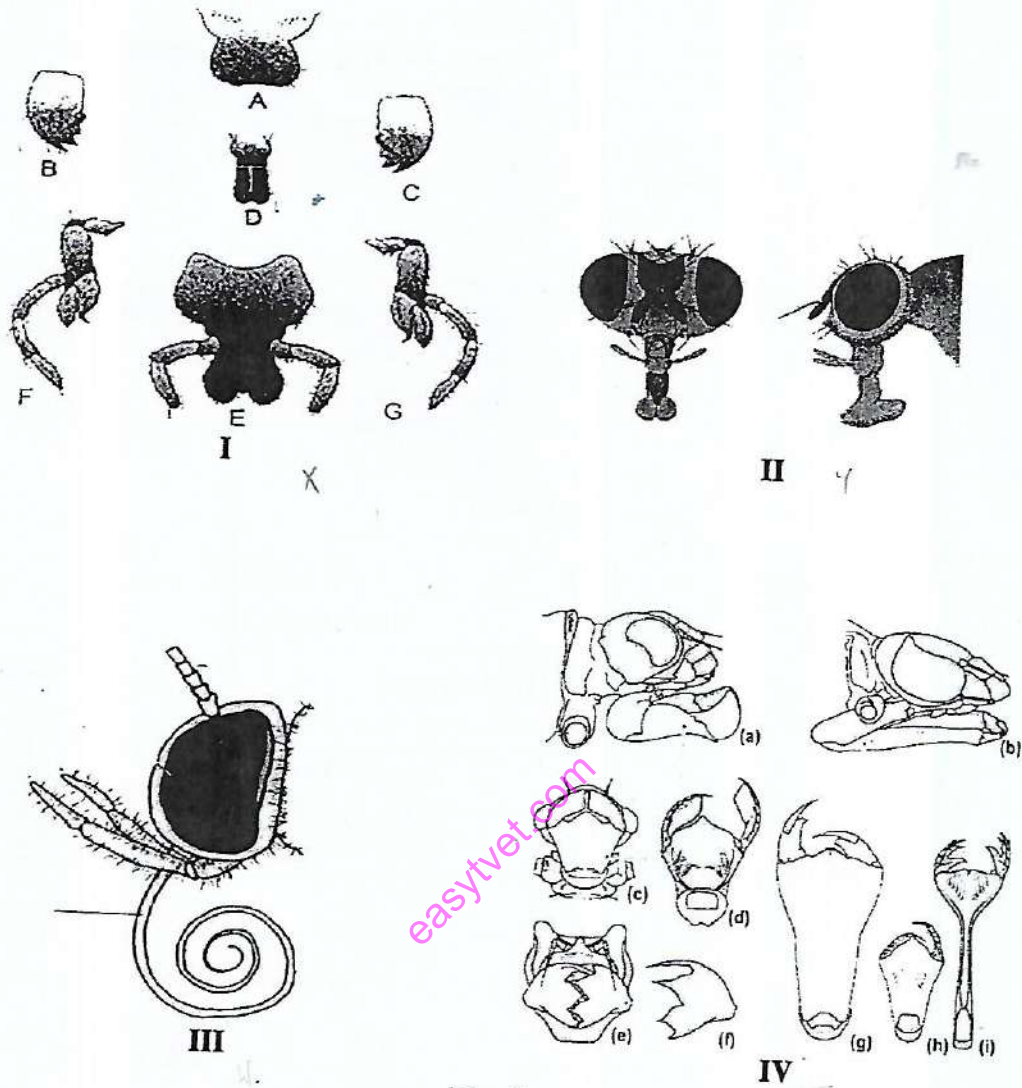
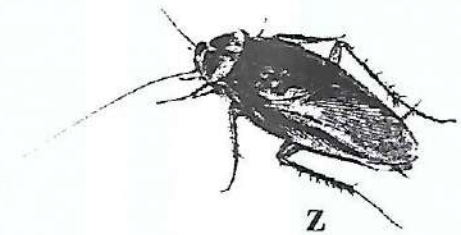
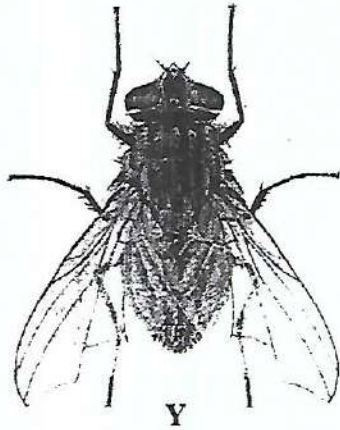
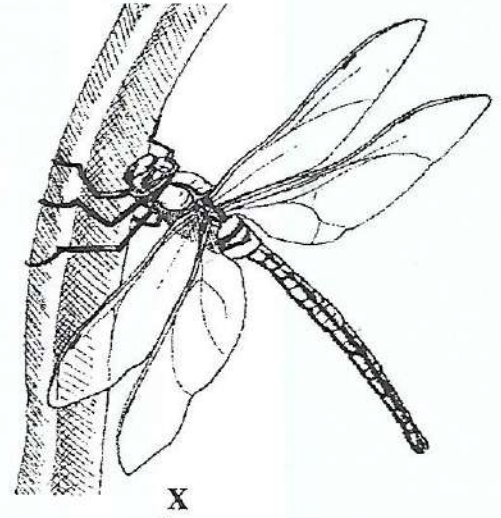
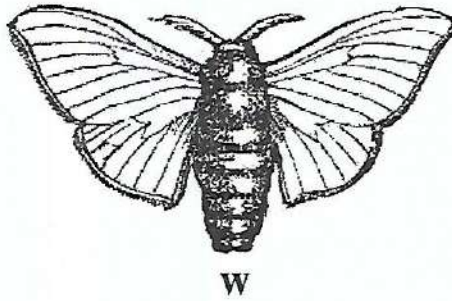


Fig. 4



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Fig. 5

- (a) Match the mouth parts labelled I, II, III and IV to the respective insects labelled W, X, Y and Z. (4 marks)
- (b) State the mode of feeding represented by each of the mouth parts labelled I, II, III and IV. (4 marks)
- (c) Describe the adaptations of each of the mouth parts to the feeding modes of insects labelled W, X, Y and Z. (17 marks)

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