

**P530/2**  
**BIOLOGY**  
**Paper 2**  
**Nov./Dec. 2025**  
2½ hours



**UGANDA NATIONAL EXAMINATIONS BOARD**

**Uganda Advanced Certificate of Education**

**BIOLOGY**

**Paper 2**  
**(Theory)**

2 hours 30 minutes

**INSTRUCTIONS TO CANDIDATES:**

*This paper consists of **two** sections; **A** and **B**. It has **six** questions.*

*Section **A** is **compulsory**.*

*Answer any **three** questions from Section **B**.*

*Answer **four** questions in all.*

*Any additional question(s) answered will **not** be marked.*

*Write your answers in the answer booklet(s) provided.*

*Begin answering each question on a fresh page.*

*You are advised to read the questions carefully, organise your answers and present them precisely and logically, illustrating with well labelled diagrams where necessary.*

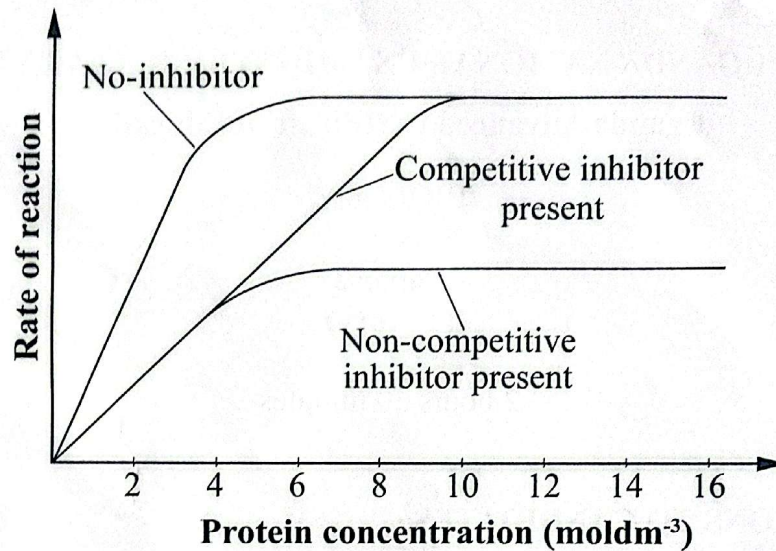
**SECTION A (40 MARKS)**

*Question 1 is compulsory.*

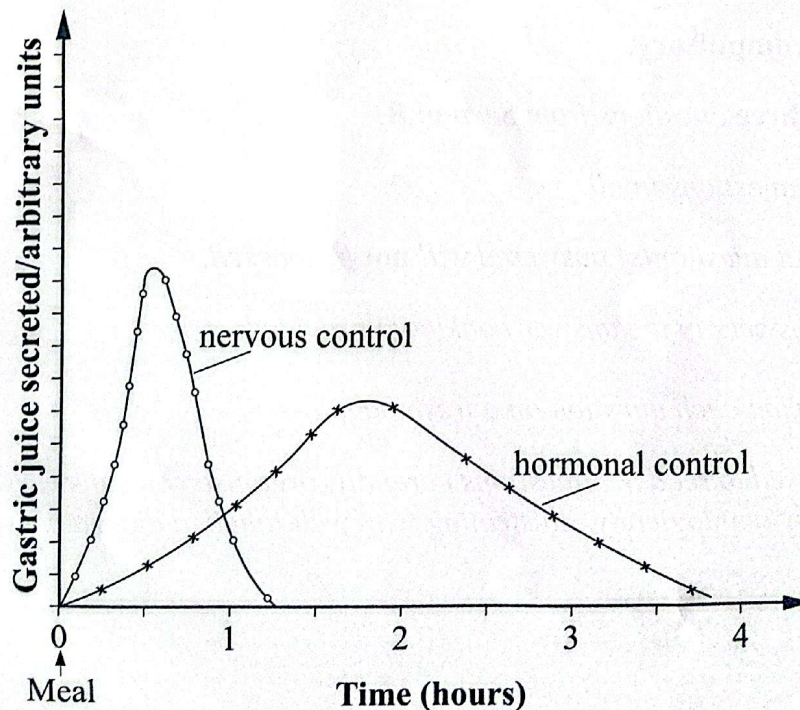
1. Figure 1 shows the results of an investigation of the effect of increasing protein concentration on the rate of reaction in the presence of a fixed amount of pepsin. The investigation was repeated with constant amounts of competitive and non-competitive inhibitors.

Figure 2 shows results of another investigation of the effect of eating a protein rich meal on the control of gastric juice secretion.

Study the two figures and answer the questions that follow.



**Fig. 1**



**Fig. 2**

- (a) From figure 1, explain the effect of increasing protein concentration on the rate of reaction in the presence of;
- (i) competitive inhibitor. (04 marks)  
(ii) non-competitive inhibitor. (03 marks)
- (b) From figure 1, explain what would happen if the concentration of the following is increased:
- (i) Non-competitive inhibitor. (03 marks)  
(ii) Pepsin. (05 marks)
- (c) From figure 2:
- (i) State the similarities between the nervous and hormonal control phases of gastric juice secretion. (03 marks)
- (ii) Explain the effect of the protein rich meal on the secretion of gastric juice during the nervous control phase. (12 marks)
- (iii) Explain the effect of the protein rich meal on the secretion of gastric juice during the hormonal control phase. (10 marks)

### SECTION B (60 MARKS)

Answer any **three** questions from this section.

Any additional question(s) answered will **not** be marked.

2. (a) Describe how the distribution and the structure of chloroplasts ensures absorption of maximum light for photosynthesis. (12 marks)
- (b) Describe how ATP is produced when sun light reaches chlorophyll molecules. (08 marks)
3. (a) Explain the role of myelin sheath in the transmission of impulses in mammalian neurons. (05 marks)
- (b) Describe how an action potential is generated in the post-synaptic neuron across an excitatory chemical synapse. (12 marks)
- (c) Explain **three** advantages of synapses in impulse transmission. (03 marks)
4. (a) How does the body prevent entry of micro-organisms that cause diseases? (10 marks)
- (b) Describe the process that leads to the formation of blood clot to minimize blood loss following an injury of a blood vessel. (10 marks)

5. (a) Explain the osmoregulatory challenges of the following organisms in their aquatic environment: *(06 marks)*
- (i) Fresh water bony fish.
  - (ii) Marine bony fish.
- (b) How do these fish overcome the challenges mentioned in (5) (a)? *(10 marks)*
- (c) Explain how the excretion of nitrogenous waste in form of uric acid contributes to the ecological success of insects. *(04 marks)*
6. (a) Explain how the following pollutants affect the ecosystem: *(12 marks)*
- (i) Sulphur dioxide.
  - (ii) Carbon dioxide.
  - (iii) Sewage.
- (b) Suggest how a rise in pest population can be controlled in a habitat. *(08 marks)*