P530/2
BIOLOGY
THEORY
Paper 2
18 July 2022
2 ½ hours

ENTEBBE JOINT EXAMINATION BUREAU

Uganda Advanced Certificate of Education

BIOLOGY THEORY

Paper 2

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

This paper consists of two Sections*:* **A** *and* **B**.

Attempt question ***one*** *in* **Section A** *and any* **three** *questions from* **Section B**.

Candidates are advised to read questions carefully, organize their answers and present them precisely and logically.

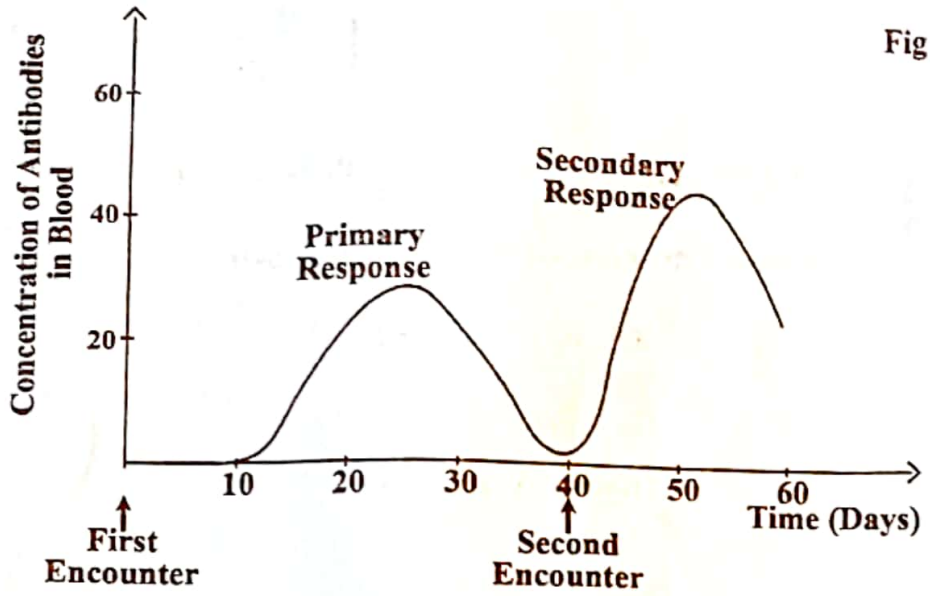
Illustrate whenever necessary with well labeled diagrams.

Any extra questions **shall not** *be assessed.*

SECTION A (40 MARKS)

1. (a) Figure 1 below shows the concentration of an individual after the first encounter with the diseases *(pathogen)* and then the second encounter on the 40th day in a period of 60 days.

Fig 1



(i) Describe the trends of the graph. *(02 marks)*

(ii) Explain primary and secondary response using the above graph. *(06 marks)*

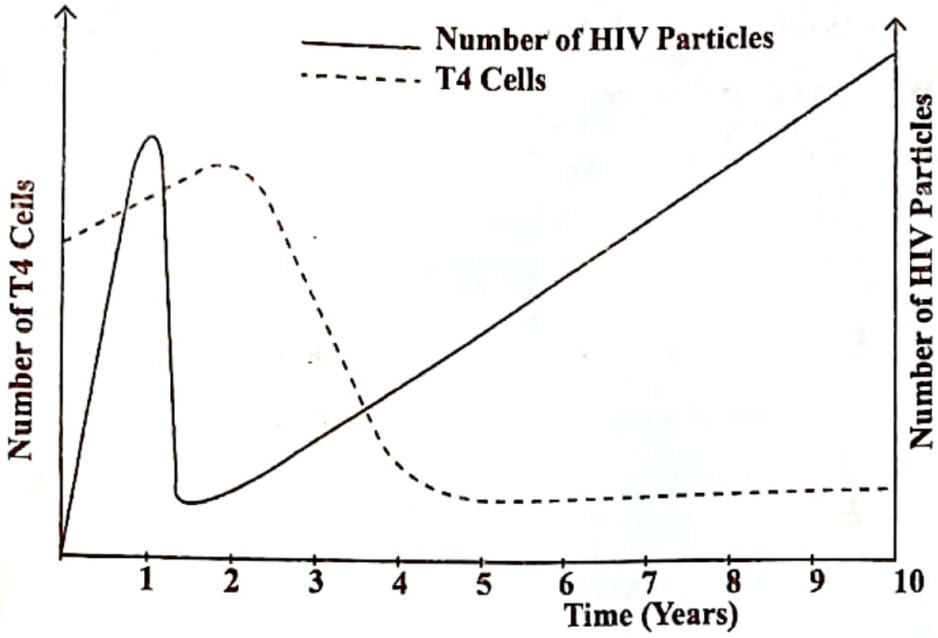
(iii) Give the advantage of response in immunization and use of several doses of a vaccine. *(02 marks)*

(b) (i) With a labeled diagram, describe the structure of an antibody. *(04 marks)*

(ii) Describe the ways in which antibodies combat disease-causing pathogens. *(05 marks)*

(c) Figure 2 below shows the relationship between HIV particles and T_4 cells in the human body in a period of 10 years.

Fig 2



(i) Compare the number of T_4 cells and the number of HIV particles. *(05 marks)*

(ii) Examine the relationship between T_4 cells and the number of HIV particles. *(09 marks)*

(iii) Explain the increase in attack by opportunistic diseases collectively known as AIDS in the later stages of HIV infection. *(04 marks)*

(iv) Describe ways of reducing HIV particles in the body. *(03 marks)*

SECTION B (60 MARKS)

2. (a) Using an example in each case, describe how each of the following is adapted to locomotion. *(10 marks)*

(i) terrestrial animal.
(ii) bird.

(b) Using an example, describe the action of fright in a small fast-moving insect. *(10 marks)*

3. (a) Describe the adaptations of mammals to fertilization and survival of their off springs. *(12 marks)*

(b) Examine the role of hormones in spermatogenesis in males. *(08 marks)*

4. (a) Show how each of the following influences evolution of new species.

(i) Type of pollination *(04 marks)*

(ii) Multitudes of species *(02 marks)*

(iii) Inbreeding *(02 marks)*

(b) Explain the following:

(i) regular use of antibiotics leads to bacteria resistance, *(06 marks)*

(ii) prevalence of sickle cell anaemia trait in the tropics is an advantage to malaria. *(06 marks)*

5. (a) Describe secondary growth in vascular tissues. *(10 marks)*

(b) Write the differences between xylem vessels and phloem sieve tubes. *(04 marks)*

(c) Briefly describe the evidence used to show that translocation of food occurs in the phloem tissue. *(06 marks)*

6. (a) What is meant by the term **epistasis**? *(02 marks)*

(b) A walnut-combed rooster was mated with three hens. *Hen A*, which is pea-combed, produced offspring in a ratio of 3 walnuts: pea combs: 1 rose comb: 1 single comb. *Hen B*, which is walnut-combed, produced offspring in the ratio of 3 walnut combs: 1 rose comb. *Hen C*, which is walnut-combed, has only walnut-combed offspring. Determine the genotypes of the three hens *A*, *B* and *C* and that of the walnut-combed rooster. Show your working. *(12 marks)*

(c) Both haemophilia and colour blindness are transmitted in the same way.

(i) What are the effects of each disease? *(03 marks)*

(ii) Explain why there are more colour blind individuals than haemophiliacs among the population in spite of a similar way of transmission. *(03 marks)*

END