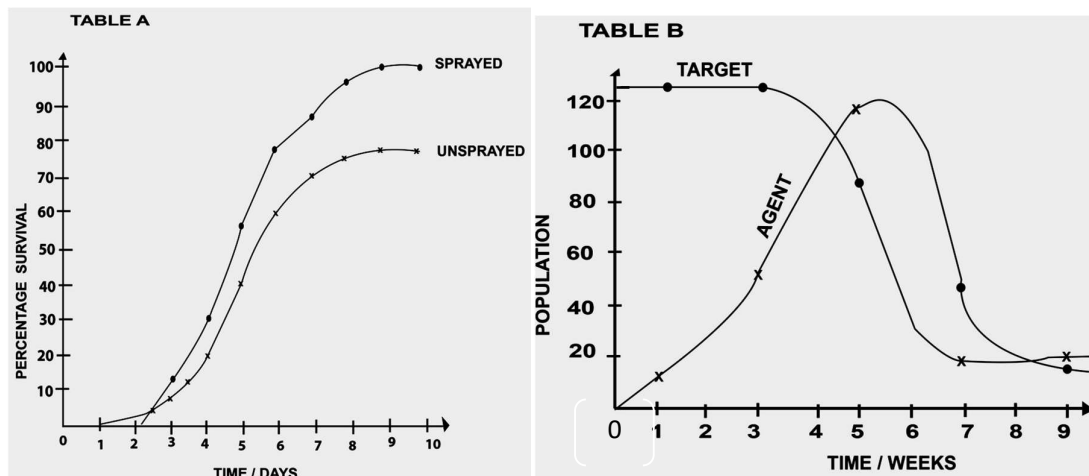


BIOLOGY 1

SECTION A: (40 MARKS)

1. In an experiment to study the effectiveness of DDT towards the cabbage pest, *Pieris rapae* which feeds on cabbage leaves, two adjacent farm yards were prepared and *Pieris* was introduced in each farm and left for some time. After spraying one farm yard with DDT for three consecutive times, the number of eggs that survived and hatched into larvae at the sprayed and non sprayed farm yards was determined as shown by **Graph A**.

In another set of experiment, *Pieris rapae* was exposed to birds as its control agents and the changes in the population of both, with time was determined as indicated by **Graph B**. Study the graphs and answer the questions that follow



- i) Account for the increase in the population of the control agent (05 marks)
- ii) Explain the decrease in the population of the control agent (05 marks)
- i) Account for the decrease in the population of *Pieris rapae* (05 marks)
- ii) Account for the population of *Pieris* and that of the control agent from 8½ to the 9th week (04 marks)
- Compare the number of eggs of *Pieris* between the sprayed and non sprayed farm yards (05 marks)
- Account for the differences in the number of eggs of *Pieris* at the sprayed and non-sprayed farm yards (08 marks)
- Explain any one property of DDT other than the one shown above, which render it unsuitable for environmental use (05 marks)
- Outline any three advantages of the method used in **Graph B** to that used in **Graph A**. (03 marks)

SECTION B (60 MARKS)

2. (a) Explain the post-natal changes in the human embryo. **(10 marks)**
- (b) What is the significance of the changes mentioned in 2(a) above? **(05 marks)**
- (c) How is the mammalian placenta adapted for the transportation role? **(05 marks)**
3. (a) Describe how food ingestion stimulates larval development into an adult grasshopper. **(12 marks)**
- (b) Explain the significance of **neuro-secretion** in man. **(08 marks)**
4. (a) Describe the chemiosmotic synthesis of energy within the chloroplasts. **(12 marks)**
- (b) Compare the chemiosmotic synthesis of energy described in 4(a) above with that in the mitochondria. **(08 marks)**
5. (a) Explain **phototropism** in plants. **(10 marks)**
- (b) What is the significance of tropisms towards plant diversity? **(10 marks)**
6. (a) Derive the **Hardy-Weinberg** equation from first principles. **(10 marks)**
- (b) Describe how:
- i) **Random mating**
- ii) **Genetic drift**, affect the allele frequency of a sexually reproducing population. **(10 marks)**

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