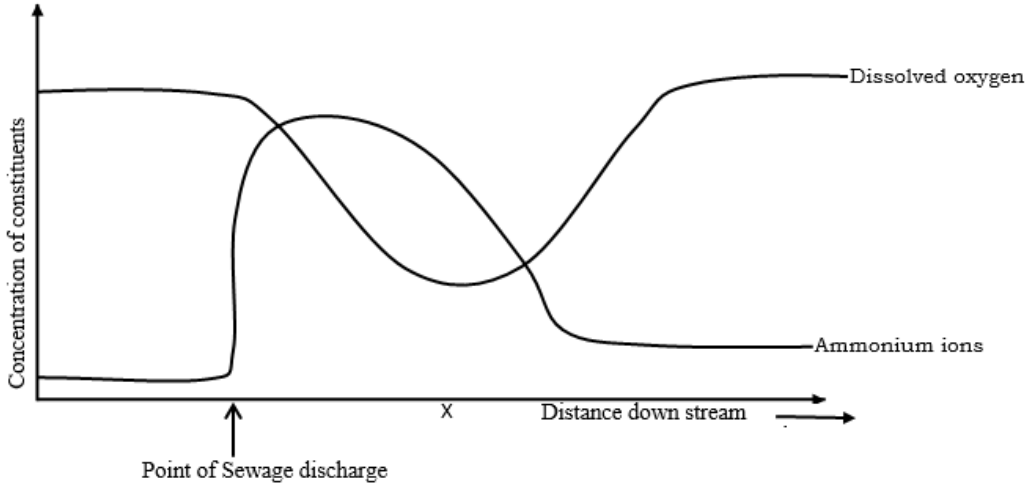
ECOLOGY DISCUSSION QUESTIONS

(A) DATA BASED QUESTIONS

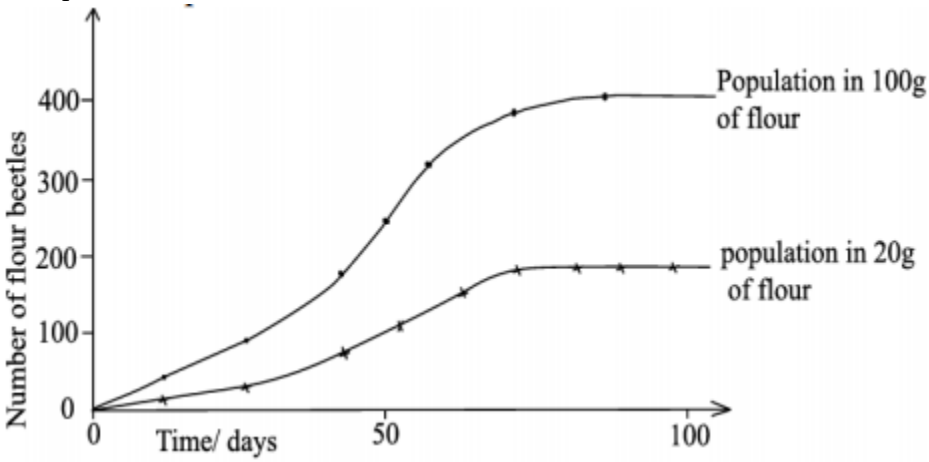
1. Graph in the figure below shows the effect of sewage discharge on some chemical constituents of a river at increasing distances downstream from the point of sewage discharge.



(a) Explain the variation in the concentration of ammonium ions and dissolved oxygen, downstream from point of sewage discharge.
   (i) Ammonium ions.
   (ii) Dissolved oxygen

(b) Suggest **two** ways in which the effects of sewage shown on the graph can be monitored.

2. Figure below shows the effect of food content on the population growth of flour beetles of the same species.



(a) Compare the effect of food content on the population growth of flour beetles with time.

(b) Explain the effect of food shortage on the population growth of flour beetles.

(c) State **one** density independent factor that would influence the results of this experiment.

3. The water hyacinth *Eichhornia crassipes* is a weed growing on many waters of Uganda. In the biological control of the weed on Lake Victoria, a fungal pathogen and weevils are employed. The characteristics of the fungus and the weevils in relation to their feeding behavior is shown in the Table below.

Fungus	**Weevils**
Feeds on the water hyacinth alone	Feeds on other plants other than the water hyacinth
Attacks only the green parts of the plant	Attacks all parts of the plant

The level of destruction of the weed by the fungus and the weevils under varying water conditions in temperature, turbidity and speed of water are shown in the figures below.

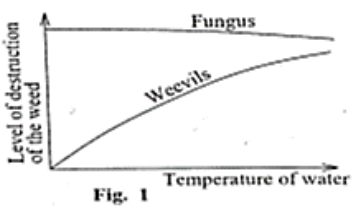


Fig. 1

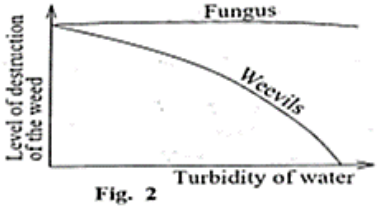


Fig. 2

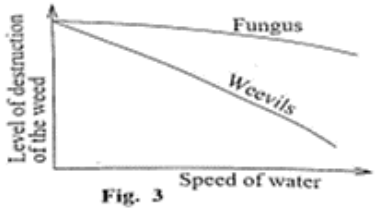


Fig. 3

(a) From the figures above, describe the level of destruction of the weed by each of the organisms under different conditions of water.
(i) Fungi. (ii) Weevils

(b) From the information provided, suggest explanations for the level of destruction of the weed by each organism under different conditions of water.
(i) Fungus. (ii) Weevils

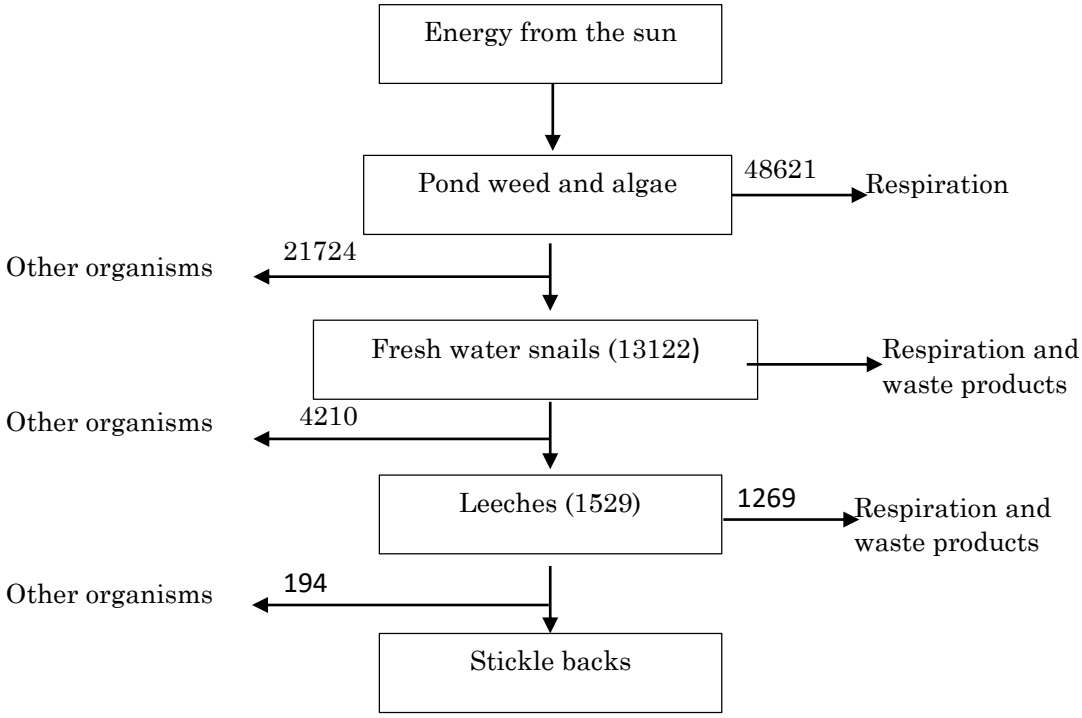
(c) From the information provided, give advantages that the;
(i) fungus has over weevils in destroying the weed.
(ii) Weevils have over fungus in destroying the weed.

(d) What are ecological effects of the water hyacinth on Lake Victoria?

(e) What are the advantages of employing biological control as a means of checking the population of the water hyacinth?

4. (a) What is **gross primary productivity**?

(b) The diagram below shows the energy flow in $KJm^{-2}year^{-1}$ through a fresh water ecosystem.



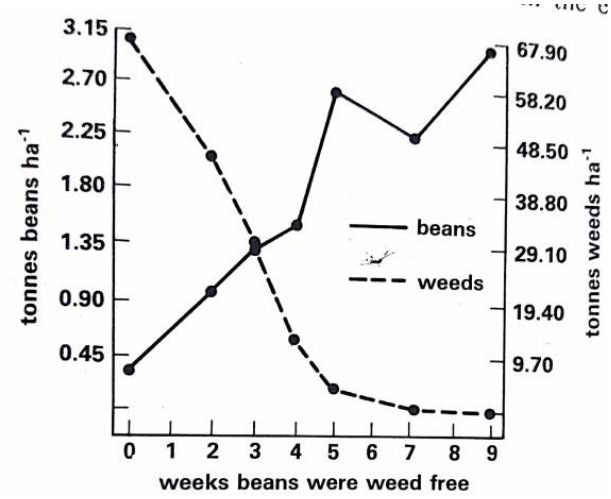
i) Calculate the gross primary productivity of the pond weed and algae.

ii) How much energy is lost in respiration and waste products by the fresh water snails?

(c) Explain why carnivores would have a higher secondary productivity than herbivores.

5. The yield of bean plants was monitored against different factors in an uninterrupted field close to a dusty road side.

Figure below shows the relationship between weed density and bean density ha^{-1}



(a) Describe the relationship between weed density and bean seed density

(b) Explain the relationship in (a) above

(c) Identify the biological process illustrated in the figure above and explain its importance in nature.

(B) SECTION B TYPE QUESTIONS

1. (a) What is meant by the term **population** in ecology?
(b) What assumptions are made when using capture –recapture method of estimating population size?
(c) Explain the ways in-breeding affects a natural population.
(d) Suggest factors which may contribute to a climax community being unstable.

2. (a) What is meant is meant by
(i) Biotic potential
(ii) Primary productivity
(b) Describe the factors which influence the size of population in an ecosystem.
(c) Suggest reasons why human populations are not naturally regulated by negative feedback mechanism.

3. (a) Define the term **fecundity**.
(b) Describe how each of the following affect a natural population.
(i) Diseases
(ii) Predation

4. (a) Differentiate between **sample count** and **total count**.
(b) Give **five** factors to be considered before carrying out a counting exercise.
(c) Outline the importance of determining population size of different organisms in a given area to an ecologist.

5. (a) Discuss the different ways in which man has influenced natural habitats to suit his life style of living.
(b) What is the long term effects of the following
(i) Pesticide application
(ii) Global warming
(c) Explain how the release of chlorofluorocarbons (CFCs) into the atmosphere can endanger the ecosystem.

6. (a) What is meant by the term **environmental degradation**?
(b) Explain the ecological impacts of each of the following human activities.
(i) Use of pesticides
(ii) Drainage of nitrate into water bodies
(iii) Use of polythene papers
(b) How can endangered species be conserved?
(c) What are the benefits of conserving nature?

7. (a) What is meant by **greenhouse effect**?
(b) How have humans contributed to increased greenhouse effect?
(c) Suggest practical solutions to the greenhouse problem.

8. (a) Explain the **sources** and **types** of air pollution.
(b) What are the effects of land pollution on agricultural productivity?

9. (a) Distinguish between **primary productivity** and **secondary productivity**.
(b) Give **five** reasons why much of the solar energy does not contribute to primary productivity in plants.
(c) Explain why carnivores have a higher secondary productivity than herbivores.

10. (a) Describe the factors that influence productivity in an ecosystem.
(b) What are the effects of light in an ecosystem?

11. Describe
(a) how different human activities results into poor quality of air and water
(b) ecological impacts of organic pollution on fresh water bodies

12. (a) Explain the meaning of **pest resurgence**.

(b) Describe the qualities of an ideal pesticide.
(c) What are the
(i) benefits of biological agents over pesticide in pest control
(ii) limitations of using Biological control.

13. (a) What is meant by the term **Economic damage threshold** of pests?
(b) Describe various cultural methods of controlling pest population.
(c) Explain the sequence of the changes that occur in a previously burnt piece of land from its initial stages until a climax community.

14. (a) Distinguish between **primary** and **secondary** succession.
(b) Describe the functional changes that occur in the ecosystem during succession.
(c) Explain the adaptations of lichens as Pioneer species.

15. (a) (i) Distinguish between a **food chain** and a **food web.**
(ii) Evaluate the use of studying food webs rather than food chains in ecology
(b) Explain how energy flows through an ecosystem.
(c) How does temperature influence the distribution of organism?
(d) Explain the adaptations of plants to fire.

16. (a) How does each of the following influence plant distribution?
(i) Acidic rain
(ii) Temperature
(iii) Light
(b) Explain why apical dominance is more common in plants that grow under forest canopy than those in open habitats.

17. (a) Describe and explain the changes in fauna, flora and chemical composition that would occur along a fresh water river due to dumping of domestic sewage from a nearby residential town.
(b) Describe how terrestrial plants in xeric habitats are suited to their environments.

18. (a) What is meant by
(i) species
(ii) species extinction
(b) Outline human activities that may lead to formation of new species.
(c) Explain how man has contributed to formation of new species.

END