Name_____ Index No._____

2404/301
TAXONOMY, ECOLOGY, SOIL STUDY, HERBARIUM, AQUARIUM AND VIVARIUM
Oct/Nov 2014
Time: 3 hours

Candidate's Signature_____

Date _____

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN APPLIED BIOLOGY

TAXONOMY, ECOLOGY, SOIL STUDY, HERBARIUM, AQUARIUM AND VIVARIUM

3 hours

INSTRUCTIONS TO CANDIDATES

Write your name and index number in the spaces provided above.
Sign and write the date of the examination in the spaces provided above.
*This paper consists of **TWO** Sections; **A** and **B**.*
*Answer **ALL** the questions in Section A any **THREE** questions from Section B in the spaces provided.*
*Each question in Section **A** carries **4** marks while each question in Section **B** carries **20** marks.*
Maximum marks for each part of a question are indicated.
*Do **NOT** remove any pages from this question paper.*
Candidates should answer the questions in English.

For Examiner's Use Only

Section A

Question	1	2	3	4	5	6	7	8	9	10	TOTAL SCORE
Candidate's Score											

Section B

Question	11	12	13	14	15	TOTAL SCORE
Candidate's Score						

GRAND TOTAL

This paper consists of 12 printed pages.

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

Turn over

SECTION A (40 marks)

*Answer **ALL** the questions in this Section in the spaces provided.*

1. Figure 1 is a diagram of a hydra.

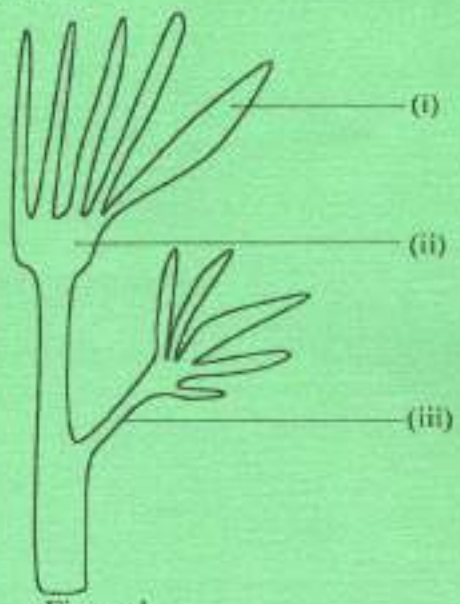

Figure 1

(a) Identify the parts (i), (ii) and (iii). ($1\frac{1}{2}$ marks)

_____

_____

_____

(b) Name the class to which hydra belongs. (1 mark)

_____

_____

(c) State the general characteristics of the class named in (b) above. ($1\frac{1}{2}$ marks)

_____

_____

_____

2. Draw a labelled diagram of a mature penicillium mould. (4 marks)

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3. Figure 2 shows the biomass and amounts of DDT in parts per million in a certain habitat.

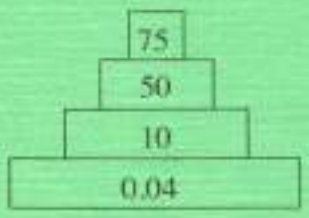

Figure 2

(a) If the concentration of DDT in the water surrounding the algae was 0.02 ppm, calculate the concentration factor for DDT in producers and carnivores. (2 marks)

(b) What is conclusions that can be drawn from the concentration factor of DDT in 3(a) above? (2 marks)

4. List:

(a) **four** effects of eutrophication on the receiving ecosystem. (2 marks)

(b) the social problems associated with each of the effects sated in 4(a) above. (2 marks)

5. Give the physical properties of soil which are determined by the clay minerals present in the soil. (4 marks)

6. Explain the role of plant roots in soil structure formation. (4 marks)

7. Draw a labelled diagram of a light trap for insect collection. (4 marks)

8. Describe the tools used in plant collection for herbarium purposes. (4 marks)

9. (a) Explain the use of each of the following in an aquarium:

(i) Activated carbon; (1 mark)

(ii) Biological filters. (1 mark)

(b) Describe the daily maintenance of a fish aquarium. (2 marks)

10. State the various methods used in maintaining suitable temperature vivarium. (4 marks)

SECTION B (60 marks)

*Answer any **THREE** questions from this section in the spaces provided after question 15.*

11. (a) Outline the procedure of examining *chylamydomones*. (6 marks)

(b) Describe sexual reproduction in *Rhizopus spp*. (14 marks)

12. (a) Describe the significance of cation exchange capacity of a soil. (10 marks)

(b) State the:

(i) uses of soil map. (4 marks)

(ii) typical information in a soil survey for soil mapping. (6 marks)

13. (a) Discuss the ecological implications of human alterations to the nitrogen cycle. (8 marks)

(b) Distinguish between density dependent and density independent factors that regulate population growth. (6 marks)

(c) Distinguish between multidimensional niche and fundamental niche. (6 marks)

14. (a) Outline the proper process handling of herbarium specimen. (6 marks)

(b) State the methods used in pest control in a herbarium. (4 marks)

(c) Describe the biological maceration technique in bone processing. (10 marks)

15. (a) Explain the advantages and disadvantages of biological over chemical monitoring of eutrophication. (10 marks)

(b) (i) List the factor likely to affect the number and diversity of species reaching an area during the process of succession. (5 marks)

(ii) Describe, using an illustration, the succession from a bare rock. (5 marks)