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2018 (21)

2528/103
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ENVIRONMENTAL BIOLOGY
Oct./Nov. 2018
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL
DIPLOMA IN ENVIRONMENTAL SCIENCE AND TECHNOLOGY
MODULE I

ENVIRONMENTAL BIOLOGY

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

answer booklet;

non-programmable scientific calculator.

This paper consists of **TWO** sections; **A** and **B**.

Answer **ALL** questions in section **A** and any **THREE** questions from section **B** in the answer booklet 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 as shown.

Candidates should answer the questions in English.



This paper consists of 4 printed pages.

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

SECTION A (40 marks)

Answer ALL the questions in this section.

1. Distinguish between food chain and food web. (4 marks)
2. (a) Draw a labelled structure of mitochondrion. (3 marks)
(b) State the function of mitochondrion. (1 mark)
3. List **four** observations made by Darwin in the theory of natural selection. (4 marks)
4. Name **four** functions of Endoplasmic reticulum in cells. (4 marks)
5. Draw a food chain of the organisms: Aquatic crustaceans; Raccoons; Algae; Fish in aquatic ecosystem. (4 marks)
6. List **four** main divisions in plant kingdom. (4 marks)
7. Outline the process of genetically modifying bacteria with plasmid to produce human insulin. (4 marks)
8. Explain why less than 3% of energy available to plants is converted into organic matter. (4 marks)
9. State **four** mechanisms of heat loss to the environment by a human being. (4 marks)
10. Name **four** cell structures present in all types of cells. (4 marks)



SECTION B (60 marks)

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

11. (a) Explain **three** importance of mitosis in living organisms. (6 marks)
- (b) With the aid of diagrams, explain mitosis in a plant cell. (14 marks)
12. (a) Describe **four** limitations of ecological pyramids. (8 marks)
- (b) In an ecosystem, vegetation is the producer, beetle, mouse and hare are primary consumers, while Jackal, eagle and snake are secondary consumers. Construct a food web using these organisms. (12 marks)
13. (a) Figure 1 shows carbon cycle.

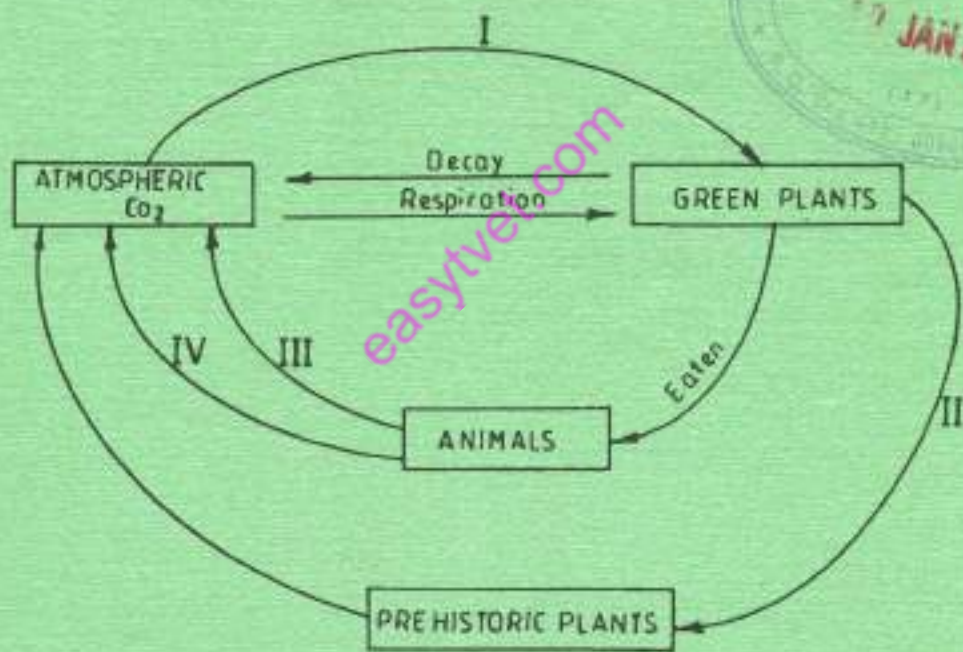


Fig. 1

- (i) Name the processes labelled I, II, III and IV. (4 marks)
- (ii) Describe how process III and IV add carbon dioxide to the atmosphere. (6 marks)
- (iii) Describe how green plants removes carbon dioxide from the atmosphere. (4 marks)
- (b) Describe using a diagram, the oxygen cycle. (6 marks)

14. (a) With the aid of a Sigmoid population growth curve, explain the growth pattern of weevils in a grain store. (14 marks)
- (b) Use a diagram to describe the following population pyramids:
- (i) expansive; (2 marks)
 - (ii) constructive; (2 marks)
 - (iii) stationary. (2 marks)
15. (a) Complete the following dichotomous key for vertebrate classes. (5 marks)
- | | | |
|----|-----------------------------|-------|
| 1. | 'Cold-blooded' ----- | 2 |
| | 'warm-blooded' ----- | 4 |
| 2. | Has fins but no limbs ----- | fish |
| | Has 4 limbs ----- | (i) |
| 3. | Has no scales on body ----- | (ii) |
| | Has scales ----- | (iii) |
| 4. | Has feathers ----- | (iv) |
| | Has fur ----- | (v) |
- (b) Describe the characteristics of the five kingdom classification. (15 marks)



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