

Biology I

001

18/11/ 2015 08.30AM - 11.30AM



ORDINARY LEVEL NATIONAL EXAMINATIONS, 2015

SUBJECT: BIOLOGY I

DURATION: 3 HOURS



INSTRUCTIONS:

1. Write your names and index number on the answer booklet as they appear on your registration form, and **DO NOT** write your names and index number on additional answer sheets of paper if provided.
2. Do not open this question paper until you are told to do so.
3. This paper consists of **THREE** sections: **A**, **B** and **C**.
 - **Section A:** Attempt **all** questions. (55 marks)
 - **Section B:** Attempt any **three** questions. (30 marks)
 - **Section C:** This section is **compulsory**. (15 marks)
4. Use only blue or black pen.

SECTION A: ATTEMPT ALL QUESTIONS. (55 MARKS)

- 1) The following are various sub-units into which species of plants or animals can be divided: cell, organ, organelle, organism, tissue, organ system.
- (a) Arrange them in order starting with the simplest and ending with the most complex. **(3marks)**
 - (b) Which of them can be applied to the following:
 - (i) A cat? **(1mark)**
 - (ii) Amoeba? **(1mark)**
 - (iii) Leaf? **(1mark)**
 - (iv) Chloroplast? **(1mark)**
 - (v) Alimentary canal? **(1mark)**
- 2) Name the cells in a mammal that:
- (a) Are sensitive to their environment. **(1mark)**
 - (b) Receive messages from sensory cells. **(1mark)**
 - (c) Transmit messages to effectors. **(1mark)**
- 3) Name the stage in the life cycle of flies and butterflies at which:
- (a) Ecdysis occurs. **(1mark)**
 - (b) Feeding for growth occurs. **(1mark)**
 - (c) Wings appear. **(1mark)**
 - (d) A period of immobility occurs. **(1mark)**
- 4) Cholera is transmitted by food and water that is contaminated with faecal matter. Suggest three measures that might be used to limit the spread of this disease. **(3marks)**
- 5) (a) Define photosynthesis. **(2marks)**
(b) What conditions are necessary for photosynthesis to occur in a green plant? **(4marks)**
- 6) (a) List two chemical elements other than carbon, hydrogen, oxygen and nitrogen which are required by both plants and animals. **(4marks)**

(b) For each of the elements you have listed, give one reason why it is required:

(i) In green plants. **(1mark)**

(ii) In mammals. **(1mark)**

7) Match the following ecological terms with their definitions.

(a) Community - A place where an organism lives.

(b) Ecosystem - A number of species interacting in a locality

(c) Food web - A nutritional interrelationship of organisms

(d) Habitat - Interaction of organisms with each other and with their abiotic environment. **(3marks)**

8) (a) Why are enzymes frequently referred to as 'biological catalysts'?

(4marks)

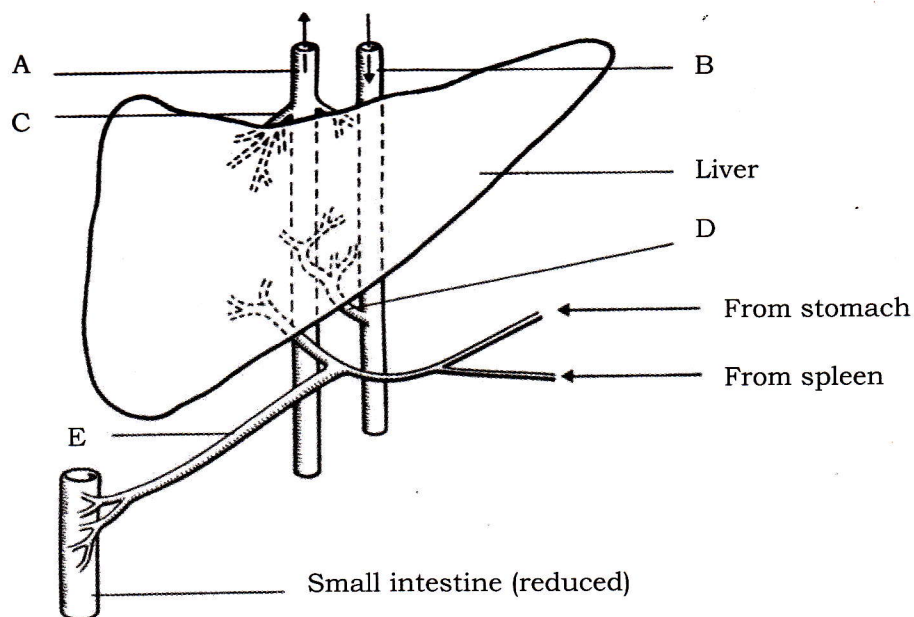
(b) What would be the effect of changing :

(i) pH?

(ii) Temperature upon the rate of action of any named enzyme?

(2marks)

9) The diagram below shows blood supply through the liver.



(a) Label the parts indicated A, B, C, D, E. **(5marks)**

(b) Which two substances would be present in greater concentrations in vessel E after a meal? **(2marks)**

10) Give at least four functions of a human brain. **(4marks)**

11) When a person's hand accidentally touches a hot object it is quickly withdrawn. Explain what causes this response. **(3marks)**

12) (a) Define a gamete. **(1mark)**

(b) What are the male and female gametes in an animal (mammal)? **(2marks)**

SECTION B: ATTEMPT ANY THREE QUESTIONS. (30MARKS)

13) (a) Explain the following terms that are used in genetics:

(i) allele **(1mark)**

(ii) heterozygous **(1mark)**

(iii) phenotype **(1mark)**

(b) In humans, brown eye (B) is dominant to blue eye (b).

Two parents, one heterozygous for eye colour and the other blue eyes, start a family.

(i) What is the genotype of the brown-eyed parent? **(1mark)**

(ii) What are the possible gametes that each parent can produce? **(2marks)**

(iii) Show the possible genotypes of their children. **(4marks)**

14) (a) Explain the following terms that are used in ecology.

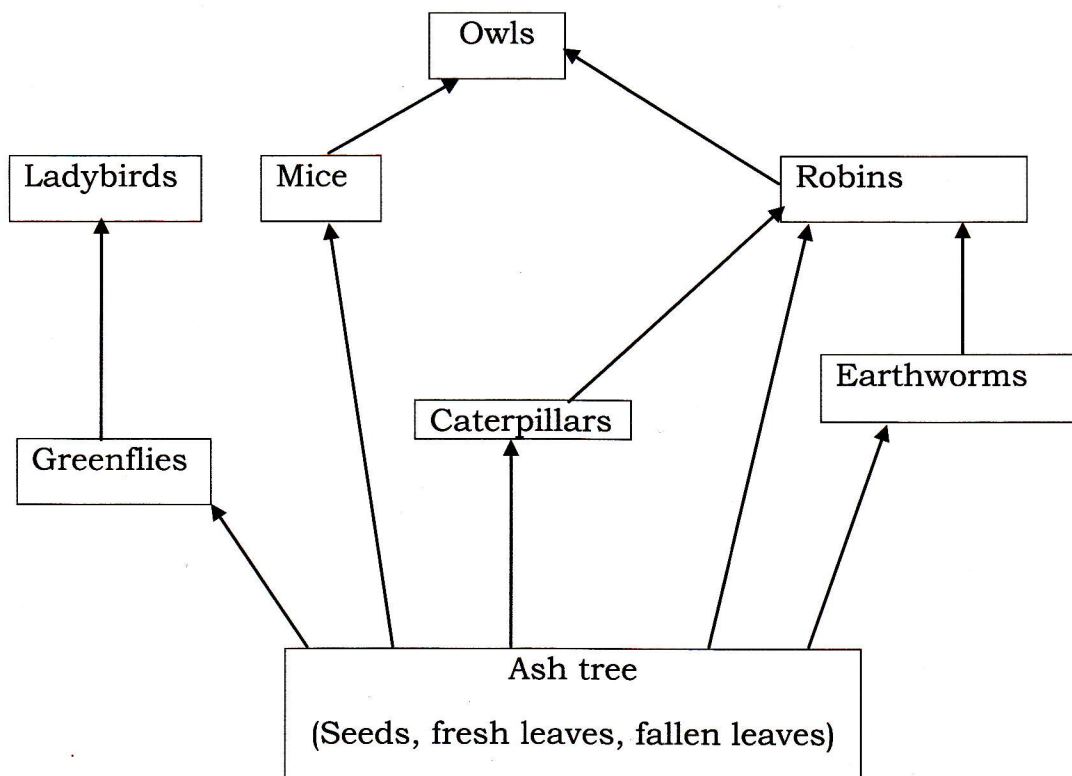
(i) Biosphere **(1mark)**

(ii) Habitat **(1mark)**

(iii) Niche **(1mark)**

(iv) Producer **(1mark)**

(b) Answer the following questions in relation to the food web shown below.



(i) Write two food chains with four organisms in it.

(2marks)

(ii) Copy and complete the table below.

(4marks)

Autotrophic organism	
Secondary consumer	
Omnivore	
Carnivore	

15) (a) Describe the effects of the failure of the pancreas to produce sufficient insulin.

(2marks)

(b) The pituitary gland produces several hormones.

(i) Give any four (4) hormones it produces.

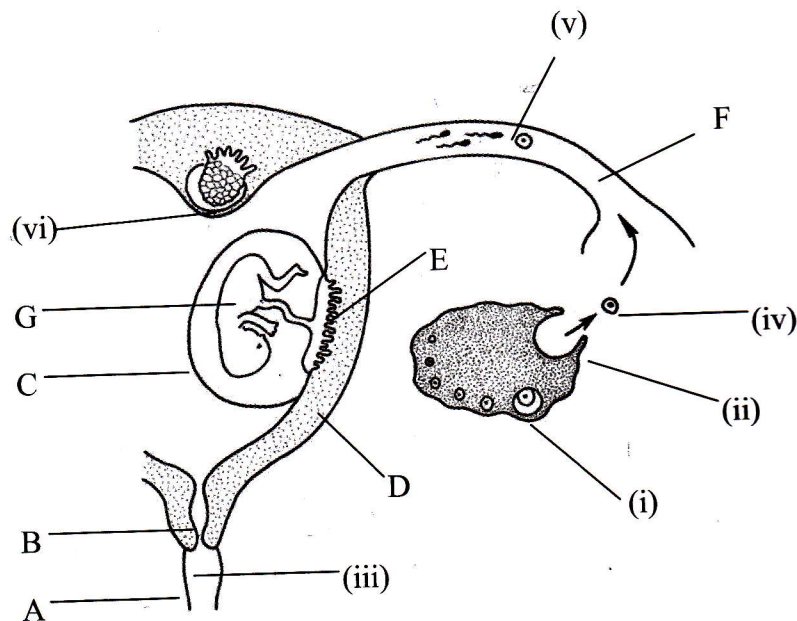
(4marks)

(ii) Give the functions of each hormone named in (b) (i) above.

(4marks)

16) The diagram below represents the events leading up to fertilization, implantation and development in human beings.

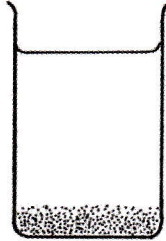
- (a) Name the structures labelled A, B, C, D, E, F, and G. **(4marks)**
 (b) Briefly describe the process of fertilization in human beings, from (i) to (v). **(6marks)**



- 17) (a) State one function of each of the following parts of a flower:
 (i) Petal **(1mark)**
 (ii) Sepal **(1mark)**
- (b) What is the difference between self-pollination and cross-pollination? **(2marks)**
- (c) Some species of plants are strongly adapted to pollination by certain insects.
 State four characteristics which are regarded as adaptations to pollination by bees. **(4marks)**
- (d) In dicotyledonous plants, the early stages of germination take place in the soil where there is little or no light for photosynthesis.
 How does the seedling obtain materials for its growth and energy during this time? **(2marks)**

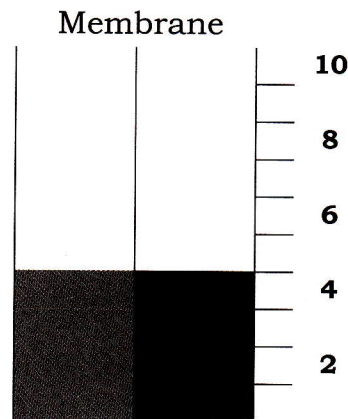
SECTION C: THIS SECTION IS COMPULSORY. (15marks)

- 18) (a) The diagram below represents molecules of a salt dissolved in the bottom layer of water in a beaker.



Make two similar diagrams to the distribution of salt molecules :

- (i) After a few minutes. **(2marks)**
 - (ii) After several hours. **(2marks)**
 - (iii) By which transport mechanism (process) the salt molecules will move? **(1mark)**
- (b) The diagram below shows a vessel which contains a concentrated (right) and a dilute (left) solution separated by a partially permeable membrane.



- (i) Draw a similar diagram to show the liquid levels after an hour or two hours. **(2marks)**
- (ii) Explain what has happened. **(4marks)**
- (iii) Name the process which is being investigated. **(1mark)**
- (iv) Define the process named in (iii) above. **(3marks)**