Paper Reference(s)

7040/01

London Examinations GCE

Biology

Ordinary Level

Paper 1

Monday 26 May 2003 – Morning

Time: 2 hours

Materials required for examination
Answer Book (AB12)

Items included with question papers
Nil

Instructions to Candidates

Answer BOTH questions from Section A and any THREE questions from Section B.

In the boxes on the answer book, write the name of the examining body (London Examinations), your centre number, candidate number, the subject title (Biology), the paper reference (7040/01), your surname, other names and signature.
Write your answers in the answer book. Make sure your answers to parts of questions are clearly numbered. Use supplementary answer sheets if necessary.

Information for Candidates

Calculators may be used.
The total mark for this paper is 100.
The mark allocation is shown at the end of each question.
Marks for parts of questions are shown in round brackets: e.g. **(2)**.
This paper has seven questions.

Advice to Candidates

Write your answers neatly and in good English.
In calculations, show **all** the steps in your working.

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SECTION A

Answer BOTH questions

1. Read the passage below. Use the information in the passage and your own knowledge to answer the questions which follow.

Shrimp farming

Aquaculture is the managed growth of marine species in a controlled environment. An example is seen in the farming of shrimps. To grow shrimps successfully, a 'pond' is needed along with a supply of water, a source of shrimp larvae, food, fertiliser and equipment to monitor water quality.

The ponds vary depending upon location but most shrimp farms use semi-intensive farming techniques. These ponds vary in size from 4 to 40 hectares and can be up to 4 metres deep. Several weeks before stocking with shrimp larvae, the ponds are filled with sea water by using either natural tidal flows or manual pumping. Algae start to grow in the pond. The shrimp larvae used to stock the ponds are either raised in a hatchery or caught in the ocean. For several weeks the larvae grow, feeding on algae and small amounts of commercial feed. As the biomass of the shrimps increases, the water in the pond is slowly replaced with more sea water or stirred with electric paddle wheels.

Several weeks after stocking, the shrimps are fed on a diet of commercial shrimp feed. This contains protein sources such as fish meal, soy bean meal and wheat. It also contains fat, fibre, vitamins and minerals.

After a growth period ranging from 4 to 10 months, the water is drained out of the pond and the shrimps are harvested.

(Adapted from Bluecadia Aquaculture Incorporated © 2001)

(a) Suggest **two** factors that a shrimp farmer would need to control in the pond. (Line 1)

(2)

(b) (i) State the source of energy used by the algae. (Line 7)

(1)

(ii) Give **two** changes that take place in the water in the pond due to the growth of the algae. (Line 7)

(2)

(c) Suggest the purpose of each of the following.

(i) Replacing the water in the ponds (Line 10)

(2)

(ii) Using electric paddle wheels to stir the water (Line 10)

(2)

(iii) Adding commercial feed to the ponds after some weeks (Line 11)

(2)

(d) Suggest **two** advantages of using larvae raised in a hatchery rather than larvae caught in the ocean. (Line 8)

(2)

(e) Explain what is meant by the term **biomass**. (Line 9)

(1)

(f) (i) Suggest **two** advantages of aquaculture compared to traditional fishing methods.

(2)

(ii) Suggest **one** disadvantage of using aquaculture to grow shrimps.

(1)

(Total 17 marks)

Section A continues on the next page

2. In the human body the concentration of blood plasma is maintained at the same concentration as that of the body cells. Changes in the concentration of the blood plasma produce changes in the shape of red blood cells. This is due to water entering or leaving the red blood cells.

These effects can be investigated by adding a few drops of human blood to different concentrations of sodium chloride solution in test tubes. The appearance of the liquid in these test tubes may change as a result of the changes in the red blood cells. The shape of the red blood cells can be observed by examining a sample of the liquid using a microscope.

The results of such an investigation are shown in the table below.

Concentration of sodium chloride solution (%)	Appearance of the liquid	Appearance of the red blood cells under microscope
3.0	Cloudy red	Smaller, with shrunken edges
1.0	Cloudy red	Normal
0.9	Cloudy red	Normal
0.7	Cloudy red	Normal
0.5	Cloudy at first then clear red	No cells seen
0.3	Clear red	No cells seen

(a) Explain the appearance of the red blood cells seen under the microscope in each of the following solutions.

(i) 3.0 % sodium chloride

(2)

(ii) 0.9 % sodium chloride

(2)

(iii) 0.3 % sodium chloride

(2)

(b) Explain how the appearance of the liquid in the test tubes is caused by the changes to the cells (as seen under the microscope) in each of the following solutions.

(i) 1.0 % sodium chloride

(1)

(ii) 0.5 % sodium chloride

(1)

(Total 8 marks)

TOTAL FOR SECTION A: 25 MARKS

SECTION B

Answer any THREE questions

3. (a) Multicellular organisms have transport systems.

(i) Name **two** substances that are transported in a mammal. For **each** substance state how it is carried and give **one** use for the substance in the body.

(6)

(ii) Name **two** substances that are transported in a flowering plant. For **each** substance state how it is carried and give **one** use for the substance in the plant.

(6)

(b) Describe the route taken by a red blood cell that leaves the kidney until it reaches the liver. In your account you should name, in the correct order, the major blood vessels and structures that the cell would pass through.

(8)

(c) Describe an experiment you could do to compare the loss of water from the upper surface of a leaf with that from its lower surface.

(5)

(Total 25 marks)

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4. (a) Explain what is meant by each of the following terms.

(i) Ingestion

(1)

(ii) Digestion

(1)

(iii) Absorption

(1)

(iv) Egestion

(1)

(b) Explain how the jaw, teeth and gut of a sheep are adapted to its diet.

(10)

(c) Describe a simple experiment you could do to investigate whether adding a small amount of salt solution (sodium chloride) speeds up the digestion of starch.

(7)

(d) Humans require certain vitamins in their diet. Name **two** vitamins required in the diet and for **each**, state **one** source and **one** function.

(4)

(Total 25 marks)

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5. (a) Describe **four** ways in which a plant cell differs from an animal cell.

(4)

(b) Describe the structure of an organism in each of the following groups.

(i) A bacterium

(3)

(ii) A virus

(3)

(c) Describe how reproduction is carried out in each of the following groups.

(i) A **named** fungus

(3)

(ii) A virus

(1)

(d) Describe how a **named** fungus feeds.

(3)

(e) (i) Name **one** human disease caused by bacteria and describe how the disease is transmitted.

(2)

(ii) For the disease you have named, suggest how the chances of it spreading could be reduced.

(2)

(f) Describe how the malarial parasite is transmitted to its human host.

(4)

(Total 25 marks)

6. (a) Name **two** of the waste products of a plant cell and for **each** product give the process that produces it.

(4)

(b) Describe a simple experiment you could do to find out how different **colours** of light alter the rate of photosynthesis.

(7)

(c) (i) The lungs are excretory organs in mammals. Describe how lungs are inflated when breathing in.

(7)

(ii) Describe how alveoli are adapted for gas exchange. Explain how each feature you give makes the process more efficient.

(5)

(d) Describe how a single celled organism such as *Amoeba* carries out gas exchange.

(2)

(Total 25 marks)

Section B continues on the next page

7. *Pleurococcus* is a simple green algae that lives on tree trunks and on other exposed vertical surfaces. In some areas, more *Pleurococcus* is found on surfaces facing the sun than on surfaces not facing the sun.

(a) Suggest **four** environmental factors that might affect the growth of *Pleurococcus*, and for each factor explain how it would affect the growth of the algae.

(8)

(b) Explain what is meant by each of the following terms.

(i) Ecosystem

(1)

(ii) Habitat

(1)

(iii) Community

(1)

(iv) Population

(1

(c) Explain how a pyramid of numbers differs from a pyramid of biomass.

(4)

(d) Describe the role of bacteria in the nitrogen cycle.

(9)

(Total 25 marks)

TOTAL FOR SECTION B: 75 MARKS

END