Important: * This question paper consists of 09 pages.
* This question paper comprises Part A and Part B. The time allotted for both parts is three hours.

PART A — Structured Essay:
(08 pages)
Answer all the questions on this paper itself. Write your answers in the space provided for each question. Please note that the space provided is sufficient for your answers and that extensive answers are not expected.

PART B — Essay:
(01 page)
Answer four questions only. Use the papers supplied for this purpose. At the end of the time allotted for this paper, tie the two parts together so that Part A is on top of Part B before handing over to the supervisor.

You are permitted to remove only Part B of the question paper from the Examination Hall.

For Examiner’s Use Only

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<tr>
<th>Part</th>
<th>Question Nos.</th>
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Total

Percentage

Final Marks

In Numbers

In Letters

Code Numbers

Marking Examiner
Marks Checked by
1
2
Supervised by
PART A — Structured Essay:
Answer all the questions on this paper itself.
(Each question carries 10 marks)

1. (A) (i) What is photosynthesis?

(ii) What is the global significance of photosynthesis?

(B) (i) Given below is an electronmicrograph of a chloroplast. Label the parts indicated by arrows.

(ii) In which part of the chloroplast do the (a) light reactions and (b) dark reactions of photosynthesis take place?
(a) Light reactions
(b) Dark reactions

(See page three)
(C) State the major events that take place in the chloroplast during the light reactions.

(D) The products formed in the light reactions of photosynthesis are used in the synthesis of carbohydrates during the dark reactions. Briefly explain the three major stages involved in this process.

(i) ...........................................................

(ii) ...........................................................

(iii) ...........................................................

2. (A) Briefly explain the term 'Biodiversity'.
(B)  (i) What are known as (a) endemic species, (b) keystone species and (c) flagship species?

(a) Endemic species

(b) Keystone species

(c) Flagship species

(ii) Name an animal that can be considered as a flagship species of Sri Lanka.

(C)  (i) Name the five kingdoms into which the organisms are classified.

(ii) In naming organisms what is the advantage of using a scientific name against the use of common names?

(iii) What is binomial nomenclature?

(iv) What are the international rules followed in the binomial nomenclature?
(D) (i) State five important evolutionary features of flowering plants which enabled them to fully adapt to life on land.

(ii) State five structural features of reptiles which enabled them to fully adapt to a terrestrial mode of life.

3. (A) (i) What is respiration?

(ii) State three main differences between aerobic and anaerobic respiration.

<table>
<thead>
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<th>Aerobic respiration</th>
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(B) (i) What are the main features that a respiratory surface of an animal should have for efficient exchange of gases?

(ii) State three respiratory organs seen among invertebrates and name three different phyla where each of these organs could be seen.

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<th>Respiratory organ</th>
<th>Phylum</th>
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(C) The questions (C) (i) - (iii) are based on the following diagram of the respiratory system of man.

(i) Name the parts labelled as P, Q, R, S and T

P .................................................................
Q .................................................................
R .................................................................
S .................................................................
T .................................................................

(ii) State the functions of R.

...........................................................................
...........................................................................
...........................................................................
...........................................................................
...........................................................................

(iii) State a non-respiratory function of Q.

.............................................................................
(D) (i) What are known as (a) tidal volume and (b) residual volume of the lungs?

(a) Tidal volume

(b) Residual volume

(ii) Name the muscles that are involved in the ventilation of lungs in man.

4. (A) (i) Define the following nutritional groups found among organisms.

(a) Chemoautotroph

(b) Chemoheterotroph

(c) Photoautotroph

(d) Photoheterotroph

(ii) Name an organism or a group of organisms which belong to the following nutritional groups.

(a) Chemoautotroph

(b) Chemoheterotroph

(c) Photoautotroph

(B) (i) Why are some mineral nutrient elements required for plant growth considered as essential elements?
(ii) Some of the essential elements are known as macronutrient elements and others as micronutrient elements. Explain.

(iii) List five macronutrient elements and indicate one major function of each of them.

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<th>Major function</th>
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(C) (i) What are the three major pathways through which water movement takes place across a plant root?

(ii) Explain briefly the mechanism of movement of water from soil solution into a root hair cell in terms of water potential concept.

(iii) How does the movement of mineral nutrients across the plant cell membranes differ from the movement of water?

(D) What are the major steps involved in an experiment carried out to determine the water potential of Colocasia petiole or potato tissue?
Part B — Essay

Answer four questions only. (Each question carries 15 marks)

1. Describe what happens to a carbohydrate meal ingested by man.

2. (i) What are the major groups of micro-organisms found in soil?
(ii) Explain the role of soil micro-organisms on plant growth.

3. (i) Describe the structure of the DNA molecule.
(ii) What is recombinant DNA technology?
(iii) Explain two applications of recombinant DNA technology.

4. (i) Using a flow diagram only show how carbon is cycled in nature.
(ii) State how man has interfered with the cycling of carbon in nature and explain briefly the environmental impacts of such interferences.

5. (i) Describe the external morphology of the adult and the life cycle of Necator americanus.
(ii) Explain how Necator americanus infections could be controlled.

6. (i) Explain what is meant by alternation of generations with reference to the life cycle of Pogonatum.
(ii) State how the form and nutritional status of the gametophyte of Pogonatum differs from those of (a) Nephrolepis and (b) flowering plants.
(iii) Explain how microspores are produced and dispersed in flowering plants.