

සියලු ම හිමිකම් ඇවිරිණි / முழுப் பதிப்புரிமையுடையது / All Rights Reserved

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ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව  
 இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம்  
 Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2019 අගෝස්තු  
 கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2019 ஓகஸ்ட்  
 General Certificate of Education (Adv. Level) Examination, August 2019

ජීව විද්‍යාව II  
 உயிரியல் II  
 Biology II

09 E II

06.08.2019 / 1300 - 1610

පැය තුනයි  
 மூன்று மணித்தியாலம்  
 Three hours

අමතර කියවීමේ කාලය - මිනිත්තු 10 යි  
 மேலதிக வாசிப்பு நேரம் - 10 நிமிடங்கள்  
 Additional Reading Time - 10 minutes

Use additional reading time to go through the question paper, select the questions and decide on the questions that you give priority in answering.

Index No. : .....

## Instructions:

- \* This question paper consists of 10 questions in 10 pages.
- \* This question paper comprises Part A and Part B. The time allotted for both parts is three hours.

## PART A — Structured Essay (Pages 2 - 9)

- \* Answer **all four** questions on this paper itself.
- \* Write your answers in the space provided for each question. Note that the space provided is sufficient for your answers and extensive answers are not expected.

## PART B — Essay (Page 10)

- \* Answer **four** questions only. Use the papers supplied for this purpose. At the end of the time allotted for this paper, before handing over to the supervisor tie the two parts together so that Part A is on the top of Part B.
- \* You are permitted to remove only Part B of the question paper from the examination hall.

## For Examiners' Use Only

Part	Question No.	Marks
A	1	
	2	
	3	
	4	
B	5	
	6	
	7	
	8	
	9	
	10	
Total		

## Total

In Numbers	
In Letters	

## Code Numbers

Marking Examiner 1	
Marking Examiner 2	
Marks checked by	
Supervised by	

**Part A - Structured Essay**  
*Answer all questions on this paper itself.*  
*(Each question carries 100 marks.)*

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1. (A) (i) (a) Name the three major types of lipids found in organisms.

.....

(b) What is the type of lipid that forms a major component of the cell membrane?

.....

(ii) What is the main structural difference between saturated fatty acids and unsaturated fatty acids?

.....

.....

(iii) State three functions of rough endoplasmic reticulum.

.....

.....

(iv) Name three types of vacuoles seen in organisms.

.....

(v) State two significances of mitosis.

.....

.....

(B) (i) Where does the Calvin cycle take place in the chloroplast?

.....

(ii) What are the three main steps of the Calvin cycle?

.....

.....

(iii) Where does the light reaction of photosynthesis take place?

.....

(iv) State the three substances produced in the light reaction of photosynthesis.

.....

(v) How does an increase in the oxygen concentration in mesophyll cells affect photosynthetic productivity in C3 plants?

.....

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(C) (i) Write in correct sequence, the four main stages by which the first cells have been produced according to the theory of biochemical evolution.

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(ii) What is meant by polyphyletic?

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(iii) Briefly describe what a zygosporangium is.

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(iv) Production of flagellated sperms is a feature seen in some plants. Name one phylum having plants with each of the following features together with the feature of producing flagellated sperms.

Feature

Phylum

(a) Presence of seeds .....

(b) Absence of a vascular system .....

(v) (a) What are the structures used to maintain osmotic balance in flukes?

.....

(b) Name the body cavity of nematodes.

.....

2. (A) (i) State the three basic functions of epithelial tissues of animals.

.....  
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(ii) State three structural features of meristematic cells in plants.

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(iii) Name two types of specialized cells found in the epidermis of plants.

.....

(iv) You are given 12 fresh potato strips immersed in distilled water, each of which is about 5 cm long and six petri dishes kept on graph papers, each containing sucrose solutions of 0.15 M, 0.20 M, 0.25 M, 0.30 M, 0.35 M and 0.40 M concentrations. State in correct sequence, the steps followed to determine the water potential of given fresh potato tissue.

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(v) State three functions of calcium in plants.

.....

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(B) (i) Name two plant genera having photosynthetic gametophytes.

.....

(ii) Name the group of plants having the least developed gametophytes.

.....

(iii) What are sori?

.....

(iv) What is pollination?

.....

.....

(v) State three functions of cytokinins in plants.

.....

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.....

(C) (i) (a) Where is the caecum located in the human alimentary canal?

.....

.....

(b) Name the type of cells in gastric glands of man that secretes pepsinogen.

.....

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(ii) What is the main function of buffers present in saliva?

.....

(iii) State whether the following substances are transported actively or passively across the epithelium of intestinal villi.

(a) Vitamins: .....

(b) Amino acids: .....

(c) Fructose: .....

(iv) (a) Name the main blood vessel formed by converging blood capillaries of the intestinal villi.

.....

(b) Why is double circulation more effective than single circulation in supplying blood to body parts?

.....

.....

(v) (a) What is hypertension?

.....

.....

(b) State the consequences of hypertension.

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3. (A) (i) State three main differences between active immunity and passive immunity.

Active immunity

Passive immunity

.....

.....

.....

(ii) Name the two types of nephrons present in the human kidney.

.....

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(iii) Write in correct sequence, the pathway of a creatinine molecule from a Bowman's capsule to the ureter in man.

.....

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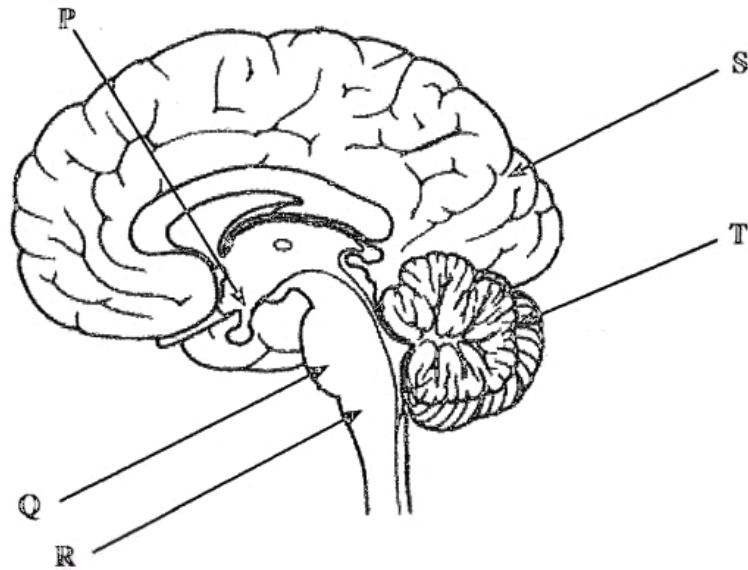
(iv) State two disorders related to human urinary system.

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(v) This question is based on the following diagram of the human brain.



(a) Name the structures labeled as P, Q, R, S and T in the above diagram.

P ..... Q .....

R ..... S .....

T .....

(b) Name the structures responsible for the following functions of man.

Maintaining posture: .....

Coordination of running: .....

Regulation of thirst: .....

(B) (i) What is a sensory receptor?

.....  
.....

(ii) Where are the receptors that detect sound vibrations located in the human ear?

.....

(iii) Name two trophic hormones secreted by anterior pituitary of man.

.....  
.....

(iv) Give an example for a regulation involving a positive feedback mechanism related to endocrine system in man.

.....

(v) Why does blood glucose level increase above the normal level in type 2 diabetes?

.....



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(C) (i) (a) State the importance of locating testes outside the abdominal cavity in man.

.....  
.....

(b) Write in correct order, the pathway of sperms from testes to the urethra in man.

.....  
.....

(c) What is the sperm nutrient present in the secretion of prostate gland of man?

.....

(ii) (a) What are the structures in the human ovary that contain hormone producing cells?

.....

(b) What is fertilization?

.....

(c) In which phase of the human uterine cycle does implantation occur?

.....

(iii) (a) What is the basis of the early pregnancy tests?

.....

(b) Give two examples for assisted reproductive technology methods.

.....

.....

(iv) (a) State three functions of the human skeletal system other than support, protection and movement.

.....

.....

.....

(b) What is the structural arrangement that provides nodding movement of the human skull?

.....

.....

(c) In which human vertebrae, a prominent bifid spinous process is found?

.....

(v) (a) What is a sarcomere?

.....

(b) Name the currently accepted theory of striated muscle contraction.

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4. (A) (i) What is a pedigree chart?

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.....

(ii) What are the data required to prepare a pedigree chart?

.....  
.....

(iii) What is denoted by each of the following symbols used in a pedigree chart?

■ .....

○ .....

(iv) Hardy-Weinberg equilibrium of a population is expressed as  $p^2 + 2pq + q^2 = 1$ . What are denoted by p and  $p^2$  in this equation?

p .....

$p^2$  .....

(v) In a population of about 100,000 persons, a recessive trait is expressed by about 4,000. If this population is at Hardy-Weinberg equilibrium, about how many persons are heterozygous for that character?

.....

(B) (i) State the significance of RNA polymerase in DNA synthesis.

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

(ii) Name two final products of genes other than polypeptides.

.....

(iii) What is the source of genetic variation?

.....

(iv) What are the information expected from a restriction map?

.....  
.....

(v) (a) Give two applications of DNA fingerprinting.

.....

.....

(b) Name the DNA delivery system specifically used in plant genetic engineering.

.....



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(C) (i) What is meant by habitat in environmental biology?

.....

(ii) (a) State the three types of interactions that occur in an ecosystem when abiotic and biotic components are considered and give one example for each of them.

Type of interaction

Example

.....

.....

.....

.....

.....

.....

(b) What is ecosystem diversity?

.....

.....

(iii) (a) What is a flagship species?

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.....

(b) Name a flagship species in Sri Lanka.

.....

(iv) State the environmental problems that occur due to open dumping of solid waste.

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(v) Briefly explain what a sanitary landfill is.

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இலங்கைப் பரீட்சைத் திணைக்களம்  
Department of Examinations, Sri Lanka

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2019 අගෝස්තු  
கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2019 ஓகஸ்ட்  
General Certificate of Education (Adv. Level) Examination, August 2019

ඡේ විද්‍යාව II  
உயிரியல் II  
Biology II

09 E II

Part B - Essay

Instructions:

- \* Answer **four** questions only.
- Give clear labelled diagrams where necessary.
- (Each question carries 150 marks.)

5. (a) Briefly describe the general characteristics of enzymes.  
(b) (i) Explain how pH and temperature affect the rate of enzymatic reactions.  
(ii) Explain the action of competitive and non-competitive inhibitors in enzymatic reactions.
6. (a) Describe the histological structure of a typical dicotyledonous leaf as observed in a transverse section and state the functions of different structures seen.  
(b) Describe the mechanism of phloem translocation.
7. (a) Describe the mechanism of ventilation of lungs in man.  
(b) Explain how breathing of man is homeostatically controlled.
8. (a) Briefly describe the significance of polyploids in agriculture.  
(b) Discuss possible environmental issues that may occur due to genetically modified organisms used in agriculture.
9. (a) Describe the characteristic features of inland wetland ecosystems of Sri Lanka.  
(b) Explain the effects of discharging wastewater into natural water sources.
10. Write short notes on the following.
  - (a) Theory of natural selection
  - (b) Energy budget of animals
  - (c) Fetal membranes

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