නව නිර්දේශය/புதிய பாடத்திட்டம்/New Syllabus

NEW ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව 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 ஓகஸ்ற்
General Certificate of Education (Adv. Level) Examination, August 2019

ජීව විද්‍යාව I
உயிரியல் I
Biology I

09 E I

05.08.2019/1300-1500

පැය දෙකයි
இரண்டு மணித்தியாலம்
Two hours

Instructions:

* *Answer* ***all*** *questions.*
* *Write your* ***Index Number*** *in the space provided in the answer sheet.*
* *Instructions are given on the back of the answer sheet. Follow them carefully.*
* *In each of the questions from* **1** *to* **50**, *pick one of the alternatives from* (1), (2), (3), (4), (5) *which is* ***correct*** *or* ***most appropriate*** *and* ***mark your response on the answer sheet with a cross*** (×) *on the number of the correct option in accordance with the instructions given on the back of the answer sheet.*

1. Basic structural and functional unit of life is
(1) macromolecule. (2) organelle. (3) cell.
(4) tissue. (5) organ.

2. Some nucleotides
(1) contain hexose sugars.
(2) act as organic cofactors.
(3) serve as enzymes.
(4) act as oxygen carriers.
(5) serve as food reserves.

3. Which of the following statements regarding microscopes is correct?
(1) In a light microscope, visible light is passed through the objective lens and then through the specimen.
(2) Projection of a light beam through a vacuum is the principle of an electron microscope.
(3) Scanning electron microscope is used to study the internal structure of cells.
(4) Transmission electron microscope is used for detail studies of living specimens.
(5) Magnification and resolution power are important properties of all microscopes.

4. In the cytoskeleton,
(1) microtubules are formed by actin.
(2) keratin is not present.
(3) microtubules are involved in the movement of organelles.
(4) microfilaments are involved in the movement of chromosomes during cell division.
(5) intermediate filaments provide channels to secrete materials from the cell.

5. In the cell cycle,
(1) DNA synthesis takes place during G1 phase.
(2) protein synthesis occurs during G2 phase.
(3) formation of spindle begins during metaphase.
(4) condensation of chromatin fibres takes place during S phase.
(5) division of the cytoplasm occurs during anaphase.

[See page two

6. Which of the following statements regarding chlorophyll is correct?
   (1) Chlorophyll absorbs violet, blue and red light.
   (2) Chlorophyll-b is the main light capturing pigment in plants.
   (3) Chlorophyll-a is most efficient for capturing green light.
   (4) Chlorophyll-a is involved in absorption and dissipation of excessive light energy.
   (5) In photosystem-I, chlorophyll-a absorbs light at 680 nm wavelength.

7. A compound formed during ethyl alcohol fermentation, lactic acid fermentation and aerobic respiration is
   (1) oxaloacetate. (2) citrate. (3) acetaldehyde.
   (4) acetyl CoA. (5) pyruvate.

8. During the evolution of organisms, coelom was first developed in
   (1) Annelida. (2) Arthropoda. (3) Mollusca.
   (4) Echinodermata. (5) Chordata.

9. Which of the following structures can be seen in annelids as well as in arthropods?
   (1) Clitellum (2) Parapodia
   (3) Ventral nerve cord (4) Capillaries
   (5) Chitinous exoskeleton

10. Which of the following plants is evolutionarily closest to *Marchantia*?
   (1) *Anthoceros* (2) *Selaginella* (3) *Gnetum*
   (4) *Pogonatum* (5) *Nephrolepis*

11. In dicotyledonous plants
   (1) stamens produce megaspores that develop into pollen grains.
   (2) pollen grain has two openings.
   (3) seeds are present within carpels.
   (4) perianth may be present.
   (5) vascular bundles in the stem are scattered.

12. Which of the following statements regarding the epidermis of plants is correct?
   (1) It usually consists of several layers of cells.
   (2) It is a permanent tissue.
   (3) Root hairs are multicellular projections of epidermal cells.
   (4) Trichomes are specialized epidermal cells.
   (5) Deposition of suberin in epidermal cells prevents water loss.

13. Select the correct statement regarding the adaptations of plants for efficient photosynthesis.
   (1) Plants are branched in a pattern that is suitable to absorb the maximum amount of carbon dioxide from atmosphere.
   (2) Large leaves are present in plants growing in dry environments to maximize light capture.
   (3) Leaves of some plants are arranged almost vertically to get the maximum amount of light.
   (4) Leaves of some plants are arranged horizontally to avoid damage by over intense light.
   (5) Plants grow tall to avoid shading by neighbouring plants.

14. During the opening of stomata
   (1) sodium ions are actively transported into guard cells.
   (2) turgor pressure of guard cells reduces.
   (3) carbon dioxide content in the substomatal cavity increases.
   (4) water potential in guard cells decreases.
   (5) potassium ions are passively transported into guard cells.

[*See page three*

15. Select the correct statement regarding nutritional requirements of plants.
(1) Iron is a macronutrient required by plants.
(2) Deficiency of sulphur can be identified by chlorosis of older leaves.
(3) Magnesium is a component of carotenoids.
(4) Deficiency of nitrogen causes chlorosis mainly in young leaves.
(5) Molybdenum is required for nitrogen metabolism.

16. A feature seen in the sexual reproduction of all land plants is
(1) non-requirement of external water for fertilization.
(2) internal fertilization.
(3) reduced gametophyte.
(4) production of two types of spores.
(5) having two types of sporophytes.

17. Which of the following statements regarding the responses of plants to light is correct?
(1) There are two major classes of photoreceptors in plants.
(2) Blue light photoreceptors regulate seed germination.
(3) Exposure to direct sunlight stimulates vertical growth.
(4) Green and red are the most important colours of light for regulating photomorphogenesis.
(5) Positive phototropism occurs due to faster elongation of cells in the brighter side of the shoot.

18. The connective tissue that does **not** contain fibres under normal conditions is
(1) areolar tissue. (2) adipose tissue. (3) blood.
(4) cartilage. (5) bone.

19. Select the response with the correct example for different types of feeders seen among animals.

	Type of feeders	**Example**
(1)	Substrate feeders	Oysters
(2)	Fluid feeders	Maggots
(3)	Filter feeders	Clams
(4)	Substrate feeders	Aphids
(5)	Bulk feeders	Humming birds

20. Which of the following statements regarding the digestion of nucleic acids in food in man is correct?
(1) It starts in the stomach.
(2) DNA is broken down to nucleotides by nucleotidase.
(3) Nucleosidase is involved in the digestion of nitrogenous bases.
(4) RNA is broken down to nucleotides by pancreatic nuclease.
(5) Intestinal nucleotidase acts on nitrogenous bases.

21. Which of the following may be a consequence of hypotension?
(1) Unconsciousness (2) Kidney damage
(3) Internal haemorrhage (4) Increase in heart beat
(5) Stroke

22. The cells that mediate internal defences in innate immunity in man are
(1) T cells and B cells.
(2) T cells and phagocytes.
(3) B cells and phagocytes.
(4) natural killer cells and T cells.
(5) natural killer cells and phagocytes.

[See page four

23. Which of the following responses correctly indicates the main nitrogenous excretory product of the given animal group?

	Animal group	**Main nitrogenous excretory product**
(1)	Mammals	Uric acid
(2)	Birds	Urea
(3)	Frogs	Uric acid
(4)	Sharks	Urea
(5)	Insects	Ammonia

24. In humans, voluntary muscular movements are coordinated by

(1) thalamus. (2) pons Varolii. (3) mid-brain.
(4) medulla oblongata. (5) cerebellum.

25. Which of the following is the correct pathway of light and nerve impulses for the vision of humans?

(1) cornea → aqueous humour → lens → vitreous humour → photoreceptors → ganglion cells → bipolar cells → optic nerve → occipital lobe of cerebrum
(2) cornea → aqueous humour → lens → vitreous humour → photoreceptors → ganglion cells → bipolar cells → optic nerve → temporal lobe of cerebrum
(3) cornea → aqueous humour → lens → vitreous humour → photoreceptors → bipolar cells → ganglion cells → optic nerve → occipital lobe of cerebrum
(4) cornea → vitreous humour → lens → aqueous humour → photoreceptors → bipolar cells → ganglion cells → optic nerve → occipital lobe of cerebrum
(5) cornea → vitreous humour → lens → aqueous humour → photoreceptors → bipolar cells → ganglion cells → optic nerve → temporal lobe of cerebrum

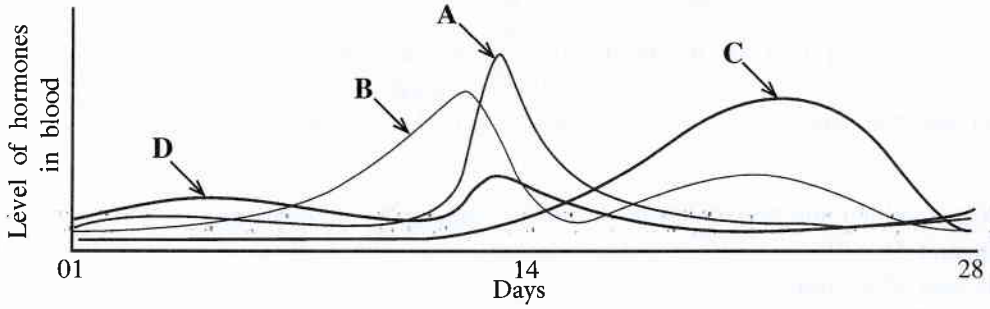
26. In which of the following responses, the hormone and its main function are correctly matched?

(1) Melatonin - Regulating biological rhythms
(2) Thymosin - Regulating innate immunity
(3) Adrenalin - Decreasing the metabolic rate
(4) Oxytocin - Stimulating milk production
(5) Parathyroid hormone - Lowering blood calcium level

27. In spermatogenesis of man, reduction of chromosome number from diploid to haploid occurs during the production of

(1) sperms from spermatids.
(2) spermatids from secondary spermatocytes.
(3) secondary spermatocytes from primary spermatocytes.
(4) spermatogonia from primordial germ cells.
(5) primary spermatocytes from spermatogonia.

28. This question is based on the following figure which shows the levels of hormones secreted by the anterior pituitary and ovary in blood during the normal reproductive cycle of mature human females.



The hormones indicated as A, B, C and D are respectively

(1) FSH, LH, estradiol and progesterone.
(2) LH, progesterone, estradiol and FSH.
(3) estradiol, LH, FSH and progesterone.
(4) LH, estradiol, progesterone and FSH.
(5) FSH, LH, progesterone and estradiol.

[*See page five*

29. Select the correct statement regarding human skeletal system.
(1) Elbow joint formed by humerus, radius and ulna permits only flexion and extension of the fore arm.
(2) Hinge joint formed by femur, fibula and patella permits standing upright for a long time.
(3) Arches of the foot are important in distributing body weight only while standing.
(4) Secondary curvatures in the thoracic and sacral regions of the vertebral column help to maintain erect posture.
(5) A non-inflammatory degenerative disease called osteoporosis causes pain and restricted movement in the affected joints.

30. In man, sickle cell anaemia is an example for
(1) heterozygous dominance. (2) polygenic inheritance. (3) epistasis.
(4) pleiotropy. (5) epigenetics.

31. Which of the following statements regarding the cross Rr × Rr is correct?
(1) The probability of having the allele r in both the egg and sperm at fertilization is ½.
(2) This is a dihybrid cross because two alleles are involved.
(3) According to Mendelian inheritance, the probability of having dominant phenotype in F_2 generation by interbreeding of F_1 is $\frac{9}{16}$.
(4) If 1:2:1 ratio of phenotypes was obtained in F_2 generation by interbreeding of F_1 generation, it may be due to codominance.
(5) R and r are linked.

32. During the gametogenesis of a particular person, a gamete with 24 chromosomes was produced. This gamete was fertilized with a normal gamete and a child was born. Which of the following best explains this process and its result?
(1) Aneuploidy, trisomy, Down syndrome
(2) Polyploidy, trisomy, Klinefelter syndrome
(3) Aneuploidy, monosomy, Down syndrome
(4) Aneuploidy, monosomy, Klinefelter syndrome
(5) Polyploidy, trisomy, Down syndrome

33. During replication of DNA, a cytosine molecule had been added instead of a thymine molecule in a gene. This mutated gene produced a peptide with the same amino acid sequence as the gene before mutation. This is an example for
(1) insertion and nonsense mutation.
(2) substitution and silent mutation.
(3) insertion and silent mutation.
(4) substitution and missense mutation.
(5) insertion and missense mutation.

34. DNA polymerase obtained from thermophilic bacteria is used for PCR because
(1) they contain more DNA polymerase than other organisms.
(2) that DNA polymerase does not have proofreading ability.
(3) that DNA polymerase is stable at high temperatures required for separation of DNA strands in the laboratory.
(4) it is the only DNA polymerase which can copy DNA in the laboratory.
(5) that DNA polymerase does not need a primer to initiate DNA synthesis.

35. A DNA fragment can be inserted in to a plasmid vector if that fragment has
(1) a nucleotide sequence identical to that of the vector.
(2) been cut by the same restriction enzyme which had been used to cut the vector.
(3) originated from the same cell type as of the vector.
(4) the same length as that of the vector.
(5) at least one origin of replication (Ori).

[*See page six*

36. Dry patana grasslands in Sri Lanka are found in
(1) intermediate and wet zones. (2) dry and intermediate zones.
(3) dry and arid zones. (4) dry, intermediate and wet zones.
(5) arid, dry and intermediate zones.

37. Which of the following is **not** an environmental service value of biodiversity?
(1) Regulating climate
(2) Recharging ground water
(3) Water purification
(4) Helping disaster management
(5) Prevention of soil erosion

38. Which of the following does **not** contribute to global warming?
(1) Depletion of ozone layer (2) Cattle farming
(3) Ozone in the lower atmosphere (4) Growth of phytoplankton
(5) Water vapour in the atmosphere

39. Which of the following statements is correct regarding the culture media used to grow microbes in the laboratory?
(1) Agar in culture media provides the suitable pH range for the growth of microorganisms.
(2) Glucose is generally used to prepare culture media to grow fungi.
(3) Culture media for bacteria are prepared using potatoes.
(4) Any microorganism can be cultured in a culture medium.
(5) Sodium chloride is usually added to all culture media.

40. Coliform bacteria were detected in a water sample obtained from a river. Drinking untreated water from this river may **not** likely to cause
(1) typhoid. (2) cholera. (3) dysentery.
(4) paratyphoid. (5) tetanus.

● **For each of the questions 41 to 50 one or more of the responses is/are correct. Decide which response/responses is/are correct and then select the correct number.**

If only A, B and D are correct **1**
If only A, C and D are correct **2**
If only A and B are correct **3**
If only C and D are correct **4**
If any other response or combination of responses is correct **5**

Directions summarised				
1	**2**	**3**	**4**	**5**
A, B, D correct.	A, C, D correct.	A, B correct.	C, D correct.	Any other response or combination of responses correct.

41. Which of the following statements regarding energy relations in organisms is/are correct?
(A) In cellular respiration, photophosphorylation and oxidative phosphorylation occur.
(B) During metabolic reactions, ATP oxidises to ADP.
(C) Energy stored in ATP can be converted to electrical energy.
(D) Substrate phosphorylation occurs in Krebs cycle.
(E) All metabolic reactions release energy.

42. Which of the following classes includes/include animals having internal fertilization as well as those having external fertilization?
(A) Osteichthyes (B) Amphibia (C) Reptilia
(D) Chondrichthyes (E) Aves

[See page seven

43. Select the correct statement/statements regarding the respiratory pigments of animals.
(A) Myoglobin is present in bony fishes.
(B) Haemoglobin is present in mollusks.
(C) Chlorocruorin is present in annelids.
(D) Haemerythrin is present in annelids.
(E) Haemocyanin is present in reptiles.

44. Smoking
(A) stimulates the secretion of mucus by goblet cells in the respiratory tract.
(B) causes tuberculosis.
(C) decreases the oxygen transport in blood.
(D) inhibits the action of cilia in the respiratory tract.
(E) reduces heart beat.

45. Which of the following contributes/contribute for the maintenance of resting potential of a neuron?
(A) Unequal distribution of Na^+, K^+, Cl^- and large anions inside and outside the neuron
(B) Active transport of Na^+ out of the neuron and K^+ in to the neuron in 3:2 ratio
(C) Opening of more K^+ channels than Na^+ channels in the neuron membrane
(D) Transport of more Na^+ in to the intracellular fluid of the neuron than K^+
(E) Transport of Cl^- from the neuron to the extracellular fluid

46. Parthenogenesis
(A) produces a complete individual from an unfertilized egg.
(B) produces female honey bees.
(C) can be observed in some lizards.
(D) forms only diploid progeny.
(E) can be seen in all invertebrates.

47. Which of the following combinations is/are correct regarding the skeletons of animals?

	Skeleton	**Example**
(A)	Coelom	Annelids
(B)	Pseudocoelom	Cnidarians
(C)	Calcium carbonate plates	Echinoderms
(D)	Bony plates	Reptiles
(E)	Gastrovascular cavity	Nematodes

48. In which of the following responses, the biomes that are encountered when traveling from the north pole towards equator are given in correct sequence?
(A) Tundra, coniferous forests, temperate grasslands, deserts, tropical forests
(B) Tundra, coniferous forests, temperate broad-leaf forests, chaparral, deserts
(C) Tundra, temperate grasslands, coniferous forests, deserts, tropical forests
(D) Tundra, temperate broad-leaf forests, coniferous forests, tropical forests, deserts
(E) Tundra, coniferous forests, chaparral, temperate grasslands, savanna

49. Select the correct combination/combinations with respect to the use of microbes in industries.

	Product	**Microorganism used in the production**
(A)	Yoghurt	*Lactobacillus bulgaricus*
(B)	Vinegar	*Gluconobacter* sp.
(C)	Citric acid	*Spirulina* sp.
(D)	Lipase	*Rhizopus* sp.
(E)	Vitamin C	*Aspergillus oryzae*

50. Which of the following statements is/are correct regarding spoilage of food?
(A) Saccharolytic microorganisms are responsible for rancidity of food.
(B) Putrefaction occurs mainly due to breakdown of proteins.
(C) Lipolytic microorganisms are responsible for fermentation of food.
(D) Acids are formed during fermentation.
(E) Rancidity occurs due to generation of amines.

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නව නිර්දේශය / புதிய பாடத்திட்டம் / New Syllabus

NEW

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

ජීව විද්‍යාව	II	09 E II
உயிரியல்	II	
Biology	II	

06.08.2019 / 1300 – 1610

පැය තුනයි
மூன்று மணித்தியாலம்
Three hours

අමතර කියවීම් 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	

[see page two

Part A - Structured Essay

*Answer **all** questions on **this paper itself**.*

*(Each question carries **100** marks.)*

Do not write in this column

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?

.....

.....

[see page three

Do not write in this column

(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?

.....

(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.

.....

100

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

.....

.....

.....

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

.....

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[see page four

Do not write in this column

(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.

.....

.....

.....

(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.

.....

[see page five

Do not write in this column

(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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100

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.

.....

.....

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

.....

.....

.....

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

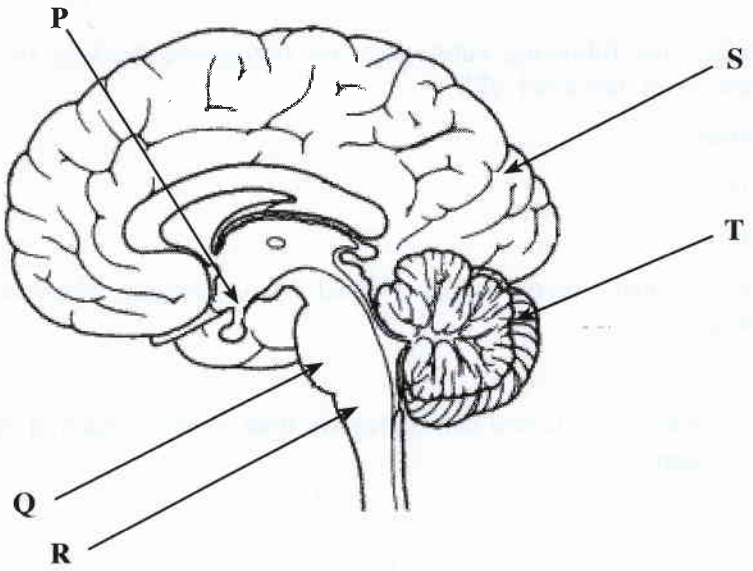
.....

.....

[see page six

Do not write in this column

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



(a) Name the structures labelled 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?

.....

[see page seven

Do not write in this column

(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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[see page eight

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

.....

.....

(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.

.....

[see page nine

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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?

.....

.....

(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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[see page ten

නව නිර්දේශය/புதிய பாடத்திட்டம்/New Syllabus

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

ජීව 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

* * *