සියලු ම හිමිකම් ඇවිරිණි/முழுப் பதிப்புரிமையுடையது/All Rights Reserved]

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

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2021(2022)
கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2021(2022)
General Certificate of Education (Adv. Level) Examination, 2021(2022)

ජීව විද්‍යාව I உயிரியல் I **Biology I**	**09 E I**	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. Which of the following is a non-reducing sugar?
(1) Ribose (2) Lactose (3) Maltose (4) Galactose (5) Sucrose

2. Which of the following statements regarding plasma membrane is correct?
(1) It is mainly composed of carbohydrates, phospholipids and proteins.
(2) Phospholipid molecules are movable and provide a fluid nature to the membrane.
(3) Peripheral proteins are tightly attached to the outer surface of the membrane.
(4) Phospholipid bilayer enables nearby cells to communicate with each other.
(5) Hydrophobic tails of phospholipids attach to cytoskeletal fibers and help to maintain the shape of the cell.

3. Select the correct 'subcellular component - function' combination.
(1) Glyoxysomes - Transport of residue materials out of the cell
(2) Smooth endoplasmic reticulum - Production of transport vesicles
(3) Rough endoplasmic reticulum - Metabolism of carbohydrates
(4) Nucleus - Synthesis of glycoproteins
(5) Peroxisomes - Photorespiration

4. Four events of meiosis are given below.
A - Centrosomes move towards opposite poles forming spindle.
B - Formation of synaptonemal complex
C - Pairs of homologous chromosomes arrange on metaphase plate.
D - Crossing over of chromatids
Which one of the following is the correct sequence of occurrence of above events?
(1) A, B, D, C (2) A, C, B, D (3) B, C, A, D
(4) B, D, A, C (5) B, D, C, A

5. Which of the following statements regarding photosynthetic pigments is correct?
(1) Chlorophylls absorb yellow and blue light and reflect green light.
(2) Chlorophyll b prevents the formation of reactive oxidative molecules.
(3) Chlorophylls and carotenoids are located on the membrane system of thylakoids.
(4) Carotenoids and chlorophyll a absorb light corresponding to the same wave lengths.
(5) According to action spectrum, chlorophyll b is more effective for blue and red light.

[See page two

6. In the light dependant reaction of photosynthesis,
(1) cyclic electron flow occurs in photosystem II.
(2) both linear and cyclic electron flows produce ATP and NADPH.
(3) primary electron acceptor of photosystem I reduces NADP and yields NADPH.
(4) photosystem I gets electrons from splitting of water in the linear electron flow.
(5) excited electrons at primary electron acceptor of photosystem I pass through an electron transport chain to photosystem II.

7. Which of following statements is most important in explaining the Darwin-Wallace theory?
(1) Organisms acquire suitable adaptations according to the needs of the environment during their lifetime.
(2) Adaptations acquired during the lifetime are passed on to the next generation.
(3) Favourable characters are passed to offspring through genetic factors.
(4) Each species produce more offspring than the environment can accommodate.
(5) Adaptations result in changes in genetic material.

8. Three genera with circular chromosomes, histones associated with DNA and several kinds of RNA polymerases are respectively
(1) *Thermococcus*, *Amoeba* and *Methanococcus*.
(2) *Methanococcus*, *Halobacteria* and *Nitrosomonas*.
(3) *Anabaena*, *Salmonella* and *Obelia*.
(4) *Halobacteria*, *Cycas* and *Nostoc*.
(5) *Pseudomonas*, *Anabaena* and *Cycas*.

9. Consider the statements A and B given below.
A - Seedless vascular plants are evolutionarily closer to hornworts than to mosses.
B - Seedless vascular plants bear spores.
Which of the following is correct regarding the above statements?
(1) A is correct and B is incorrect.
(2) A is incorrect and B is correct.
(3) Both A and B are incorrect.
(4) Both A and B are correct and A is supported by B.
(5) Both A and B are correct and A is not supported by B.

10. Four structures present in protists are as follows:
A - Multicellular thallus
B - Contractile vacuole
C - Pellicle
D - Cell wall
Organisms having A, B, C and D are respectively
(1) *Sargassum*, diatoms, *Amoeba* and *Ulva*.
(2) *Ulva*, *Euglena*, *Paramecium* and *Gelidium*.
(3) *Gelidium*, *Amoeba*, *Ulva* and diatoms.
(4) *Sargassum*, *Paramecium*, *Amoeba* and *Gelidium*.
(5) *Ulva*, *Euglena*, *Sargassum* and diatoms.

11. Which of the following indicate two features found in the organisms of the same phylum?
A : Heart absent; endoskeleton present.
B : Heart absent; jointed legs present.
C : Anus absent; tentacles present around the mouth.
D : Anus absent; show asexual reproduction.
(1) A and B only. (2) A and C only. (3) A and D only.
(4) A, B and C only. (5) A, C and D only.

[*See page three*

12. Which of the following statements regarding companion cells is correct?
(1) They are dead at maturity.
(2) They help in phloem unloading.
(3) They connect with adjacent cells by desmosomes.
(4) They are present alongside each sieve tube element in gymnosperms and angiosperms.
(5) Their cytoplasm is reduced and present as a thin layer close to the cell wall.

13. Select the correct statement regarding plant leaves.
(1) Leaves are vertically arranged in some plants to capture light efficiently in low light conditions.
(2) In monocot leaves, chloroplasts are more abundant in palisade mesophyll cells than in spongy mesophyll cells.
(3) Angiosperms can be identified due to net-like venation of leaves.
(4) Arrangement of leaves on the stem is called leaf orientation.
(5) Plants inhabiting very cold environments bear smallest leaves.

14. Some events that occur at the source during phloem translocation of angiosperms according to pressure flow hypothesis are as follows.
A : Flow of water into sieve tube from xylem
B : Generation of positive pressure inside the sieve tube
C : Reduction of water potential inside the sieve tube
Correct sequence of the above events is
(1) A, B and C. (2) A, C and B. (3) B, A and C.
(4) B, C and A. (5) C, A and B.

15. Atmospheric air is the only source for which of the following elements required by plants?
(1) Chlorine (2) Nitrogen (3) Hydrogen (4) Oxygen (5) Carbon

16. Some characteristics of two species of plants are given below.
Species A : Sporophyte is dominant; gametophyte is reduced; sporophyte and gametophyte are photosynthetic and independent.
Species B : Sporophyte is dominant and photosynthetic; gametophyte is reduced and partially dependent on sporophyte.
Species A and B are respectively
(1) *Nephrolepis* sp. and *Selaginella* sp.
(2) *Pogonatum* sp. and *Nephrolepis* sp.
(3) *Selaginella* sp. and *Cycas* sp.
(4) *Selaginella* sp. and *Nephrolepis* sp.
(5) *Nephrolepis* sp. and *Cycas* sp.

17. Release of which of the following hormones in plants is stimulated by water deficit?
(1) Auxins (2) Gibberellins (3) Abscisic acid
(4) Cytokinins (5) Ethylene

18. Which of the following 'tissue - location' combinations is correct regarding the human body?

	Tissue	**Location**
(1)	Loose connective tissue	Tendons
(2)	Adipose tissue	Lining of the mouth
(3)	Stratified squamous epithelium	Anus
(4)	Simple cuboidal epithelium	Intestine
(5)	Pseudostratified epithelium	Kidney tubules

19. In which of the following, will the release of (i) result in the stimulation of (ii)?
A : (i) Gastrin (ii) Production of gastric juice
B : (i) Cholecystokinin (ii) Secretion of gastric juice
C : (i) Secretin (ii) Release of bicarbonate ions from pancreas
(1) In A only. (2) In C only. (3) In A and B only.
(4) In A and C only. (5) In B and C only.

[*See page four*

20. Which of the following is most likely to happen if tricuspid valve of the human heart does not close properly?
(1) Right atrium will not completely empty during atrial systole.
(2) Left atrium will not completely empty during atrial systole.
(3) Amount of blood that flows into right atrium will be reduced.
(4) Amount of blood that flows into lungs will be reduced.
(5) Some amount of blood will flow into left atrium from left ventricle during ventricular systole.

21. In which of the following, is (ii) caused by (i) during the homeostatic control of breathing of man?
A : (i) Carbon dioxide level in tissues increases.
(ii) Blood pH decreases.
B : (i) Medulla oblongata detects decreasing pH of cerebrospinal fluid.
(ii) Depth of ventilation of lungs decreases.
C : (i) Sensors in aorta detects high concentration of carbon dioxide in blood.
(ii) Medulla oblongata receives signals from aorta.
(1) In A only. (2) In A and B only. (3) In A and C only.
(4) In B and C only. (5) In A, B and C.

22. B lymphocytes of humans
(1) complete the development in thymus.
(2) are mainly responsible for cell mediated immunity.
(3) are not involved in naturally acquired active immunity.
(4) can differentiate into natural killer cells and helper cells.
(5) contain antigen receptors on plasma membrane.

23. Excretory structures of crustaceans, annelids and flat worms are respectively
(1) green glands, body surface and flame cells.
(2) salt glands, body surface and nephridia.
(3) green glands, nephridia and body surface.
(4) salt glands, flame cells and nephridia.
(5) green glands, nephridia and flame cells.

24. Select the correct statement regarding human brain.
(1) Brain stem is developed from embryonic mid brain and hind brain.
(2) Frontal lobes of the cerebral cortex contain visual sensory areas.
(3) Mid brain contains the fourth ventricle of the brain.
(4) Corpus callosum connects the two hemispheres of the cerebellum.
(5) Thalamus regulates the sleep and awake cycles.

25. Events that occur after the membrane potential of a neuron is changed above the threshold value are given below.
A : K^+ channels open and K^+ outflow.
B : Na^+ channels open and Na^+ inflow.
C : Membrane becomes repolarized.
D : Membrane becomes depolarized.
Select the correct sequence of above events.
(1) A, D, B, C (2) B, C, A, D (3) B, D, A, C (4) C, A, D, B (5) D, B, C, A

26. Select the response with the correct match of the hormone and its main function.
(1) Adrenalin – mediates long term stress responses
(2) Prolactin – stimulates milk ejection
(3) Melatonin – regulates innate immunity
(4) Thyroxin – increases metabolic rate
(5) LH – stimulates spermatogenesis

[*See page five*

27. In women, meiotic division of the secondary oocyte released at ovulation is arrested at
(1) prophase I. (2) metaphase I. (3) prophase II. (4) metaphase II. (5) anaphase I.

28. In human development, amnion
(1) produces hCG.
(2) becomes the main fetal portion of placenta.
(3) protects the fetus from mother's immune responses.
(4) entirely surrounds the embryo.
(5) serves as the source of primodial germ cells in the developing gonads of the fetus.

29. After birth, anteriorly convex curvatures of the vertebral column of humans are developed in the
(1) thoracic and sacral regions. (2) thoracic and lumbar regions.
(3) cervical and lumbar regions. (4) cervical and sacral regions.
(5) lumbar and sacral regions.

30. Select the correct statement regarding human skeleton.
(1) Articulation of axis vertebra with the occipital bone permits nodding movements of the head.
(2) All carpel bones in the upper limb contribute to form the wrist joint.
(3) Osteoarthritis is a condition associated with reduction in bone density.
(4) Patella articulates with the lower end of femur.
(5) Maxilla is the only movable bone in the skull.

31. Certain plants of a particular species bear purple flowers while other plants of the same species bear white flowers. To explain the inheritance of the flower colour of this plant species
(1) a monohybrid cross is sufficient.
(2) a dihybrid cross is sufficient.
(3) a monohybrid cross and a dihybrid cross are necessary.
(4) knowledge of incomplete dominance is necessary.
(5) knowledge of gene linkage is necessary.

32. Non coding sequences and DNA segments without any identified function in the chromosomes of eukaryotes are respectively
(1) heterochromatin and introns.
(2) introns and intergenic DNA.
(3) heterochromatin and intergenic DNA.
(4) euchromatin and introns.
(5) euchromatin and intergenic DNA.

33. Select the correct statement regarding the synthesis of polypeptides.
(1) Except for having U in mRNA instead of T in DNA, the base sequences of DNA template and its mRNA molecule are similar.
(2) An mRNA molecule of a prokaryote cannot code a polypeptide in an eukaryote.
(3) Start codon of an mRNA molecule is AUG and it provides the code for methionine.
(4) There are 64 codons and 62 of them provide codes for amino acids.
(5) The first triplet of bases in a tRNA molecule is AUG.

34. Restriction maps are mostly important in
(1) identifying multiple copies of genes in a genome.
(2) determining evolutionary relationships of different species.
(3) constructing cloning vectors.
(4) diagnosing cancers.
(5) paternity testing.

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35. Three animals that live in tundra are
(1) caribou, wolf and bear. (2) siberian tiger, fox and brown bear.
(3) reindeer, tiger and moose. (4) reindeer, siberian tiger and bear.
(5) musk oxen, fox and moose.

[*See page six*

36. Select the response that indicates a relict species and a species endemic to Sri Lanka respectively.
(1) *Acanthus ilicifolius* and *Dipterocarpus zeylanicus*
(2) *Panicum maximum* and *Garcinia quaesita*
(3) *Ichthyophis* sp. and *Salacia reticulata*
(4) *Crudia zeylanica* and *Puntius nigrofasciatus*
(5) *Lingula* sp. and *Loris tardigradus*

37. Three gases that contribute to acid rain, global warming and ozone layer depletion are respectively
(1) carbon dioxide, perfluorocarbon and helene.
(2) sulphur dioxide, hydrofluorocarbon and methyl bromide (MeBr).
(3) nitrous oxide, methane and carbon monoxide.
(4) nitric oxide, helene and chlorofluorocarbon.
(5) nitrogen dioxide, sulphur hexafluoride and methane.

38. Which of the following antibiotics inhibits the synthesis of DNA/RNA in bacteria?
(1) Rifampin (2) Daptomycin (3) Penicillin (4) Erythromycin (5) Tetracycline

39. Which of the following statements regarding microorganisms is correct?
(1) Pathogenic fungi in a rhizosphere obtain nutrients from compounds exuded from plant roots.
(2) Some bacteria secrete alkaline compounds that contribute to release of phosphorus to soil solution.
(3) Actinomycetes carry out composting more efficiently under anaerobic conditions.
(4) Rhizobia form symbiotic associations with both leguminous plants and *Azolla*.
(5) Vitamin C can be produced by *Azotobacter* spp.

40. Which of the following is a step in the primary treatment of purification of industrial waste water?
(1) Spraying over a bed of rocky material
(2) Removal of oil and grease
(3) Mechanical aeration
(4) Anaerobic decomposition
(5) Disinfection

- **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 is/are common to both ethyl alcohol fermentation and lactic acid fermentation?
(A) One molecule of glucose is converted to two molecules of pyruvate.
(B) Two molecules of ATP and two molecules of NADH are released.
(C) NADH is used to reduce acetaldehyde.
(D) Final hydrogen acceptor is an organic compound.
(E) One molecule of carbon dioxide is released.

42. During the primary growth of roots,
(A) root apical meristem produces new cells to both sides.
(B) the cells produced outward by the root apical meristem form root cap.
(C) vascular tissues are produced by vascular cambium.
(D) some cells produced outward by the root apical meristem elongate and push the root through soil.
(E) epidermis splits due to being pushed outward.

[*See page seven*

43. Which of the following statements is/are correct regarding blood circulation of vertebrates?
(A) Animals with single circulation do not have lungs.
(B) In single circulation, blood flows from respiratory organs to other organs under a reduced pressure.
(C) Animals with single circulation have two or three chambers in the heart.
(D) In double circulation, blood flows through lungs twice during a complete circulation through the body.
(E) Myoglobin is not present in the muscles of animals having a single circulation.

44. Sensory receptors
(A) are connected with the nervous system.
(B) include specialized glands designed to receive specific stimuli.
(C) show sensory adaptation.
(D) can amplify the sensory signal.
(E) detect the stimuli that arise only in the external environment.

45. Leydig cells
(A) secrete testosterone.
(B) produce the fluid required for transport of sperm.
(C) nourish the cells in different stages of spermatogenesis.
(D) are located in the connective tissue among seminiferous tubules.
(E) provide attachment for cells in different stages of spermatogenesis.

46. Which of the following could be the reason/reasons for cystic fibrosis?
(A) Y-linked inheritance
(B) X-linked recessive inheritance
(C) Pleiotropy
(D) Autosomal recessive inheritance
(E) Autosomal dominant inheritance

47. Which of the following ecological pyramids could be inverted?
(A) Pyramid of biomass in a forest
(B) Pyramid of numbers in the ocean
(C) Pyramid of biomass in the ocean
(D) Pyramid of numbers in a parasitic system
(E) Pyramid of biomass in a parasitic system

48. Select the response/responses with the correct match of feature and example of microorganisms.
(A) Icosahedron symmetry – Adeno virus
(B) Obligate aerobic respiration – *Clostridium* sp.
(C) Reproduce in leaf hoppers and plants – Phytoplasma
(D) Reproduce by budding and binary fission – Mycoplasma
(E) Photoheterotrophic nutrition – Purple sulphur bacteria

49. Stem cells
(A) can give rise to cells of the same type.
(B) can divide without a limit.
(C) are of three types.
(D) are undifferentiated cells.
(E) divide rapidly.

50. Which of the following could be used to control dengue vector as well as filaria vector?
(A) Construction of buildings without roof gutters
(B) Mosquito proofing of domestic wells
(C) Preventing creation of vector breeding sites
(D) Use of fish that feed on mosquito larvae
(E) Repairing broken septic tanks

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සියලු ම හිමිකම් ඇවිරිණි/முழுப் பதிப்புரிமையுடையது/All Rights Reserved]

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இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரீட்சைத் திணைக்களம்
Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2021(2022)
கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2021(2022)
General Certificate of Education (Adv. Level) Examination, 2021(2022)

ජීව විද්‍යාව	II	09 E II
உயிரியல்	II	
Biology	**II**	

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 you will answer and decide which of them you will prioritise.

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.*

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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) About how many years ago did life originate on earth?

.....

(ii) Metabolism, growth and development are some characteristics of organisms. What is meant by each of them?

(a) Metabolism : .....

.....

(b) Growth : .....

.....

(c) Development : .....

.....

(iii) (a) State the **three** main methods by which food production can be sustainably maintained.

.....

.....

.....

(b) What mainly contributes for overuse of natural resources of earth?

.....

(iv) In which geological eon, did the concentration of oxygen in earth's atmosphere start to increase?

.....

(v) Name the eras in which each of the following took place.

(a) Colonization of land by plants : .....

(b) Dominance of gymnosperms : .....

(c) Appearance of first seed plants : .....

(B) (i) What is known as classification of organisms?

.....

.....

(ii) What are the important criteria used in modern systematics?

.....

.....

.....

.....

.....

.....

[*see page three*

Do not write in this column

(iii) State **four** structural features that can be seen only in arthropods.

.....

.....

.....

.....

(iv) State **three** structural features unique to class Mammalia.

.....

.....

.....

(v) What is the main physiological feature common to birds and mammals?

.....

(C) (i) State the phylum of seedless plants that has a more recent common ancestor with seed plants and name a genus that belongs to this phylum.

(a) Phylum : .....

(b) Genus : .....

(ii) State **two** features of microphylls that can be used to distinguish them from megaphylls.

.....

.....

(iii) State a structure common to sporophytes of bryophytes and angiosperms other than sub cellular components, cells, stems and leaves.

.....

(iv) What is the structural feature used to divide plants into two major groups?

.....

(v) State the cell wall composition of organisms belonging to each of the following domains.

(a) Bacteria : .....

(b) Archaea : .....

(c) Eukarya : .....

.....

100

2. (A) (i) (a) What is the property of water that helps in transporting dissolved minerals through vascular tissues in plants?

.....

(b) Name a protein that has a defensive role in man.

.....

(c) Name the monomer of a polysaccharide, which is a component of the fungal cell wall.

.....

(ii) State an event that occurs in mitosis and meiosis II, but does **not** occur in meiosis I of the eukaryotic cell cycle.

.....

[*see page four*

Do not write in this column

(iii) (a) State where CO_2 is first fixed in C4 plants.

.....

(b) Give **two** reasons for PEP carboxylase enzyme in C4 pathway of photosynthesis being more efficient than RuBP carboxylase enzyme in C3 pathway.

.....

.....

.....

.....

(iv) (a) What is known as secondary growth in plants?

.....

.....

.....

(b) State **two** factors that are responsible for opening of stomata other than light.

.....

.....

(c) What is the special feature of soil in which *Nepenthes* is grown?

.....

(v) (a) What happens to the triploid nucleus formed after double fertilization in angiosperms?

.....

(b) State the specific location of statoliths in plants.

.....

(B) (i) (a) State the protein-carbohydrate complex found in the matrix of cartilage tissue and name the type of cells that secretes it.

Protein-carbohydrate complex : .....

Type of cells : .....

(b) State a major function of cartilage tissue other than providing support.

.....

(ii) What is known as each of the following?

(a) Protein sparing : .....

.....

(b) Non-essential fatty acids : .....

.....

(c) Balanced diet : .....

.....

(iii) Name **two** non-essential amino acids.

.....

[*see page five*

Do not write in this column

(iv) What is the normal value of each of the following in a healthy adult person?

(a) Blood pH : .....

(b) Life span of erythrocytes : .....

(c) Blood pressure at rest : .....

(v) What is known by each of the following?

(a) Cardiac cycle : .....

.....

(b) Hypertension : .....

.....

(C) (i) (a) What is known as anatomical dead space?

.....

.....

.....

(b) What is the volume of the anatomical dead space of a normal healthy adult person?

.....

(ii) State how the coordination through nervous system is faster when compared with coordination through the endocrine system.

.....

.....

.....

.....

(iii) (a) Name the **three** major functional areas of the cerebral cortex of man.

.....

(b) State **two** differences between sympathetic and parasympathetic divisions of the autonomic nervous system.

Sympathetic division	**Parasympathetic division**
.....	.....
.....	.....
.....	.....
.....	.....

(iv) Name the disease that causes severe mental deterioration characterized by confusion and memory loss in man.

.....

(v) (a) State an advantage of binocular vision.

.....

(b) What is the function of the Eustachian tube?

.....

.....

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[see page six

Do not write in this column

3. (A) (i) Name a phylum that contains animals with hydrostatic skeleton.

.....

(ii) (a) State **one** function of each of the following in the human skull.

Fontanelles : .....

.....

Sutures : .....

(b) Which human vertebrae contain a foramen in each transverse process?

.....

(c) Give **two** examples for hinge joints found in the human lower limb.

.....

(iii) Name a group of animals which possesses salt glands for excretion.

.....

(iv) (a) Name **two** substances that are secreted by the distal convoluted tubule of human nephron.

.....

(b) State the **two** sites of action of ADH in the human kidney.

.....

.....

(v) State the roles of helper T cells in immunity.

.....

.....

.....

.....

(B) (i) What is the reason for developing Type I diabetes in man?

.....

.....

(ii) Construct a flow chart to show the feedback mechanism related to the action of oxytocin on mammary glands of humans.

(iii) State **two** advantages of asexual reproduction seen among invertebrates.

.....

.....

[*see page seven*

Do not write in this column

(iv) (a) Write in correct sequence, the entire process of production of sperm in man starting from spermatogonial stem cells.

.....

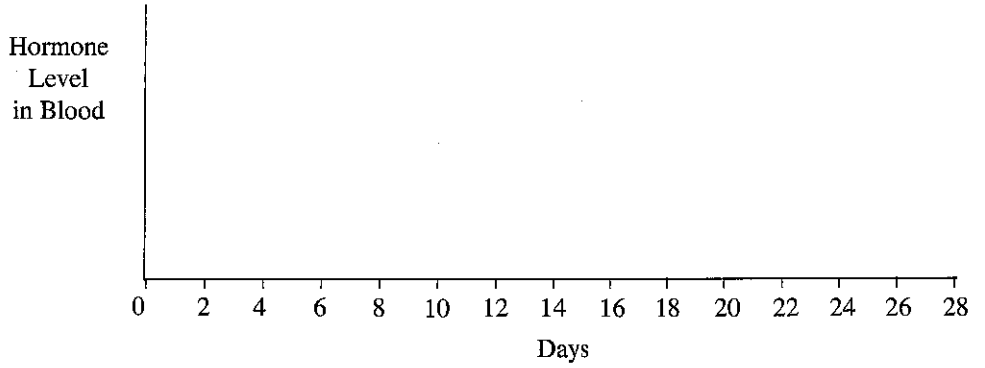
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(b) From which portion of the blastocyst, does the fetal portion of placenta develop in humans?

.....

(v) (a) Indicate below, how the levels of ovarian hormones in the blood are changed during the typical 28 days reproductive cycle of a mature woman.



(b) State the actions of Depo-Provera injection in human females.

.....

.....

.....

.....

(C) (i) (a) What are known as microaerophilic organisms?

.....

.....

(b) Name a microaerophilic bacterial species.

.....

(ii) Why do heterocysts have thick walls?

.....

.....

(iii) (a) State **two** methods where dry heat is used for sterilization of materials in a microbiological laboratory.

.....

.....

(b) State **two** methods of disinfection used in drinking water treatment.

.....

.....

(iv) Name a fungal species and a bacterial species that cause food intoxication.

Fungal species : .....

Bacterial species : .....

[*see page eight*

Do not write in this column

(v) (a) State **two** differences between sub-unit vaccines and live attenuated vaccines.

.....

.....

.....

.....

(b) State in correct sequence, the **two** steps in the production of vinegar using fruit juice and name **one** species of microorganisms used in each of these steps.

	Step	**Microorganism species**
(1)	.....	.....
(2)	.....	.....

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4. (A) (i) What are the **two** types of signals that are responsible for epigenetics?

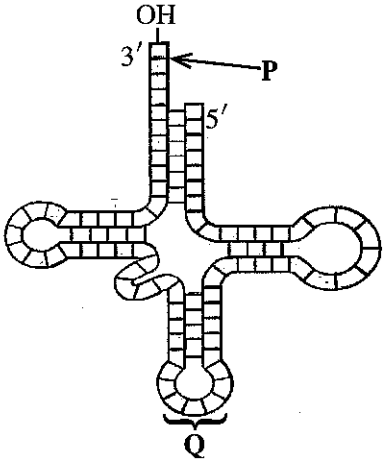
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.....

(ii) State a major function of signal peptides present in certain polypeptides.

.....

(iii) Identify the molecule given in the diagram and name the parts labelled as **P** and **Q**.



Molecule : .....

P : .....

Q : .....

(iv) What is the property of the genetic code that allows a gene isolated from one organism expressing the same polypeptide when inserted into another organism?

.....

(v) State **two** methods used to introduce a foreign DNA molecule into a plant cell.

.....

.....

(B) (i) Name the **three** biomes that are located closest to the equator.

.....

(ii) (a) State the **two** dominant vegetation types in villus.

.....

(b) State **two** locations in Sri Lanka where villus are common.

.....

[*see page nine*

Do not write in this column

(iii) What is meant by each of the following?

(a) Population : .....

.....

.....

(b) Trophic level : .....

(c) Food chain : .....

.....

.....

(iv) (a) Name **two** invasive alien plants found in the reservoirs of Sri Lanka.

.....

(b) Name **two** common sea grass genera in Sri Lanka.

.....

(v) Why are coral reefs considered as rain forests of the sea?

.....

.....

(C) (i) State **five** important environmental services provided by biodiversity.

.....

.....

.....

.....

.....

(ii) State **five** human activities that contribute to desertification.

.....

.....

.....

.....

.....

(iii) (a) Many legislations and policies are formulated by the Sri Lankan government for environmental conservation. What is meant by a legislation and a policy?

Legislation : .....

.....

Policy : .....

.....

(b) State a key legislation available in Sri Lanka for environmental conservation.

.....

(iv) State the main concept on which tissue culture is based.

.....

(v) How does addition of sugar preserve food?

.....

100

* *

[see page ten

සියලු ම හිමිකම් ඇවිරිණි / முழுப் பதிப்புரிமையுடையது / All Rights Reserved]

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இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரீட்சைத் திணைக்களம்
Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka
ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
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අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2021(2022)
கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2021(2022)
General Certificate of Education (Adv. Level) Examination, 2021(2022)

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) Describe the components of nucleotides and explain how nucleotides form the backbone of DNA.

(b) Describe the structure of DNA molecule according to Watson and Crick model.

6. Briefly describe the structure and functions of ground tissue in plants.

7. (a) Describe the structure of human pancreas.

(b) Explain the role of human pancreas in digestion of food.

8. Discuss the innate immunity of the human body against pathogen invasions.

9. (a) Write an account of the essential features of a cloning vector.

(b) Briefly describe the chemical changes that take place in food during spoilage due to microbial activity.

10. Write short notes on the following.

(a) Rules of nomenclature

(b) Hardy-Weinberg equilibrium and evolution

(c) General characteristics of a culturable fish species

* * *