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

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

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2023 (2024)
கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2023 (2024)
General Certificate of Education (Adv. Level) Examination, 2023 (2024)

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. A feature common to lysosomes and peroxisomes is that they
(1) are single membrane bounded vesicles.
(2) transport residual materials by exocytosis.
(3) contain oxidising enzymes that catalyse breakdown of nucleic acids.
(4) are important in photorespiration.
(5) digest worn out organelles.

2. Two characteristics that can be seen only in living organisms are
(1) adaptation and growth.
(2) movement and irritability.
(3) change with time and development.
(4) metabolism and heredity.
(5) synthesis and decomposition.

3. Which of the following statements is correct regarding transmission electron microscope?
(1) Specimens are magnified 5×10^6 times.
(2) Less electrons may get displayed in cellular structures with dense staining.
(3) Living specimens cannot be observed.
(4) Three dimensional appearance of the specimens can be observed.
(5) Specimens scatter many electrons whilst others are absorbed.

4. Select the response which correctly indicates the event and phase in the eukaryotic cell cycle.
(1) DNA replication – G_o phase
(2) Synthesis of proteins – G_1 phase
(3) Chromatin formation – G_2 phase
(4) Production of cellular organelles – S phase
(5) Duplication of centrosome – M phase

5. In allosteric regulation of enzymes
(1) regulatory molecules bind reversibly to the active site of enzyme.
(2) regulatory molecules bind to the enzyme via non-covalent interactions.
(3) an activator molecule that binds to a particular sub unit will affect the active site of that sub unit only.
(4) inhibitory molecules affect the function of the enzyme but not the shape.
(5) ATP functions as an allosteric activator.

CamScanner

6. In ethyl alcohol fermentation,
   (1) one molecule of glucose produces one molecule of pyruvate and two molecules of NADH.
   (2) pyruvate is reduced directly to ethanol using NADH.
   (3) one molecule of CO_2 is produced from one molecule of glucose.
   (4) final hydrogen acceptor is an inorganic compound.
   (5) two molecules of ATP are produced from one molecule of glucose.

7. Which of the following statements regarding glycolysis of one molecule of glucose is correct?
   (1) There is a net yield of four ATP molecules.
   (2) Two hydrogen ions are released.
   (3) It partially depends on molecular oxygen.
   (4) Two NADH molecules are formed.
   (5) Part of glycolysis takes place in the outer membrane of mitochondria.

8. Some events that took place during the evolution of organisms are as follows:
   A - Saturation of water bodies with oxygen
   B - Oxidation of Fe^{2+}
   C - Increase in photosynthetic bacterial populations
   D - Origin of cyanobacteria

   The correct sequence of above events are
   (1) A, B, C and D. (2) C, A, B and D. (3) C, B, A and D.
   (4) D, A, B and C. (5) D, B, A and C.

9. Which of the following pairs of organisms have the highest number of common characteristics?
   (1) Bat and crow (2) Lizard and turtle
   (3) *Ichthyophis* and *Taenia* (4) *Ulva* and *Pogonatum*
   (5) *Pinus* and *Cycas*

10. Which of the following are unique characteristics of some phyla of the kingdom Animalia?
   A - Internal fertilization B - Parapodia
   C - Radula D - Nephridia
   (1) A and C only. (2) A and D only. (3) B and C only.
   (4) B and D only. (5) C and D only.

11. Select the correct statement regarding vascular tissues of plants.
   (1) Xylem tissues of pterophytes contain tracheids.
   (2) Xylem vessel elements are long and tapered cells.
   (3) Tracheids provide support to the stems of bryophytes.
   (4) Companion cells are found in Cycadophyta.
   (5) Pits are present between sieve tube elements.

12. Some structures of plants and their functions are shown below.

Structure	Function
A – Lenticels	P – Transpiration
B – Stomata	Q – Gaseous exchange
C – Hydathodes	R – Guttation

   Select the response with all correct "structure-function" combinations.
   (1) A–P, B–R, C–Q
   (2) A–R, B–P, C–P
   (3) A–P, B–Q, C–R
   (4) A–Q, B–P, C–P
   (5) A–R, B–Q, C–R

CamScanner

13. Transport of water molecules due to physical adsorption by hydrophyllic material is called
(1) imbibition.
(2) osmosis.
(3) facilitated diffusion.
(4) bulk flow.
(5) mass flow.

14. Some steps in the process of opening and closing of stomata are given below.

A - Flow of water into guard cells
B - Bending of inner walls of guard cells
C - Expansion of guard cells
D - Opening of the pore
E - Decrease in the turgor of guard cells
F - Closure of the pore

Correct sequence of the above steps is
(1) A, B, C, D, E and F.
(2) A, C, B, D, E and F.
(3) A, C, D, B, E and F.
(4) A, E, B, D, C and F.
(5) A, E, C, D, B and F.

15. A macronutrient and a micronutrient which cause chlorosis in plants due to their deficiency are respectively
(1) Mg and Mn.
(2) Fe and Ni.
(3) P and Mo.
(4) N and S.
(5) Cu and B.

16. Two plant hormones that promote root formation are
(1) auxin and gibberellins.
(2) cytokinins and abscisic acid.
(3) ethylene and auxin.
(4) ethylene and gibberellins.
(5) cytokinins and gibberellins.

17. Which of the following statements regarding epithelia is correct?
(1) Stratified squamous epithelium is involved in exchange of materials.
(2) Pseudostratified columnar epithelium is a compound epithelial tissue.
(3) Simple columnar epithelium is found in the intestine and nasal passage.
(4) Simple cuboidal epithelium is found in salivary glands and kidney tubules.
(5) Simple squamous epithelium prevents exchange of substances.

18. The three types of symbiosis seen among organisms with examples are given below.

A : Mutualism – Cow and crane
B : Parasitism – Man and *Planaria*
C : Commensalism – Whale and barnacle

Which of these combinations is/are correct?
(1) A only.
(2) B only.
(3) C only.
(4) A and B only.
(5) A and C only.

19. Select the pair/pairs where an increase in (i) causes an increase in (ii).

X : (i) Stretching of the stomach wall
(ii) Release of gastrin
Y : (i) Fat content in chyme
(ii) Food digestion in stomach
Z : (i) Amino acid content in chyme
(ii) Release of bicarbonate ions from pancreas

(1) X only.
(2) Y only.
(3) Z only.
(4) X and Y only.
(5) X and Z only.

CamScanner

20. Select the correct route of blood through the human heart from systemic circulation to pulmonary circulation and back to systemic circulation via aortic valve.
(1) Left atrium, bicuspid valve, left ventricle, pulmonary valve, right atrium, tricuspid valve, right ventricle
(2) Right atrium, tricuspid valve, right ventricle, pulmonary valve, left atrium, bicuspid valve, left ventricle
(3) Left atrium, tricuspid valve, left ventricle, pulmonary valve, right atrium, bicuspid valve, right ventricle
(4) Left ventricle, bicuspid valve, left atrium, pulmonary valve, right atrium, tricuspid valve, right ventricle
(5) Right atrium, bicuspid valve, right ventricle, pulmonary valve, left atrium, tricuspid valve, left ventricle

21. Which of the following indicates the forms that transport the lowest and highest percentages of carbon dioxide in the human blood?

	Lowest percentage	Highest percentage
(1)	Dissolved CO_2	Carbaminohemoglobin
(2)	HCO_3^-	Carbaminohemoglobin
(3)	Carbaminohemoglobin	Dissolved CO_2
(4)	HCO_3^-	Dissolved CO_2
(5)	Dissolved CO_2	HCO_3^-

22. If the tidal volume, residual volume, inspiratory reserve volume and expiratory reserve volume of a person are 500 mL, 1200 mL, 3100 mL and 1100 mL respectively, vital capacity of this person is
(1) 1600 mL. (2) 1700 mL. (3) 3600 mL. (4) 4700 mL. (5) 5200 mL.

23. Parasympathetic division of the autonomic nervous system of man
(1) inhibits saliva secretion.
(2) dilates the pupil of eye.
(3) relaxes bronchi in lungs.
(4) stimulates the release of glucose from liver.
(5) stimulates gall bladder.

24. Select the correct statement regarding human vision.
(1) Changing refractory power of cornea facilitates binocular vision.
(2) Convergence occurs during distant vision.
(3) Accommodation is important for near vision.
(4) Photopsin in rods provides night vision.
(5) Correct perception of visual objects occurs in the frontal lobe of the cerebrum.

25. Which of the following combinations correctly matches the hormone and its function?
(1) ACTH – Stimulates adrenalin secretion
(2) Oxytocin – Stimulates milk production
(3) Calcitonin – Promotes high calcium level in blood
(4) Melatonin – Increases basal metabolic rate
(5) Cholecystokinin – Triggers release of pancreatic amylase

26. Select the correct statement regarding spermatogenesis of man.
(1) Spermatogenesis starts at birth and occurs throughout the life.
(2) Spermatogenesis is promoted by testosterone secreted by sertoli cells.
(3) Primary spermatocytes are formed by spermatogonia through mitotic division.
(4) Leydig cells provide attachment for cells that are in different stages of spermatogenesis.
(5) All cells that undergo spermatogenesis are diploid except sperm cells.

CamScanner

27. Which of the following statements regarding human development is correct?
(1) During fertilization, a sperm enters the mature ovum penetrating surrounding epithelial cells.
(2) Blastocyst reaches the uterus 3–4 days after fertilization.
(3) Secretions of endometrial glands provide nutrition to the early embryo.
(4) Placenta contains only fetal blood vessels.
(5) The heart of the fetus begins to beat by 8–10 weeks of pregnancy.

28. Which of the following statements regarding axial skeleton of man is correct?
(1) Three pairs of ribs articulate with the sternum indirectly.
(2) Zygomatic arch provides surface for muscle attachment for the movement of upper jaw.
(3) Sacrum is formed from seven fused rudimentary vertebrae.
(4) Sinuses are located in the nasal and temporal bones.
(5) Until the development of lumbar curvature, child cannot hold the head upright.

29. Excluding patella, the number of bones in the lower limb of the human is
(1) 22. (2) 24. (3) 25. (4) 29. (5) 30.

30. If two individuals having genotype AaBb for two particular traits are crossed, how many different genotypes can appear in the progeny according to Mendel's laws?
(1) 2 (2) 3 (3) 4 (4) 8 (5) 16

31. If a woman homozygous for blood group B marries a man who is heterozygous for blood group A, possible blood groups of their children would be,
(1) A and AB. (2) A and B. (3) AB and O.
(4) AB and B. (5) B and O.

32. Which of the following human genetic disorders are caused due to gene mutations?
A - Down syndrome
B - Colour Blindness
C - Turner syndrome
D - Sickle Cell Anemia
(1) A and B only. (2) A and D only. (3) B and C only.
(4) B and D only. (5) A, B and C only.

33. Major steps in the isolation of DNA are as follows:
A - Precipitation of DNA
B - Dissociation of nucleoprotein complexes
C - Removal of contaminants
D - Inhibition of DNase
E - Homogenization
The correct sequence of above steps is
(1) B, C, A, D and E. (2) C, B, A, E and D.
(3) C, B, E, A and D. (4) E, B, A, D and C.
(5) E, D, B, C and A.

34. When a migratory bird flies northward from Sri Lanka along a straight line path, the biomes it could encounter in correct sequence are
(1) tropical forests, chaparrals, temperate broad leaf forests, northern coniferous forests and tundra.
(2) tropical forests, deserts, temperate grasslands, northern coniferous forests and tundra.
(3) savanna, deserts, chaparrals, temperate grasslands and tundra.
(4) tropical forests, chaparrals, savanna, temperate broad leaf forests and tundra.
(5) savanna, deserts, temperate grasslands, northern coniferous forests and tundra.

CamScanner

35. Two invasive alien organisms in Sri Lanka are
(1) Giant African land snail and Citronella grass.
(2) Tilapia and Tussock grass.
(3) Guinea grass and Cogon grass.
(4) Gini Andara and Themeda.
(5) Lantana and Water Hyacinth.

36. Which of the following statements regarding viroids and prions are correct?
A - Creutzfeldt-Jakob disease is a human disease caused by prions.
B - Viroids carry signals for their multiplication in host plant cells.
C - Viroids have a short piece of DNA protected by a protein coat.
D - Nucleic acids in prions replicate with the help of host genes.
(1) A and B only.
(2) A and C only.
(3) A and D only.
(4) B and C only.
(5) B and D only.

37. Which of the following statements regarding endotoxins and exotoxins produced by pathogenic bacteria is correct?
(1) Both endotoxins and exotoxins are inactivated by heat.
(2) Endotoxins are proteins or lipopolysaccharides produced by gram positive bacteria.
(3) Exotoxins are produced by both gram negative and gram positive bacteria.
(4) Exotoxin produced by *Corynebacterium diphtheriae* acts as an enterotoxin.
(5) Endotoxins produced by different bacterial species cause different symptoms.

38. Which of the following statements regarding metabolic products of microorganisms is correct?
(1) *Saccharomyces cerevisiae* is used for commercial production of invertase.
(2) Citric acid is produced through fermentation of molasses by *Aspergillus oryzae*.
(3) Riboflavin is produced through fermentation by *Bacillus subtilis*.
(4) Tetracycline is a secondary metabolite produced by *Streptomyces griseus*.
(5) Ethanol is a secondary metabolite produced through fermentation of sugarcane sap by microorganisms.

39. Which of the following may contribute to keep the immunity of ornamental fish in a home aquarium at a high level?
(1) Using correct feeding regime as a biosecurity measure.
(2) Replacing entire volume of water fortnightly.
(3) Turning off aeration at night.
(4) Keeping the lights of the aquarium switched on continuously.
(5) Maintaining a correct stocking density of compatible plants and fish.

40. Which of the following statements regarding genome projects are correct?
A - One of the aims of the human genome project is to determine the sequence of 20000 base pairs of human DNA.
B - Human genome project is yet to be completed.
C - Human Genome project has lead to the description of molecular activities of human cells.
D - Genome project of *Escherichia coli* is already completed.
(1) A and B only.
(2) B and C only.
(3) B and D only.
(4) B, C and D only.
(5) C and D only.

CamScanner

● **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 nucleotides is/are correct?
(A) $NADP^+$ functions as an electron carrier and an oxidising agent.
(B) FAD functions as an electron carrier and a reducing agent.
(C) $NADP^+$ and FAD function as coenzymes and electron carriers.
(D) NAD^+ functions as an electron carrier and an oxidising agent.
(E) NAD^+ and $NADP^+$ function as coenzymes and reducing agents.

42. Some characteristics of organisms and phyla of kingdom Fungi are given below.

Characteristic	Phylum
P – Coenocytic	X – Chytridiomycota
Q – Multicellular	Y – Zygomycota
R – Unicellular	Z – Ascomycota

Select the response/responses where all 'characteristic – phylum' combinations are correct.
(A) P – X, Q – Z, R – Z
(B) P – Y, Q – X, R – X
(C) P – Z, Q – Y, R – X
(D) P – X, Q – X, R – X
(E) P – Y, Q – Y, R – Z

43. Select the correct statement/statements regarding kingdom Plantae.
(A) Reduction in the gametophyte is a trend seen in the evolution of plants.
(B) Root tissues of living vascular plants resemble the stem tissues of early vascular plants.
(C) Ancestors of the members of kingdom Plantae had key traits of land plants.
(D) Members of kingdom Plantae evolved from a group of olive green coloured protists.
(E) Liverworts are evolutionarily closer to hornworts than to mosses.

44. Which of the following statements regarding the life cycles of plants is/are correct?
(A) Gametophyte of *Pogonatum* is dominant and photosynthetic.
(B) Sporophyte of *Selaginella* is dominant and photosynthetic.
(C) In *Cycas*, sporophyte is dominant and gametophyte partially depends on sporophyte.
(D) Gametophyte of *Selaginella* is reduced and partially depends on sporophyte.
(E) Gametophyte of *Nephrolepis* is photosynthetic and partially depends on sporophyte.

45. Select the correct statement/statements regarding nitrogenous excretory products of animals.
(A) Secretion of ammonia occurs in human nephrons.
(B) Energy cost for urea production is less than that of ammonia production.
(C) Uric acid is the main nitrogenous excretory product of land snails.
(D) Sharks excrete urea as the main nitrogenous excretory product.
(E) Urea is less toxic than uric acid.

CamScanner

46. In the human brain,
(A) three ventricles are located in the forebrain.
(B) pineal body is developed from the embryonic hind brain.
(C) Pons Varolii is situated between the mid brain and medulla oblongata.
(D) superficial part of the cerebrum is composed of nerve cell bodies.
(E) hypothalamus is linked to the anterior pituitary gland by long nerve fibres.

47. Select the correct statement/statements regarding the functions of amnion.
(A) It protects the fetus from mother's immune responses.
(B) It is associated with the development of urinary bladder of the fetus.
(C) It helps to prevent desiccation of the fetus.
(D) It creates a fluid filled cavity to absorb shocks.
(E) It is the source of primodial germ cells of developing gonads.

48. Transcription process of polypeptide synthesis
(A) begins when DNA polymerase binds to the promoter site.
(B) takes place in the cytoplasm of eukaryotes.
(C) does not involve DNA helicase.
(D) adds ribonucleotides against the template in the 5′ to 3′ direction.
(E) converts the information in the mRNA to a sequence of amino acids.

49. Two species of plants that can be seen in the highest altitudes of Sri Lanka are
(A) *Cymbopogan nardus* and *Themeda tremula*.
(B) *Eleocarpus montanus* and *Mesua ferrea*.
(C) *Chrysopogan nodulibarbis* and *Callophyllum walkeri*.
(D) *Cinnamomum ovalifolium* and *Arundinella villosa*.
(E) *Terminalia chebula* and *Imperata cylindrica*.

50. During the secondary treatment of industrial wastewater,
(A) organic matter is oxidized by microorganisms in the trickling filter.
(B) solid matter is allowed to settle in tanks.
(C) more than 75% of the organic matter is oxidized.
(D) methane is produced.
(E) sludge remaining after trickling filter treatment is decomposed aerobically.

***

CamScanner

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) What is the structural difference between a nucleotide and a nucleoside?

.....

.....

(ii) Name **two** ions present in the plant cell sap.

.....

(iii) At which phase of mitosis would the nuclear envelop be fragmented?

.....

(iv) State the specific site of occurrence of each of the following in a mitochondrion.

(a) Oxidative phosphorylation : .....

(b) Conversion of pyruvate to acetyl group : .....

(v) What is known as the respiratory quotient of a substrate?

.....

.....

(B) (i) State the major events that took place in the evolution of organisms during the following time periods.

(a) About 700 million years ago : .....

(b) About 365 million years ago : .....

(c) 6–7 million years ago : .....

.....

(ii) State **two** main differences between artificial classification and natural classification.

.....

.....

.....

.....

(iii) State **two** nutritional modes seen in bacteria.

.....

.....

(iv) State the common structural features that can be seen in both *Euglena* and *Paramecium*, and the structural features that can be seen only in each of them.

(a) In both : .....

(b) In *Euglena* only : .....

.....

(c) In *Paramecium* only : .....

.....

CamScanner

Do not write in this column

(v) (a) Name a phylum with animals having a mantle. : .....

(b) Name the first animal group that showed cephalization.: .....

(C) (i) What are the common features shown by Cycadophyta and Pterophyta?

.....

.....

.....

(ii) State the specific location and functions of companion cells.

Specific location : .....

.....

Functions : .....

.....

.....

(iii) What is known as heart wood?

.....

.....

.....

(iv) What is the role of abscisic acid in plants during drought conditions?

.....

.....

.....

100

2. (A) (i) Indicate the relationship between the water potential (Ψ) and solute potential (Ψ_s) of a fully flaccid cell.

.....

(ii) State the main characteristics of bulk flow that takes place within plants.

.....

.....

.....

.....

.....

.....

(iii) Name **two** substances other than sucrose that can be found in phloem sap but **not** in xylem sap.

.....

[see page four

CamScanner

(iv) Name **two** essential elements each needed by plants for the following.

(a) Activation of enzymes : .....

(b) Nitrogen metabolism : .....

(v) Name the structure that develops from each of the following in flowering plants after fertilization.

(a) Ovary : .....

(b) Ovule : .....

(c) Zygote : .....

(d) Triploid nucleus : .....

(B) (i) State what is meant by parthenogenesis and parthenocarpy in plants and give one example of plants that show each of them.

(a) Parthenogenesis : .....

..... Example : .....

(b) Parthenocarpy : .....

..... Example : .....

(ii) How do halophytes respond to salt stress?

.....

.....

(iii) (a) Name the **two** classes of photoreceptors in plants.

.....

(b) Which of the above classes provides information on quality of light?

.....

(C) (i) State **three** main functions of glial cells of man.

.....

.....

.....

(ii) (a) What are the structural features of the human small intestine that contribute to effective absorption?

.....

.....

.....

(b) State **two** reasons for excessive secretion of HCl in the human stomach other than prolonged starvation.

.....

CamScanner

Do not write in this column

(iii) Why do animals need a circulatory system?

.....

.....

.....

(iv) (a) State **two** characteristics that effective respiratory surfaces of animals should have other than a large surface area.

.....

.....

(b) What is known as a respiratory pigment?

.....

.....

.....

(v) Indicate the correct pathway of conduction of electrical impulses in the human heart.

.....

.....

100

3. (A) (i) (a) Show the sequence of blood clotting process in man using a flow chart.

(b) Other than the specificity for foreign molecules, state **two** main characteristics that distinguish acquired immunity from innate immunity.

.....

.....

.....

(ii) (a) State the location of the human kidneys.

.....

.....

.....

[see page six

CamScanner

(b) What are kidney stones?

.....

(c) Name the enzyme secreted by the human kidney.

.....

(iii) (a) Name a phylum that includes animals with a nerve net.

.....

(b) Name the meninges starting from the innermost layer.

.....

(iv) (a) State **two** functions of the cerebellum of man.

.....

.....

(b) What is a synapse?

.....

.....

(v) (a) What is meant by sensory adaptation?

.....

.....

(b) State the structures located in the human ear which contribute to maintaining posture and balance.

.....

(B) (i) (a) Why do only target cells respond to a specific hormone although all hormones can reach all body cells through blood?

.....

.....

(b) State the functions of thymosin.

.....

.....

(ii) State the disadvantage of asexual reproduction to a particular species of animals.

.....

.....

(iii) (a) What is the specific site of sperm production in man?

.....

(b) What is the normal life expectancy range of a human sperm after ejaculation?

.....

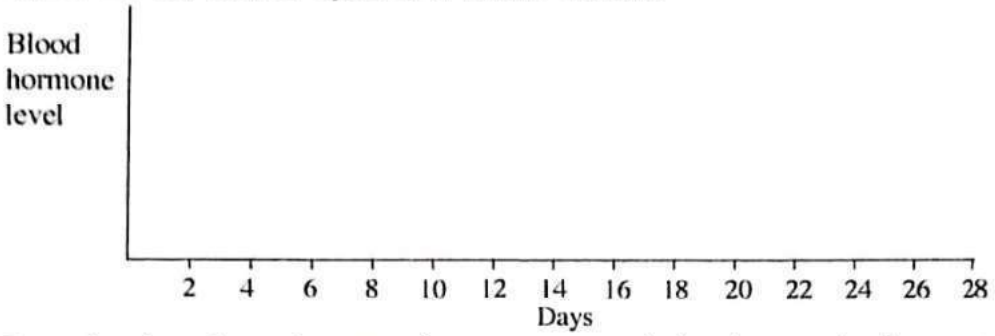
CamScanner

(iv) (a) How are the polar bodies formed during the process of cell division in oogenesis?

.....

Do not write in this column

(b) Indicate below how the levels of LH and FSH in the blood change during the typical 28 day ovarian cycle of a mature woman.



(v) (a) State the site where cleavage of zygote occurs during human development.

.....

(b) State **two** surgical sterilization methods of birth control.

.....

.....

(C) (i) (a) Name a phylum that contains animals with exoskeletons formed mainly by calcium carbonate.

.....

(b) What structures in the human cranium facilitate parturition?

.....

(ii) (a) State the main function of the vertebral foramens in man.

.....

(b) What is the structural arrangement which allows pronation and supination of the upper limb of man?

.....

.....

(iii) Name the human disorder associated with reduction of bone density.

.....

(iv) What is the number of ATP utilized by a myosin head in one cross bridge cycle of skeletal muscle contraction?

.....

(v) (a) State Mendel's second law of inheritance.

.....

.....

(b) If A and B are dominant alleles for two particular traits, and if their respective recessive alleles are a and b, name the cross given below and state its purpose.

AaBb × aabb

Cross : .....

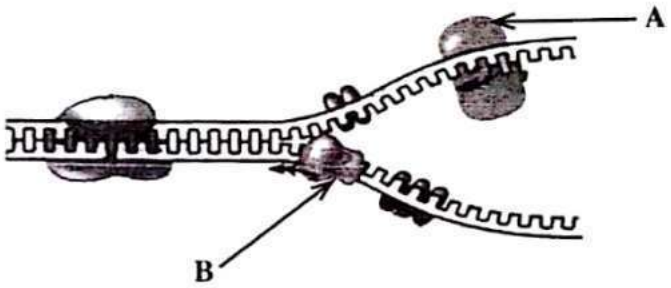
Purpose : .....

100

CamScanner

Do not write in this column

4. (A) (i) Given below is a diagram illustrating the origin of replication of DNA.



Name the enzymes **A** and **B** and state the main function of each of them.

	Enzyme	**Main function**
A :	.....	.....
B :	.....	.....

(ii) What is recombinant DNA technology?

.....

.....

(iii) What is the technique used to separate DNA fragments according to their size in recombinant DNA technology?

.....

(iv) Which types of interactions that occur in an ecosystem are depicted by the following examples?

(a) Conversion of Fe^{2+} into Fe^{3+} in soil : .....

(b) Absorption of mineral ions into root hairs from soil :

.....

(B) (i) How do inland freshwater marshlands in Sri Lanka receive water?

.....

.....

.....

(ii) (a) State **three** abiotic characteristics of mangrove ecosystems.

.....

.....

.....

(b) Name **two** true mangrove plants that are common in Sri Lanka.

.....

(iii) State **four** types of values of biodiversity.

.....

.....

.....

.....

CamScanner

(iv) State **two** impacts of acid rain on soil.

.....

.....

(v) What are the objectives of Ramsar convention?

.....

.....

(C) (i) State the stages of the lytic cycle of a bacteriophage.

.....

.....

.....

.....

.....

(ii) Name one virus each that causes diseases in the following:

(a) Nervous system : .....

(b) Digestive system : .....

(iii) (a) Name **two** gases produced due to acetogenic bacterial activity on organic waste.

.....

(b) Name a bacterial genus that carries out the following conversion in soil.

$NO_3^- \rightarrow NO_2^- \rightarrow N_2O \rightarrow N_2$

.....

(iv) State how Bt toxin affects mosquito larvae.

.....

.....

(v) (a) Why is the use of ozone preferred over chlorination for disinfection of drinking water?

.....

.....

(b) Name one enzyme each that causes rancidity and putrefaction during food spoilage by microorganisms.

Rancidity : .....

Putrefaction : .....

**

CamScanner

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
இலங்கைப் பரீட்சைத் திணைக்களம்
Department of Examinations, Sri Lanka
අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2023(2024)
கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2023 (2024)
General Certificate of Education (Adv. Level) Examination, 2023 (2024)

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 linear electron flow that takes place in the chloroplast during the light reaction of photosynthesis.

   (b) Briefly discuss the reasons for high efficiency of photosynthesis in C_4 plants.

6. (a) Briefly describe how the two groups of flowering plants could be distinguished from each other.

   (b) Explain the radial transport process that takes place in plants through apoplastic route.

7. (a) Briefly describe the structure of the wall of the human heart.

   (b) Explain the coronary circulation and the consequences of the blockage of coronary arteries in man.

8. (a) Explain how blood glucose level is regulated in man.

   (b) Briefly discuss the reason for type I diabetes and its controlling measures.

9. (a) Explain the process of packing of chromatin inside the nuclei of eukaryotic cells.

   (b) Describe the role of microbes in vinegar production and dairy industry.

10. Write short notes on the following.

    (a) Polygenic inheritance

    (b) Desertification

    (c) Control of filariasis

* * *

CamScanner