සියළුම හිමිකම් ඇවිරිණි / All Rights Reserved ]

අධ්‍යාපන, උසස් අධ්‍යාපන සහ වෘත්තීය අධ්‍යාපන අමාත්‍යාංශය
கல்வி, உயர்கல்வி மற்றும் தொழிற்கல்வி அமைச்சு
**Ministry of Education, Higher Education and Vocational Education**

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2026 උපකාරක තක්සේරුව
General Certificate of Education (Adv. Level) Exam, 2026 Supportive Assessment

| ජීව විද්‍යාව I<br>Biology I | 09 | E | I | 13 ශ්‍රේණිය<br>Grade 13 |
|---|---|---|---|---|

**Instructions:**

* Answer **all** questions.
* 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 compound that contains a ketose group when monosaccharides are classified according to the carbonyl group is

(1) Ribose
(2) Glyceraldehyde
(3) Fructose
(4) Erythrose
(5) Galactose

**2.** Which of the following statements regarding electron microscopes is true?

(1) The transmission electron microscope is suitable for clearly observing the structures on the surface of the cell.
(2) The ciliary movement of *Paramecium* can be seen using the scanning electron microscope.
(3) Powerful electromagnets are used to focus light rays.
(4) A scanning electron microscope can be used to observe the three-dimensional surface appearance of epidermal cells of a plant leaf.
(5) An electron microscope can achieve a magnification of $5 \times 10^5$ times with a resolution of 0.2 nm.

**3.** An ATP-consuming process is

(1) Regeneration of OAA during $C_3$ photosynthesis
(2) Bioluminescence in fireflies
(3) Transport of water from the symplast to the apoplast
(4) Ascent of sap occurring in woody plants.
(5) Phloem loading at the sink

Past Papers Wiki



සියළුම හිමිකම් ඇවිරිණි / All Rights Reserved ]

**4.** Which of the following is a true statement regarding cancer cells?

1) Generally, cancer cells reproduce only within living cells and respond to the body's control mechanisms.

(2) The spread of cancer cells from the original site to a distant site is called metastasis.

(3) A malignant tumor is one in which abnormal cells remain confined to the original site.

(4) A tumour that become invasive and attack one or more organs is a benign tumour.

(5) Cancer cells respond to the normal signals that regulate the cell cycle.

**5.** Several statements regarding the linear electron flow of photosynthesis are given below.

A. The electrons released during the photolysis of water neutralize the excited Photosystem II.

B. The oxidation of $NADP^+$ is catalyzed by the enzyme $NADP^+$ reductase.

C. Photophosphorylation is the synthesis of ATP using the energy released when electrons move from a lower energy level to a higher energy level.

D. When photons of light strike the pigments in Photosystem II, the electrons present there are excited to a higher energy level.

Which of the above statements is/are true?

(1) A only
(2) B only
(3) A and D only
(4) A, B and D only
(5) A, B, C and D all

**6.** Several proteins important during different stages of the cell cycle and some of their functions are given below.

| **Protein** | **Function** |
|---|---|
| A – Histone | P – Holding together the chromosome arms of sister chromatids |
| B – Cohesin | Q – Forming the microtubules required for chromosome movement |
| C – Tubulin | R – Forming chromatin with DNA |
| | S – Forming the mitotic spindle |
| | T – Attaching chromosomes to microtubules |

Select the option in which all the "Protein – Function" combinations are correct.

(1)A-Q, B-P, C-R
(2) A-T, B-R, C-Q
(3) A-R, B-S, C-P
(4) A-R, B-P, C-S
(5) A-T, B-Q, C-S

*සියළුම හිමිකම් ඇවිරිණි / All Rights Reserved ]*

**7.** The true statement regarding photorespiration in $C_3$ plants is,

(1) Photorespiration occurs only in double membrane bound organelles.
(2) It is a process that leads to a reduction in the net carbon gain of plants.
(3) Only molecules containing three carbon atoms are produced as a result of photorespiration.
(4) Photorespiration is a reaction aimed at absorbing energy.
(5) In the $C_3$ photosynthetic pathway, photorespiration is prevented because the Rubisco enzyme lowers the surrounding $CO_2$ concentration.

**8.** Among the following combinations of algal groups and their characteristics, which are correct?

A – Brown algae Chlorophyll d, Alginic acid, Floats
B – Green algae Chlorophyll b, Starch, Holdfast
C – Red algae Chlorophyll a, Floridean starch, Holdfast
D – Diatoms Chlorophyll c, Chrysolaminarin, Silica cell wall

(1) A only (2) A and C only (3) B and C only
(4) B, C, and D only (5) A, C and D only

**9.** Correct statement/ statements regarding plant evolution is/are,

A. Evidence for plant evolution during the Devonian and Carboniferous periods is shown by fossils and living vascular plants containing seeds.

B. Fossil evidence exists that ancestors of vascular plants had gametophytes and sporophytes of equal size.

C. Pterophytes and gymnosperms have a more recent common ancestor than the common ancestor of pterophytes and lycophytes.

(1) B only (2) C only (3) A and B only
(4) B and C only (5) A, B and C all

**10.** Which combination contains a characteristic/ characteristics that are not seen in Basidiomycota, but are seen in Ascomycota or Zygomycota?

A –Coenocytic fungal mycelium
B – Predominant monokaryotic fungal mycelium
C – Exogenous sexual spores
D – Structures resistant to unfavorable environmental conditions

*සියළුම හිමිකම් ඇවිරිණි / All Rights Reserved ]*

**11.** A student collected a marine organism found on a seashore and brought it to the laboratory and upon dissection, the following characteristics were observed.

A – Complete digestive system
B – Ventral nerve chord
C – Segmented body
D – Closed blood circulatory system

To which phylum could this organism belong?

(1) Echinodermata (2) ) Annelida (3) Arthropoda
(4) Cnidaria (5) Mollusca

**12.** Six structures that appeared during the evolution of terrestrial plants are given below as (A–F). Which answer shows the correct order of their origin?

| | | |
|---|---|---|
| A–Independent sporophyte | B–Ovule retained within the archegonium | C – Petals |
| D – Heterospory | E – Seeds | F – Megaphylls |

(1) B→ A → F→ D →E → C
(2)B → D → A → F → E → C
(3)A →B → D → E→ C→ F
(4)B → E → A → F → C → D
(5)B → F→A→ E→ D→ C

**13.** Correct statement regarding the dermal tissue system of angiosperms is,

(1) It contributes to the absorption of water and minerals.
(2) It never contains glands.
(3) It exists as a loosely arranged single layer of cells.
(4) It always has hydrophobic cell walls.
(5) It is always covered by a waxy layer.

**14.** Which is the correct statement regarding plant responses to stimuli?

(1) In thigmonasty, folding of leaves in *Mimosa pudica* occurs due to loss of turgor pressure in cells of the pulvinus.
(2) In some climbing plants, when tendrils coil around a support, equal growth is stimulated on both sides of the tendril.
(3) Short, thick stems in plants in montane forests is a response to resist strong winds.
(4) In vascular plants, accumulation of statoliths in the root cap reduces auxin distribution and inhibits root elongation.
(5) In angiosperms, pollen grain germination and growth of the pollen tube to the embryo sac through the style are inhibited by gibberellins.

සියලම හිමිකම් ඇවිරිණි / All Rights Reserved ]

**15.** Does an increase in the components in column K contribute to an increase/stimulation of the responses given in column L? Select the correct combination,

| K (Component) | L (Response) |
|---|---|
| (1) Concentration of ABA in guard cells of leaves | Opening of stomatal pore |
| (2) Concentration of water vapor in the external environment | Rate of transpiration |
| (3) Concentration of cytokinin within sieve tube elements | Transport of nutrients to sink tissue |
| (4) Concentration of auxin in leaves | Leaf abscission |
| (5) Ion concentration in the soil solution relative to root hair cell sap | Active ion absorption |

**16.** Characteristics such as thick, dark brown necrotic spots on leaves and death of meristematic tissues are observed in plants due to the deficiency of which of the following in the soil solution?

(1) $MoO_4^{2-}$ (2) $Zn^{2+}$ (3) $Ni^{2+}$
(4) $H_2BO_3^-$ (5) $Fe^{2+}$

**17.** Which of the following statement/ statements is/are correct regarding the effect of light on seed germination and flowering?

A - After the seedling emerges above the soil, inhibition of hypocotyl elongation is done by cryptochrome receptors.
B - Cells elongate faster on the side of plant shoots not receiving light.
C - Far-red light stimulates seed germination.
D - Phytochrome photoreceptors influence flowering.

(1) A and B only
(2) A and B only
(3) A, B and D only
(4) A, B and D only
(5) A, B, C and D all

**18.** Which of the following statements regarding animal epithelial tissues is/are correct?

A - Covers external or internal free surfaces of organs.
B - Contains blood vessels within the tissue.
C - Cells are closely packed within the tissue.

(1) A only
(2) A and B only
(3) A and C only
(4) B and C only
(5) A, B and C all

*සියළුම හිමිකම් ඇවිරිණි / All Rights Reserved ]*

**19.** Hormones associated with the regulation of food digestion in the human digestive system and their functions are given below,

| Hormone | Function |
|---|---|
| A - Gastrin | P - Triggers the release of bile from the gall bladder |
| B - Secretin | Q - Stimulates the release of bicarbonate from the pancreas |
| C – Cholecystokinin | R - Stimulates the production of gastric juice |

Select the correct combination from the above.

(1) A-Q, B-P, C-R
(2) A-P, B-R, C-Q
(3) A-P, B-Q, C-R
(4) A-R, B-P, C-Q
(5) A-R, B-Q, C-P

**20.** Select the correct statement regarding dietary fibre.

(1) It is composed of indigestible polysaccharides.
(2) It is not commonly found in vegetables and grains.
(3) It reduces the bulk of food.
(4) It increases the appetite.
(5) It stimulates the attraction of water to reduce fecal volume.

**21.** The correct statement regarding hemoglobin is

(1) Hemoglobin is composed of three subunits.
(2) A hemoglobin molecule can transport four $O_2$ molecules.
(3) Each heme group in hemoglobin contains two ferrous atoms.
(4) Ferrous atoms in hemoglobin bind irreversibly with $O_2$ molecules.
(5) Hemoglobin contributes only to oxygen transport.

**22.** Several functions of the human urinary system are given below.

A - Maintenance of osmotic balance and acid-base balance.
B - Temporary storage of urine.
C - Production of urine to excrete waste products.
Which of the above function/ functions is/are performed by kidneys?

(1) A only
(2) B only
(3) A and B only
(4) B and C only
(5) A and C only

සියලම හිමිකම් ඇවිරිණි / All Rights Reserved ]

**23.** Valves of the human heart and their locations are given below.

| Type of Valve | Location |
|---|---|
| A - Bicuspid valve | P - Between right atrium and right ventricle |
| B - Tricuspid valve | Q – At the place where pulmonary artery leaves |
| C - Semilunar valve | R - At the place where aorta leaves |
| | S - Between left atrium and left ventricle |

Select the correct combination from the above.

(1) A-R, B-Q, C-P
(2) A-S, B-P, C-Q
(3) A-Q, B-R, C-S
(4) A-R, B-S, C-Q
(5) A-P, B-S, C-R

**24.** Several features of sensory receptors in human skin are given below.

A – Present in the deep skin.
B - Sensitive to large pressure changes.
C - Sensitive to vibrations.
The sensory receptor possessing the above features is

(1) Meissner's corpuscles
(2) Merkel discs
(3) Free nerve endings
(4) Pacinian corpuscles
(5) Ruffini corpuscles

**25.** Select the response where "Hormone - Function" is correctly matched.

| Hormone | Target/Function |
|---|---|
| (1) Cortisol | Increases the rate of glycogen breakdown in the liver. |
| (2) Adrenaline | Stimulates the release of fatty acids from fat cells. |
| (3) Aldosterone | Stimulates $K^+$ reabsorption from renal tubules. |
| (4) Calcitonin | Acts on bone cells to stimulate bone breakdown and release calcium into blood. |
| (5) Oxytocin | Stimulates milk production from mammary glands. |

**26.** Which of the following statement is true regarding the chorion formed during human embryonic development?

(1) It surrounds the embryo as a protective membrane, forming a fluid-filled cavity.
(2) It gives rise to primordial germ cells that migrate to the developing ovaries.
(3) It produces hCG which is necessary during pregnancy
(4) It functions in connection with the development of the bladder.
(5) It acts as an early site for blood formation.

සියළුම හිමිකම් ඇවිරිණි / All Rights Reserved ]

**27.** Joints present in the human skeletal system and the bones contributing to form each joint are given below. Which of these combinations is/are correct?

| Joint | Bones contributing to form the joint |
|---|---|
| A- Shoulder joint | Scapula and humerus only |
| B - Elbow joint | Humerus and ulna only |
| C - Wrist joint | Radius, ulna and carpals only |
| D - Hip joint | Hip bone and femur only |
| E - Knee joint | Femur, tibia and patella only |

(1) A and C only
(2) A and D only
(3) A, B and D only
(4) A, D and E only
(5) A, B, D and E only

**28.** Which of the following statements given below regarding the homeostatic regulation of the human breathing process is correct?

(1) Typically, the breathing process is regulated by a voluntary mechanism.
(2) Two pairs of respiratory control centers are located in the medulla oblongata.
(3) Sensors in the medulla oblongata detect an increase in the pH of cerebrospinal fluid.
(4) When blood $O_2$ concentration drops very low, $O_2$ sensors in the aorta send impulses to the medulla oblongata.
(5) Main neural circuits relevant to steering respiratory regulation properly are located in the pons Varolii.

**29.** Select the correct statement regarding T lymphocytes in acquired immunity.

(1) T lymphocytes recognize specialized cells called antigen-presenting cells.
(2) Specific antigen receptors on a single T lymphocyte cannot be identical.
(3) All antigen receptors on the surface of a T lymphocyte can bind to the same epitope
(4) When T lymphocytes are activated, they proliferate to produce daughter cells that are not identical to the parent cell.
(5) All cells in T cell clones differentiate into effector T cells.

**30.** Which of the following statements regarding birth control methods is correct?

(1) The use of condoms is a temporary birth control method widely used by males.
(2) Oral contraceptive pills for females stimulate the release of GnRH from the hypothalamus.
(3) Through the Depo-Provera injection, women receive synthetic estrogen.
(4) The IUD loop is a permanent birth control method used for women.
(5) Tubal ligation prevents the entry of sperm into the Fallopian tubes.

PAST PAPERS WIKI

*සියළුම හිමිකම් ඇවිරිණි / All Rights Reserved ]*

**31.** When a woman born to a father suffering from red-green color blindness and a homozygous mother with normal vision marries a man with normal vision, what is the probability that the first male child of this couple will be a color-blind person?

(1) 0 (2) 0.25 (3) 0.5 (4) 0.75 (5) 1

**32.** In a hypothetical population of flowering plants in Hardy-Weinberg equilibrium, red flower color (R) is dominant over white flower color (r). 16% of the plants in the population produce white flowers. What is the percentage of heterozygotes in this population?

(1) 16% (2) 24% (3) 32% (4) 48% (5) 64%

**33.** Which of the following is correct regarding gene mutations?

(1) They can occur due to common errors happening during DNA replication.
(2) Substitution of a nucleotide pair is a point mutation.
(3) Substitution is a frameshift mutation.
(4) Many gene mutations can be lethal.
(5) Insertion can sometimes lead to silent mutations.

**34.** The main purpose of marking a recombinant plasmid vector with an antibiotic resistance gene is to

(1) Stimulate the expression of the foreign gene.
(2) Prevent mutations from occurring in the host bacterial chromosome.
(3) Increase the rate of replication of the plasmid within the vector.
(4) Increase the rate of antibiotic synthesis within the host.
(5) Identify the bacterial population in the bacterial culture where the plasmid has successfully transformed.

**35.** Which response correctly matches the biome and its corresponding characteristic?

| Biome | Characteristic |
|---|---|
| (1) Savanna | Plants with fire-resistant roots |
| (2) Desert | Pygmy forests and shrubs |
| (3) Chaparral | Woody plants with evergreen leaves |
| (4) Temperate grassland | Plants with vertical stratification |
| (5) Tundra | Presence of plants like pine and spruce |

**36.** Which is the correct statement regarding the cellular arrangement of bacteria?

(1) Cell division in three planes is present in the tetrad arrangement.
(2) Bacilli divide only across their short axis.
(3) Spiral bacteria sometimes show a straight shape.
(4) Spirochetes are spiral-shaped with a rigid body.
(5) A chain-like cell arrangement resulting from cell division in a single plane is seen in the staphylococci form.

*සියළුම හිමිකම් ඇවිරිණි / All Rights Reserved ]*

**37.** Which of the following combinations contains only diseases caused to humans by viruses?

(1) Chickenpox, Rubella, Rabies
(2) Cholera, Hepatitis, Influenza
(3) AIDS, Genital Herpes, Tetanus
(4) Leptospirosis, Rubella, Tetanus
(5) Gonorrhea, Cholera, Influenza

**38.** Some products manufactured using microorganisms and the microorganisms important for them are given below. Which of these is the correct "Product - Microorganism" combination?

| **Manufactured Product** | **Microorganism** |
|---|---|
| (1) Amylase | *Streptomyces griseus* |
| (2) Citric acid | *Acetobacter* |
| (3) Riboflavin | *Pseudomonas sp.* |
| (4) Vitamin $B_{12}$ | *Propionibacterium sp.* |
| (5) Tetracycline | *Saccharomyces cerevisiae* |

**39.** Several methods used for sterilization and control of microorganisms are given below.

A - Moist heat
B - Membrane filtration
C - Dry heat
D - Pasteurization

Which states the methods used to sterilize vitamins, wine, pipettes, and microbial culture media in the correct sequential order?

(1) D, A, C, B
(2) D, B, C, A
(3) B, D, C, A
(4) B, C, D, A
(5) A, D,B, C

**40.** Which of the following statements regarding food preservation is/are correct?

A - Sugar is used in its crystalline form when preserving ginger and citrus peel.
B - In deep-freezing, food is preserved by osmotic processes.
C - Natural antioxidants present in the smoke emitted during wood burning are important for food preservation in smoking.
D - Radiation with short wavelengths is used for the preservation of minced meat.

(1) A only
(2) C only
(3) A, and C only
(4) A, C and D only
(5) A, B, C and D all

*සියළුම හිමිකම් ඇවිරිණි / All Rights Reserved ]*

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.** Correct statement/statements regarding the plasma membrane is/are,

(A) The hydrophilic heads of phospholipids face inwards, while the hydrophobic tails face outwards.
(B) As Phospholipid molecules are not movable, they give a fluid nature to the membrane.
(C) Some protein molecules that completely span across the membrane are transmembrane proteins.
(D) Cholesterol molecules provide rigidity and stability to the membrane.
(E) Proteins that are not embedded and are tightly bound to the surface of the lipid bilayer are called integral membrane proteins.

**42.** Characteristic/characteristics of the phylum Platyhelminthes is/are,

(A) Eye spots are present as sensory organs.
(B) They are triploblastic pseudocoelomates.
(C) Flame bulbs are present as excretory organs.
(D) A pair of anterior ganglia and a pair of longitudinal nerve chords belong to the central nervous system.
(E) They are not sensitive to bacterial antibiotics.

*සියළුම හිමිකම් ඇවිරිණි / All Rights Reserved ]*

**43.** Regarding mosses, club mosses, and spike mosses, which is/are correct?

(A) All mosses and club mosses are homosporous, while spike mosses are heterosporous.

(B) In spike mosses and club mosses, the dominant plant is the sporophyte, while in mosses, the dominant plant is the gametophyte.

(C) The dominant plants of spike mosses and mosses bear rhizoids, while the dominant plants of club mosses bear roots.

(D) Spike mosses and club mosses possess differentiated vascular tissues, while mosses do not possess differentiated vascular tissues.

(E) Spike mosses and mosses mostly grow vertically, while club mosses grow horizontally.

**44.** Which of the following statements is/are correct?

(A) Lymphocytes that remain within the bone marrow to complete their development are B lymphocytes.

(B) Lymphocytes that migrate to the thymus for maturation are known as T lymphocytes.

(C) Both T lymphocytes and B lymphocytes originate from secondary cells present in the bone marrow.

(D) Only a single epitope is found on a single antigen.

(E) The entire antigen is required to elicit an adaptive immune response

**45.** Which of the following is/are true statement/statements regarding respiratory pigments?

(A) Hemoglobin can be observed in human blood and in arthropods.

(B) Hemocyanin can be seen only in arthropods.

(C) Chlorocruorin is present in the blood of many annelids.

(D) The pigment not contained within blood is myoglobin.

(E) Haemoerythrin can be seen in marine vertebrates.

**46.** Which of the following is/are correct regarding non-Mendelian inheritance patterns?

(A) In incomplete dominance, the phenotypic ratio of the F2 generation is not equal to the genotypic ratio.

(B) The equal contribution of both alleles to express the phenotype in the heterozygous condition is known as codominance.

(C) The human AB blood group is an example of multiple allelism.

(D) Data representing a population with respect to a polygenic trait show a normal distribution.

(E) In epistasis, the phenotypic expression of a gene at one locus is altered due to the effect of another gene at a different locus

*සියළුම හිමිකම් ඇවිරිණි / All Rights Reserved ]*

**47.** Select the correct statement/statements regarding Genetically Modified Organisms (GMOs) and their uses.

(A) Additional traits have been introduced to them through genetic engineering techniques.
(B) Foods obtained from these organisms are known as Genetically Modified Foods (GMF).
(C) A significant contribution is not received from these organisms to increase crop yield.
(D) Currently, these organisms are created as a result of rDNA technology.
(E) Golden Rice, enriched with Vitamin A, is an instance of the usage of these organisms.

**48.** Which of the following characteristics is/are correct regarding the forests distributed within the wet zone of Sri Lanka?

(A) Some forests are distributed in areas where the altitude is less than 900 m.
(B) Some forests consist of a short canopy of about 15 m.
(C) The mean annual rainfall varies between 2000 mm−5000 mm without any dry period.
(D) There are plants bearing umbrella - shaped rounded crowns.
(E) Vegetation consists of a network of woody climbers, and they do not reach the canopy layer.

**49.** Bacteria that produce endotoxins are,

(A) *Salmonella typhi*
(B) *Bacillus thuringiensis*
(C) *Clostridium tetani*
(D) *Vibrio cholerae*
(E) *Escherichia coli*

**50.** Which of the following statements is/are correct regarding filariasis?

(A) It is a neglected tropical disease.
(B) It is one of the oldest debilitating diseases in the world.
(C) It is caused by a bacterium living in the human lymphatic system.
(D) Clinically, disease symptoms can vary from being asymptomatic to chronic lymphedema.
(E) The accumulation of lymph fluid in the testes is known as hydrocele.

සියළුම හිමිකම් ඇවිරිණි / All Rights Reserved]


අධ්‍යාපන,උසස් අධ්‍යාපන හා වෘත්තීය අධ්‍යාපන අමාත්‍යාංශය
கல்வி, உயர்கல்வி மற்றும் தொழிற்கல்வி அமைச்சு
**Ministry of Education, Higher Education and Vocational Education**

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය- **2026** උපකාරක තක්සේරුව
General Certificate of Education (Adv. Level) Exam-**2026 Supportive Assessment**

| ජීව විද්‍යාව II<br>**Biology II** | **09** | **E** | **II** | **13 ශ්‍රේණිය**<br>**Grade 13** |
|---|---|---|---|---|

පැය තුනයි
*Three hours*

අමතර කියවීම් කාලය – මිනිත්තු 10 යි
Additional Reading Time – 10 minutes

**Use additional reading time to go through the question paper, select the questions you will answer and decide which them you will prioritise.**

Instructions :

* *This question paper consists of **10** questions in **11** 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 – 13)**

* *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 14)**

* *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**

**For Examiners' Use Only**

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

**Total**

| | |
|---|---|
| In Numbers | |
| In Letters | |

**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 type macromolecular type that acted as the first enzymes in the origin of the 'Protocell'?

……

(ii) (a) What is a "coenzyme"?

……

……

(b) Name a nucleotide found within the chloroplast of a plant cell that acts as a coenzyme as well as an electron carrier.

……..

(iii) State briefly what is meant by "cooperativity" in the allosteric regulation of enzymes within a cell.

……..

……..

……..

……..

……..

(iv) (a) Name a major storage polysaccharide utilized as an energy source in Dahlia tubers.

……..

(b) Name the basic structural unit of the polysaccharide mentioned in (iv) (a) above and state the number of carbon atoms contained in it.

……..

- Structural unit: ……
- Number of carbon atoms: ……

(c) Name a reagent that can be used in the laboratory to identify the basic structural Unit you recognized in (iv) (b) above an aqueous medium.

……..

(B) (i) State three main structural differences between prokaryotic flagella and eukaryotic flagella.

| Prokaryotic flagella | Eukaryotic flagella |
|---|---|
| 1. …… | 1. …… |
| 2. …… | 2. …… |
| 3. …… | 3. …… |

(ii) (a) What is the most common glycoprotein found in the extracellular matrix of most animal cells?

……..

Do not write in this column

(b) How does the glycoprotein you mentioned in (ii) (a) above organized within the extracellular matrix of an animal cell?

.....

(c) State three functions of the extracellular matrix of an animal cell.

.....

.....

.....

(d) What is the type of cellular junction that prevents leakage of extracellular fluid through intercellular spaces in animal cells?

.....

(iii) (a) What are the components that belong to the spindle apparatus formed during cell division of an animal cell?

.....

(b) State two major events occurring during Anaphase II of meiosis, and state one main cause for each event to occur.

| | **Event** | **Cause** |
|---|---|---|
| 1. | ..... | ..... |
| | ..... | ..... |
| 2. | ..... | ..... |
| | ..... | ..... |

(iv) (a) What is the total number of ATP molecules produced by a human cardiac muscle cell when one glucose molecule undergoes aerobic respiration?

.....

(b) What is the type of cellular junction abundantly seen between intercalated discs that connect human cardiac muscle cells together?

.....

(C) (i) How many billions of years old are the oldest currently discovered fossils of protists similar to red algae?

.....

(ii) Name the main polymer found in the thick walls of pollen grains.

.....

Do not write in this column

(iii) Name one animal phylum in which each of the following features is present.

(a) Radula: .....

(b) Mesohyll: .....

(c) Flame bulbs: .....

(d) Water vascular system: .....

(e) Respiratory trees: .....

(iv) Name three diagnostic structures that can be seen in animals of the Phylum Chordata at least during their embryonic stage.

.....

.....

.....

2. (A) (i) (a) Name the chemical component of which the Casparian strip in the endodermis of an angiosperm root is made.

.....

(b) State two functions performed by the Casparian strip during radial transport of water in angiosperms.

.....

.....

(ii) (a) What are the cellular components belong to the symplastic pathway of radial transportation of water transport in plants?

.....

(b) What is the main cause for the occurrence of guttation in certain herbaceous plants?

.....

(iii) (a) What is the hypothesis put forward to explain the ascent of sap in angiosperms?

.....

(b) According to the hypothesis mentioned in (iii) (a) above, briefly explain the reason for the negative pressure potential ($\psi_p$) encountered in xylem sap of a plant stem.

.....

.....

.....

.....

.....

Do not write in this column

(iv) (a) What is meristematic tissue contributes to make the periderm during secondary growth of a plant stem?

……

(b) Name a structure produced by the pericycle during primary growth of a dicotyledonous root.

……

(c) State the plant hormone that stimulates the production of the structure mentioned in (iv) (b) above.

……

(v) Name the specific structure that performs each of the following functions:

(a) Production of homospores in *Pogonatum*:

……

(b) Protection of sporanjial clusters from drying out in *Nephrolepis*:

……

(c) The structure which carried the sporophylls bearing sporangia in *Selaginella*:

……

(d) Providing nourishment for the male gametophyte with branched pollen tube in *Cycas*:

……

(B)

(i) (a) How does pseudostratified columnar epithelium differ structurally from stratified epithelium?

……

(b) State two locations where stratified squamous epithelium is located in human.

……

……

(ii) What takes place during the step of "digestion" in the holozoic nutritional method?

……

……

Do not write in this column

(iii) State one function of each of the following digestive enzymes of man.

- Pancreatic carboxypeptidase:

  ……..

  ……..

- Intestinal carboxypeptidase:

  ……..

  ……..

(iv) Explain how the products of lipid digestion enter the blood circulation in man.

……

……

……

……

……

(C) (i) (a) What is the 'cardiac cycle'?

……

(ii) (a) At which stage/stages of the cardiac cycle do the pulmonary and aortic semilunar valves of the human heart remains open?

……..

……..

(b) State the location where the human cardiac pacemaker is located.

……..

……..

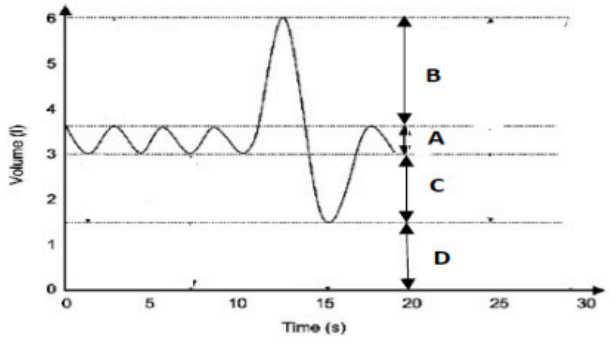
(c) State two major factors that affect changes in a person's blood pressure.

……..

……..

Do not write in this column

(iii)




The above is a graph showing the lung volume of a healthy person. Answer the following questions based on it.

(a) What is the lung volume represented by A? .....

(b) Contraction of muscles in the neck, back, and chest regions contributes to the stage belonging to the lung volume indicated by which letter?

.....

(c) Which volume or combination of volumes among A, B, C, and D above are important for maintaining a continuous gas exchange process within the alveoli?

.....

(iv) What is "anatomical dead space"?

.....

.....

3. (A) (i) Name an antimicrobial substance that contains in human saliva acts against bacteria.

.....

(ii) (a) Name two substances that are contained in blood plasma which are not present in the glomerular filtrate during the process of human urine formation.

.....

.....

(b) Mention two hypothesized causes for chronic kidney disease of unknown etiology (CKDu) identified in Sri Lanka.

.....

.....

(iii) What is meant by the "irritability" of living organisms?

.....

Do not write in this column

(iv) (a) What is the functional unit of the nervous system of vertebrates?

……

(b) State two differences between nervous coordination and hormonal coordination.

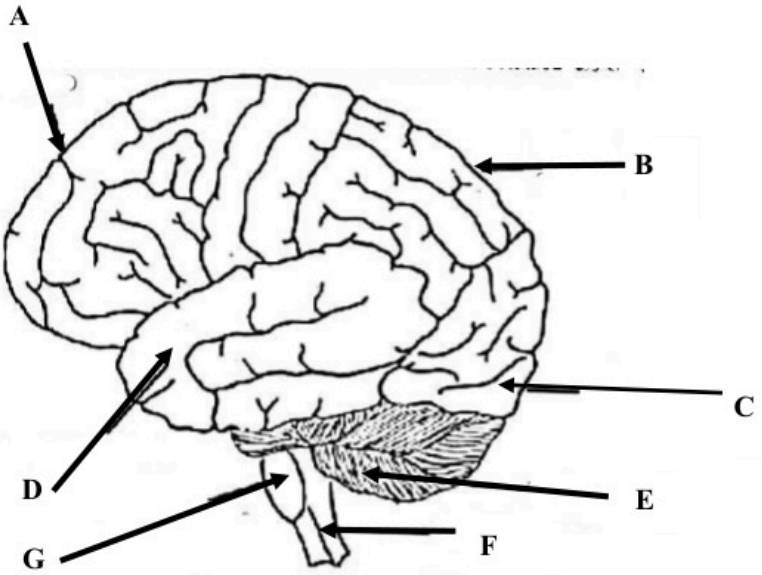
……

……

……

……

(c) Identify the parts A to D of the human cerebral cortex shown in the diagram below.




A: …… B: ……

C: …….. D:……..

(v) (a) Select the letter from the above diagram that corresponds to the part responsible for performing the following functions:

- Maintaining posture and balance: ……
- Coordinating large-scale body movements such as running and climbing: ……

(b) What is the nervous system disorder characterized by memory loss and mental confusion?

……

(B) (i) (a) Why is prolactin not considered as a tropic hormone?

……

……

……

(b) State two functions of the aqueous humor found in the human eye.

Do not write in this column

……

……

(c) Using words and arrows, show the pathway of transmitting an image focused on the retina as an action potential to the brain.

……

……

(ii) Which hormone is important in regulating biological rhythms related to human reproduction and daily activity levels?

……

(iii) (a) Name two accessory glands that produce the fluid necessary for the survival and motility of human sperm.

……

……

(b) State in which trimester of pregnancy the following changes occur in the fetus.

- Initiation of heartbeat: ……
- Complete development of organ systems:

……

(iv) (a) Name two chemical substances that mainly stimulate further contraction of the uterus at the onset of childbirth.

……

……

(b) State two major proteins contained in breast milk.

……

……

(c) What type of immunity does an infant receive through breast milk?

……

(C) (i) Name the three main processes found on the temporal bone of the human skull.

……

……

……

Do not write in this column

(ii) Write one unique external characteristic feature that can be used to identify each of the following types of human vertebrae:

- Atlas vertebra: ……
- Axis vertebra: ……
- Thoracic vertebra: ……..

(iii) Mention the structural adaptation seen in the axis vertebra for the rotation of the human head.

……

……

(iv) What are the main types of joints found in the human skeletal system?

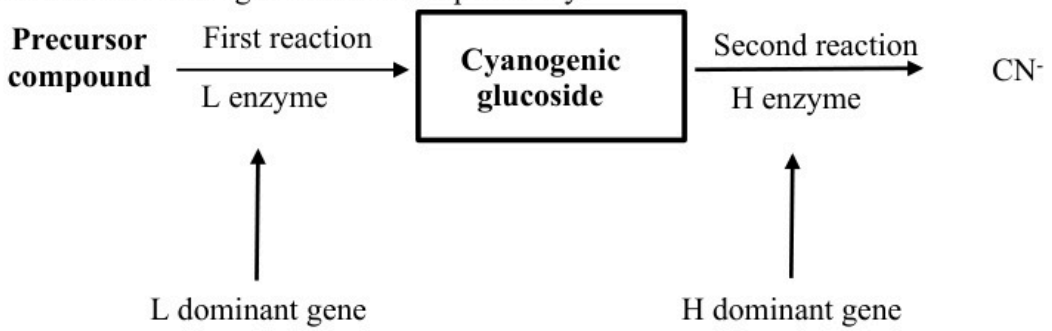
……

4. (A) (i) What is meant by a "pure line" in genetics?

……

……

(ii) The production of cyanide ions ($CN^-$) in plant leaves is a two-step biochemical process. In this process, a precursor compound present in every leaf is first converted into a cyanogenic glucoside in the first reaction, and then into cyanide ions ($CN^-$) in the second reaction. The first step requires an enzyme called "L" and its corresponding dominant gene L, while the second step requires an enzyme called "H" and its corresponding dominant gene H. The H and L genes assort independently.




Consider the following genotypes and phenotypes.

| Genotype | Phenotype |
|---|---|
| 1) LLHH | produces $CN^-$ |
| 2) LLhh | does not produce $CN^-$ |
| 3) llHH | does not produce $CN^-$ |
| 4) llhh | does not produce $CN^-$ |

(a) Name what type of genetic phenomenon this is based on the above data, name the type of genetic phenomenon.

…..……

(b) State the reason for your answer given in (ii) (a) above.

……..……

…..……

Do not write in this column

(c) In a Mendelian dihybrid cross, what would be the phenotypic ratio of $F_2$ progeny that prod
CN −: does not produce CN −?

……..

(iii) (a) What is meant by gene "pleiotropy"?

……

……

(b) Name two human genetic disorders with pleiotropic symptoms caused by pleiotropic alleles.

……

……

(c) Out of identical twins, only one child suffers from schizophrenia while the other child is not. What is the main genetic reason for this?

……

(iv) (a) Name two vertebrate groups in which polyploidy can be observed.

……

……

(b) Why is the insertion of a DNA molecule into a host cell usually considered as a difficult step?

……

(c) What are the reasons for delivering useful genes through a modified viral genome is more efficient than transformating through a bacterial vector?

……

……

(d) What is meant by a "superweed"?

……

……

(B) (i) Name two microbial groups that do not belong to a cellular organization.

……

……

(ii) State the genus of a microorganism responsible for each of the following food-borne diseases transmitted to man:

(a) Dysentery: ……

(b) Food poisoning: ……

(c) Botulism: ……

Do not write in this column

(iii) State two vitamins synthesized by microorganisms living in the large intestine of human that are added to the bloodstream.

……

……

(iv) (a) What is meant by "probiotics"?

……

……

(b) Name one microbial genus directly involved in the commercial production process of each of the following products:

- Cellulase: ……
- Invertase: ……
- Tetracycline: ……

(c) State three non-fungal microbial genera that are cultured on a large scale as food supplements, known as single-cell proteins.

……

……

……

(v)

(a) What is meant by a culture medium in microbiology?

……

(b) Why does a culture medium must sterilized during its preparation?

……

……

(C)(i) (a) Why it is suitable to take blood samples at night when testing for lymphatic filariasis?

……

……

(b) State one characteristic feature that can be used to distinguish between the eggs of Dengue vector mosquitoes and the eggs of filariasis vector mosquitoes.

……

……

(ii) (a) What is the first formed during a successful graft union in plants?

……

(b) Why monocotyledonous plants cannot be successfully grafted?

……

……

Past Papers Wiki



(iii) State a reason for following conditions found in a domestic aquarium.

Do not write in this column

(a) The water in the aquarium frequently becoming green.

.....

(b) Deposition of a blue-green phytoplankton layer on the side glass panes of the aquarium

.....

(iv) State the reasons why induced pluripotent stem cells (iPS cells) are widely used in the field of regenerative medicine.

.....

.....

.....

.....

.....



සියලුම විෂයන්ට අදාල ප්‍රශ්න පත්‍ර/පිළිතුරු පත්‍ර/සටහන් ලබා ගැනීමට Past Papers Wiki වෙත පිවිසෙන්න

## Biology II (Part B - Essay)

Do not write in this column

Instructions: Answer four questions only.
Use clearly labeled diagrams where necessary.

5. (a) Explain the process of ATP synthesis when a single glucose molecule undergoes fermentation inside a living yeast cell.

   (b) Describe briefly the major types of enzymes involved in the mechanism of DNA Replication within eukaryotic cells and state their functions.

6. (a) Explain what is meant by "alternation of generations" with reference to the life cycle of *Pogonatum*.

   (c) Briefly explain the major events occurred/occur in pollination, development of the minisporophyte and fertilization in flowery plants.

7. (a) Explain the relationship between metabolic substrates and the excretory products of animals.

   (b) Discuss the adverse effects of cigarette smoke on the proper functioning of the human respiratory system.

8. (a) Describe the adaptations of the human lower limb to maintain the erect posture, to bear body weight, and to facilitate bipedal locomotion.

   (b) Explain what is meant by the condition osteoporosis associated with the human skeletal system, and state the causes that lead to this condition.

9. (a) Briefly explain the interactions of soil microorganisms in relation to plant growth.

   (b) Explain how metagenomics is used to study the organisms present in a microbiome.

10. Write short notes on the following:
    (a) Galls in plants
    (b) Interbreeding
    (c) Protected cultivation of crops.

PAST PAPERS WIKI
WWW.PastPapers.WiKi



Downloaded From Past Papers WiKi - Sri Lanka's Largest Past Paper Bank