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Southern Provincial Education Department

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General Certificate of Education (Adv.Level) – Grade 13 – Third Term Test –2026

ජීව විද්‍යාව I
Biology I

09

E

I

පැය දෙකයි
Two hours

Name / Grade :

Instructions :

- Answer for **all** questions.
- Write your Name or Index number in the space provided on answer sheet.
- Instructions are given on the backside of the answer sheet. Follow them carefully.
- 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 mark sheet with a cross (X)** on the number of the correct option in accordance with the instructions given on the back of the answer sheet.

(01) What is the characteristic feature possessed by living organisms that is important to ensure the continuous existence of a species from generation to generation?

- (1) Metabolism (2) Reproduction (3) Heredity
(4) Evolution (5) Growth and Development

(02) Select the pair that correctly shows an organic compound and its structural unit.

- (1) Insulin – Glucosamine (2) Albumin – Amino acids
(3) Hemicellulose – Glucose (4) Nucleic acid – Nucleoside
(5) Phospholipids – Glycerol and fatty acids

(03) Which of the following is **correct** regarding cellular organelles?

- (1) All are not surrounded by a plasma membrane.
(2) Few organelles are found in prokaryotes.
(3) They are found in prokaryotes as well as eukaryotes.
(4) They are always adapted to perform few specific functions.
(5) They are suspended only within the cytosol of eukaryotes.

(04) Select the **correct** statement regarding galls in plants.

- (1) They produce a differentiated mass of plant cells.
(2) They modify host cells and carry out normal growth.
(3) They occur due to uncontrolled meiosis of plant cells.
(4) Galls are a swelling and growth, and they develop in plants before being attacked by living organisms like mites.
(5) The control of plant cell division is maintained by a specific balance between plant growth regulators like auxin and cytokinin.



- (05) Select the **correct** statement regarding an enzyme that shows allosteric regulation.
- (1) It consists of more than two subunits.
 - (2) In between each two subunits an active site is present.
 - (3) The entire complex oscillates between different shapes.
 - (4) Each subunit has one regulatory site.
 - (5) Regulatory molecules stimulate or inhibit the activity of the enzyme.
- (06) Select the **correct** statement regarding the Calvin cycle in photosynthesis.
- (1) Energy is not consumed for RuBP regeneration.
 - (2) 1, 3-Bisphosphoglycerate is oxidized in to G3P in step by step.
 - (3) CO₂ is reduced by the energy of ATP and NADPH produced in the light reaction.
 - (4) For the net synthesis of one glucose molecule, the Calvin cycle must occur three times.
 - (5) The first product of RuBP carboxylation is a stable molecule consisting of three-carbons.
- (07) The end products of the respiratory process occurring in *Saccharomyces cerevisiae* are,
- (1) Ethanol and CO₂
 - (2) Lactic acid and CO₂
 - (3) Ethanol and ATP.
 - (4) Ethanol, CO₂, and ATP.
 - (5) Lactic acid and ATP.
- (08) Which of the following statements is **correct** regarding the evolution of biodiversity?
- (1) DNA acted as the first genes and enzymes.
 - (2) Oxidation of iron ions occurred due to the origin of chloroplasts.
 - (3) The reducing nature of the primitive atmosphere led to the synthesis of small inorganic molecules.
 - (4) Cell growth occurred by the accumulation of proteins into a membrane and collision of vesicles.
 - (5) The origin of prokaryotic cells occurred through the aggregation of organic and inorganic molecules inside a membrane.
- (09) Which of the following is the **correct** statement regarding all seed plants?
- (1) Gametophytes are mostly microscopic.
 - (2) Megasporangium is retained within parent sporophyte.
 - (3) The female gametophyte is contained within the carpels.
 - (4) The sperm is transported directly through the pollen tube.
 - (5) The megasporangium and its protective integuments are collectively known as the ovary.
- (10) Which of the following statements is **correct** regarding living species belonging to the Domain Archaea?
- (1) Introns are very rarely present in their genes.
 - (2) They live in extreme environments as well as in other environments.
 - (3) All membrane lipids consist of unbranched hydrocarbons.
 - (4) The cell wall is composed of peptidoglycan and polysaccharides.
 - (5) Only some species grow at temperatures higher than 100°C.
- (11) Which of the following is the **correct** statement regarding the animals of Phylum Chordata?
- (1) Animals of Class Osteichthyes possess a tympanic membrane.
 - (2) A muscular ventral heart can be seen in most chordates.
 - (3) A muscular diaphragm is observed in both Classes Aves and Mammalia.
 - (4) The skin of Class Amphibia is covered with thin, moist, glandless skin.
 - (5) Glandless skin of Class Reptilia is covered by keratinized scales.



(12) Select the **correct** statement regarding plant tissues.

- (1) Large living cells with a central vacuole are found within vascular tissues.
- (2) There are no nonliving cells in vascular tissue systems.
- (3) The ground tissue system is composed of cells deposited with suberin.
- (4) The dermal tissue system always consists of a single layer of cells.
- (5) Trichomes are epidermal outgrowths originating from the cells of the ground tissue system.

(13) In the mechanism of stomatal opening that occurs during daytime,

- (1) The water potential of guard cells decreases.
- (2) The turgor pressure of guard cells decreases.
- (3) The CO₂ concentration in the sub-stomatal cavity increases.
- (4) K⁺ ions are actively removed from guard cells.
- (5) water leaves from the guard cells via exosmosis.

(14) Which of the following is the **correct** statement regarding the transport of water and minerals in plants?

- (1) Energy is expended for the transport of water and minerals through the xylem tissue.
- (2) Water and mineral ions enter the vascular cylinder through the cell wall spaces of endodermal cells.
- (3) According to the cohesion-tension theory, diffusion is important to pull water upwards through the xylem.
- (4) Entry of water and minerals into the root hairs follows an inactive pathway through osmosis along a concentration gradient.
- (5) Water that has entered the vascular cylinder of the root is transported through the apoplast up to the shoot system.

(15) Select the **correct** statement regarding phloem translocation.

- (1) Sugar translocation into the phloem occurs actively in most plants.
- (2) Translocation through two adjacent sieve tubes always occurs in the same direction.
- (3) The free sugar concentration at the sink is always higher than the concentration in the sieve tube.
- (4) Along with the unloading of sugar at the sink, water enters the phloem from the xylem.
- (5) Due to the unloading of sugar into the sieve tube, the water potential become reduced inside the Sieve tube element.

(16) Select the **correct** statement regarding gravitotropism in plants.

- (1) Gravitotropism is always a positive response.
- (2) Gravitotropism begins as soon as seed germination occurs.
- (3) Under the influence of gravity, statoliths settle in the upper parts of root hair cells.
- (4) Plants recognize gravity by means of plastids rich in lipid granules called statoliths.
- (5) According to the statolith hypothesis, K⁺ ions and auxin are important for displaying the gravitropic response.

(17) In a plant stem showing secondary growth,

- (1) Every cell of the periderm is permeable to water and gases.
- (2) All tissues external to the secondary phloem are collectively called bark.
- (3) Short initials in vascular cambium produces vessel elements and tracheids.
- (4) Lenticels seen in the epidermis are composed of loosely arranged cork cells.
- (5) Vascular rays connect the secondary xylem and secondary phloem with each other.



(18) Select the response that correctly shows the relationship between the cell and its function.

- (1) Glial cells – Receiving nerve impulses
- (2) Macrophages – Releasing signaling molecules like cytokines
- (3) Mast cells – Destroying abnormal cells on the cell surface
- (4) Neurons – Modulate nerve cell functions
- (5) Adipose cell – Providing nutrition to nerve cells

(19) What is the enzyme present in both pancreatic juice and intestinal juice that contributes to protein digestion in the small intestine?

- (1) Trypsin (2) Dipeptidases (3) Chymotrypsin
- (4) Carboxypeptidase (5) Aminopeptidase

(20) Several steps related to blood clotting are given below.

- A – Binding of platelets with collagen fibers
- B – Conversion of fibrinogen into fibrin
- C – Formation of a blood clot by fiber aggregation
- D – Damage to blood vessels and exposure of connective tissue
- E – Formation of a platelet plug

The correct sequence is,

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

(21) Which of the following is the **correct** statement regarding lung ventilation in humans?

- (1) In human respiration, a pushing action occurs rather than pulling air into the lungs.
- (2) Contraction of internal intercostal muscles and diaphragm muscles causes to decrease the volume of the thoracic cavity.
- (3) The inner visceral pleura and outer parietal pleura which surrounds lungs are loosely attached to each other, allowing smooth sliding.
- (4) Lung ventilation is necessary to maintain a high O_2 concentration and a low CO_2 concentration inside the lungs.
- (5) When at rest, contraction of intercostal muscles, diaphragm muscles, and abdominal muscles contributes to the inhalation-exhalation process.

(22) Which of the following is a function performed by phagocytic cells?

- (1) Directly destroying pathogens.
- (2) Increasing the inflammatory response.
- (3) Disturbing the reproductive process of pathogens.
- (4) Engulfing and destroying abnormal cells.
- (5) Destroying invaded cells through a cascade of biochemical reactions.

(23) Select the **correct** statement regarding the inflammatory response.

- (1) Complement proteins activated during inflammation further release histamine.
- (2) Localized swelling occurs due to accumulation of toxins of microorganisms at the site of inflammation.
- (3) Due to signaling molecules released by damaged tissues, blood vessels constrict and permeability increases.
- (4) Active macrophages arriving to the damaged site release inflammatory chemicals like histamine.
- (5) The increase in body temperature occurs to speed up chemical reactions for tissue repairing.



(24) A few symptoms of a disease related to the human nervous system are given below.

- Displaying abnormalities in sleeping and eating habits.
- Developing a depressed mood.

What is the disease that shows the above symptoms?

- (1) Depression (2) Dementia (3) Alzheimer's
(4) Schizophrenia (5) Parkinson's disease

(25) A function of the hormone secreted by the parathyroid gland is,

- (1) Regulating carbohydrate and lipid metabolism.
(2) Breaking down bone matrix to release calcium into the blood.
(3) Maintaining heart rate and muscle tone.
(4) Inhibiting calcium reabsorption by kidney tubules.
(5) Inhibiting calcium absorption by the small intestine.

(26) When warm blood flows through the hypothalamus, an action that occurs within the body is,

- (1) Contraction of arrector pili muscles.
(2) Constriction of peripheral blood vessels in the skin.
(3) Directing blood towards deep tissues from the skin.
(4) Stimulation of increased secretion of thyroid hormone into blood.
(5) Dissipation of heat by evaporative cooling due to the activity of sweat glands.

(27) Which of the following is an importance of asexual reproduction?

- (1) It is advantageous under stable, environmentally favorable conditions.
(2) It creates new species that can withstand changing environments.
(3) It does not allow successful genetic traits to spread rapidly.
(4) Harmful gene combinations are easily eliminated from the population.
(5) Offsprings are not genetically identical to each other and to the parent organism.

(28) You are provided with 24 separated vertebrae contributing to the formation of the vertebral column. Which of the following feature/features would be used by you to identify and separate the 7th cervical vertebrae from the other vertebrae?

- A – Spinous process
B – Pair of transverse processes
C – Vertebral body
D – Pair of superior articular processes
E – Pair of inferior articular processes

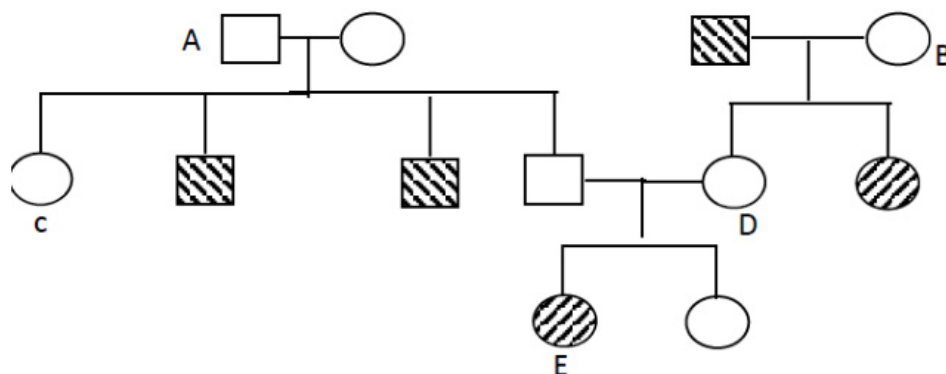
- (1) Only A (2) Only B (3) Only A and B (4) Only A and C (5) Only A, B, and C

(29) A cause for the disease Osteoporosis is,

- (1) obesity. (2) aging. (3) low calcium levels.
(4) female gender. (5) excessive usage of joints.



(30) The mode of inheritance of bent thumb through three generations is represented by the following pedigree chart.



The genotypes of the individuals symbolized by C and D could be,

- (1) Ss and ss only (2) SS and ss only (3) SS/Ss and ss
(4) ss and SS only (5) Ss and SS/Ss

(31) In sesame plants, black seeds (B) are dominant over white seeds (b). Normal leaves (L) are dominant over wrinkled leaves (l). If the genes related to seed color and leaf morphology are on different chromosomes, what are the genotypes of the parental generation that resulted the following offsprings?

- Black seed, normal leaf – 178
- White seed, normal leaf – 181

- (1) $BbLl \times BbLl$ (2) $BbLl \times BbLL$ (3) $BBLL \times bblL$
(4) $BbLL \times bblL$ (5) $bblL \times BBLL$

(32) Select the **correct** statement regarding the mechanism of polypeptide synthesis.

- (1) Energy required for the elongation process is supplied by ATP.
(2) The formation of polysomes increases the efficiency of transcription.
(3) The promoter sequence with the correct orientation is located only on the template strand.
(4) DNA helicase does not participate in unwinding the DNA double helix.
(5) Translation terminates as soon as RNA polymerase passes the termination sequence on the DNA.

(33) The normal nitrogenous base sequence of a DNA strand coding for a certain polypeptide chain and a mutation that occurred in that chain are given below.

Normal coding strand: - ATG GGG GCG TAC ATG GCG CAC

Mutated strand: - ATG GGG GCG TAA ATG GCG CAC

Select the **correct** statement regarding this mutation.

- (1) This is a missense mutation.
(2) This does not affect the polypeptide chain.
(3) This is a nonsense mutation producing a non-functional polypeptide chain.
(4) This does not affect the functional structure of the protein.
(5) This is a point mutation caused by an insertion.

(34) Which of the following is the **incorrect** statement regarding DNA libraries?

- (1) A cDNA library reflects the pattern of gene expression.
(2) The total RNA in a cell is called the transcriptome.
(3) Separated DNA fragments are cloned into identical vector populations.
(4) The genome should be cut into suitable fragments using restriction enzymes first.
(5) Complementary DNA (cDNA) libraries obtained by reverse transcription of mRNA.

(35) Select the **correct** statement regarding ecological pyramids.

- (1) Pyramids of biomass are always upright.
- (2) Moving up along the trophic levels of an ecological pyramid, the body size of organisms decreases.
- (3) In most cases, moving up the trophic levels, the number of individuals decreases.
- (4) When energy flows from one organism to another, 10% energy loss occurs.
- (5) The weight of biomass is represented by the organic matter of an organism present in the form of available energy content.

(36) Select the answer with threatened living organisms only.

- (1) Small Squirrel, Loris, Maha Madu
- (2) Elephant, Small Squirrel, Maha Madu
- (3) Giant tortoise, Buttercup, *Ichthyopsis*
- (4) Dumbara gal para diya madiya, Wesak orchid, Tilapia
- (5) Elephant, Buttercup, Dumbara gal para diya madiya,

(37) Select the **correct** response among the groups of bacteria classified according to energy source and carbon source.

- (1) Organic carbon – *Nitrosomonas*
- (2) Inorganic carbon – *Thiobacillus* sp.
- (3) Organic chemical substances – Purple sulfur bacteria
- (4) Inorganic chemical substances – Most bacteria
- (5) Inorganic chemical substances – Purple non-sulfur bacteria

(38) Which of the following response is **correct** regarding the process carried out by the contribution of microorganisms within the Nitrogen cycle?

- (1) NO_2^- *Nitrosomonas* → NO_3^-
- (2) NH_4^+ *Nitrobacter* → NO_2^-
- (3) N_2O *Pseudomonas* sp → N_2
- (4) NH_3 *Azotobacter* sp → NH_4^+
- (5) NH_4^+ *Clostridium* sp → N_2

(39) Which option correctly displays the microorganism related to the production of the following commercial products?

- (1) Riboflavin – *Pseudomonas* sp
- (2) Cellulose – *Aspergillus oryzae*
- (3) Cheese – *Lactobacillus* sp
- (4) Acetic Acid – *Aspergillus niger*
- (5) Tetracycline – *Streptomyces aureofaciens*

(40) Select the **correct** statement regarding the dengue disease vector.

- (1) Breeds in polluted water.
- (2) Female mosquito lays eggs like a raft.
- (3) Eggs hatch within 4 - 5 days and turn into larvae.
- (4) White-colored markings can be seen on the adult's body surface.
- (5) The adult wing skeleton is margined by small black scales.



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

Instructions				
1	2	3	4	5
A, B, D correct	A, C, D correct	A, B correct	C, D correct	Any other response or combination is correct

- (41) Event/events that occur during various divisional stages of onion root tip cells is/are,
 A – Depolymerization of spindle microtubules.
 B – Separation of sister chromatids from the centromere.
 C – Production of two genetically non identical daughter cells.
 D – Formation of a cleavage furrow during cytokinesis.
 E – Centrioles move towards opposite poles while forming the spindle.
- (42) The answer/answers containing structures that can be observed only within *Euglena* is/are,
 A – Flagella, Pellicle, Oral groove
 B – Eyespots, Contractile vacuole, Oral groove
 C – Flagella, Eyespots, Contractile vacuole
 D – Contractile vacuole, Eyespots, Pellicle
 E – Contractile vacuole, Oral groove, Flagella
- (43) Which of the following cell/cells has/have lignified cell walls?
 A – Sclerenchyma B – Vessel elements C – Sieve tube elements
 D – Tracheids E – Companion cells
- (44) Ion/ions subjected to both secretion and selective reabsorption during the process of urine formation in the human nephron is/are,
 A – Na^+ B – K^+ C – Cl^- D – HCO_3^- E – H^+
- (45) Select the **correct** statement/statements regarding human semen.
 A – The lifespan of a sperm is about 48 - 72 hours.
 B – In a normal single ejaculation, about 3 – 5ml of semen is released.
 C – Semen is a mixture of secretions from three types of accessory glands and sperms.
 D – The volume of sperm is usually less than 10% of the final ejaculated semen.
 E – The main contribution of semen comes from the fluid secreted by the prostate gland.
- (46) Change/changes occurring within the mother during the first trimester of pregnancy is/are,
 A – Starting to feel the movements of the fetus.
 B – Blockage of the cervix by a mucus plug.
 C – Production of progesterone and estrogen by the placenta.
 D – Frequent urination due to the digestive process being disrupted.
 E – High concentration of hCG hormone is important for the secretion of progesterone and estrogen.
- (47) Method/methods required for the production of a recombinant DNA molecule is/are,
 A – Digestion of DNA using restriction enzymes.
 B – Gel electrophoresis of DNA fragments.
 C – Identification of correct DNA fragments using probes.
 D – Joining DNA fragments obtained from multiple sources using DNA ligase.
 E – Shooting useful DNA fragments into the cell to be transformed using a gene gun.



(48) Biome/biomes with a normal annual rainfall less than 1000mm is/are,

A – Deserts

B – Chaparral

C – Tropical forests

D – Northern coniferous forests

E – Temperate broadleaf forests

(49) A statement/statements relevant to the sterilization of glass items like Petri dishes and pipettes inside a school laboratory is/are,

A – Heating to a temperature of 170°C.

B – Killing microorganisms by oxidation.

C – Sterilization under 1 atmospheric pressure using steam.

D – Destruction of endospores except prions.

E – Sterilization using steam at 140°C.

(50) Genome project/projects that have been completely sequenced by now is/are,

A – Rice plant

B – Mouse

C – *Escherichia coli*

D – *Arabidopsis thaliana*

E – *Wuchereria bancrofti*



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தென் மாகாணக் கல்வித் திணைக்களம்
Southern Provincial Education Department

අධ්‍යාපන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය - 13 ශ්‍රේණිය - තෙවන වාර පරීක්ෂණය - 2026

General Certificate of Education (Adv.Level) – Grade 13 – Third Term Test –2026

ජීව විද්‍යාව II
Biology II

09 E II

පැය තුනයි
Three hours

Extra reading time 10 min

Name / Grade :

Instructions

- * This question paper consists of **12** pages and **10** questions.
- * This paper consists of two parts as A and B, and the time scheduled for both parts is three hours.
 - ☐ **Part A - Structured Essay (Page 2 – 11)**
- * Answer all the **four** questions in this question paper.
- * Your answers should be written in the space provided in the paper. Note that this space is enough to write answers and long answers are not expected.
 - ☐ **Part B - Essay (Page – 12)**
- * Answer only four questions. Use other papers for this purpose. After the deadline, attach A, B parts as one answer sheet and hand it over to the invigilator.
- * only part B of the question paper can be taken out of the examination hall.

* **For invigilators use only**

Part	Question no	Marks
A	01	
	02	
	03	
	04	
B	05	
	06	
	07	
	08	
	09	
	10	
Sum		
Percentage		

Final Marks

By number	
By words	

Signature

Marked by	
Checked by	

See page no. 02



Part A – Structured Essay

(01)(A) (i) (a) What is the reason for polarity of water molecule?

.....
.....

(b) How does high heat of evaporation of water important for survival of organisms?

.....
.....

(ii)(a) What is major storage polysaccharide of fungi?

.....

(b) Write example for each of the following type of molecules.

- Amphoteric -
- Amphipathic -

(c) What is the major bond which is important to maintain secondary structure of proteins?

.....

(iii) Mention two differences between light microscope and electron microscope.

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

(iv) Mention two lipid types which are important to maintain fluidity nature of plasma membrane.

.....
.....

(B) (i) (a) What are photosynthetic pigments?

.....

(b) What is major pigment which captures light.

.....

(ii) What is the major functional difference between bundle sheath cells of Barly and *Zea mays* plants.

.....
.....

(iii) (a) What is the reason for reducing rate of photosynthesis under high light intensities?

.....
.....

(b) What are the appendages found in plants to protect against high light intensities?

.....
.....

(c) Name two reactions which catalyzed by Rubisco enzyme.

.....
.....



(iv) (a) What is chromatin?

.....

(b) What is the function of microtubules that are not attached to kinetochore?

.....

(v) State the locations where photosynthesis and aerobic respiration occur in prokaryotic cells.

- Photosynthesis -
- Aerobic respiration -

(vi) (a) What is anabolism?

.....

.....

(b) Why is the reason to consider ATP as the universal currency in energy transaction processes?

.....

.....

(C) (i) State two advantageous characteristics of a population that favor the survival and reproduction of organisms.

.....

.....

(ii) State a method of sexual reproduction that can be seen in some bacteria.

.....

(iii) (a) What are the structures used by organisms in the phylum Arthropoda for respiration.

.....

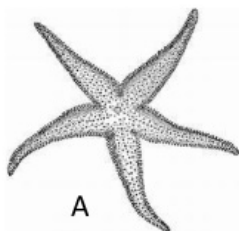
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(b) Which animal phylum possesses a reduced circulatory system without a heart?

.....

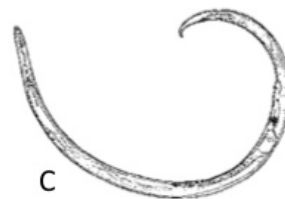
(iv) State one unique characteristic for each of the phyla to which the organisms shown in the diagrams below belong.



A



B



C

A -

B -

C -



(v) The characteristics of two plants that produce flagellated sperms are given below. Name the plant phylum that exhibits each characteristic.

(a) The sporophyte absorb water from female gametophyte.

.....

(b) The sporophyte produces large cones.

.....

(vi) State the fungal phylum that exhibits each of the following characteristics.

(a) Production of flagellated zoospores in reproduction

.....

(b) Dominance of a dikaryotic fungal mycelium in the life cycle.

.....

(vii) State two differences that can be observed between the flowers of monocotyledonous and dicotyledonous plants.

.....

.....

(02) (A) (i) (a) Name two cell types that can be seen in the tissue acting as the outer protective covering of dicotyledonous plant parts.

.....

.....

(b) Name two plant groups that do not require external water for fertilization.

.....

.....

(ii) (a) State two functions of Magnesium(Mg) element in plants.

.....

.....

(b) Name two plant growth substances that stimulate seed germination.

.....

.....

(iii) State two responses shown by plants to mechanical stimuli.

.....

.....

(iv) What is pollination?

.....



(v) What is meant by double fertilization?

.....

(B) (i) (a) What is the main component present in the matrix of cartilage tissue?

.....

(b) By which structure, that the matrix mentioned in above (a) is secreted?

.....

(ii) What is the structure formed by the union of the pancreatic duct with the common bile duct?

.....

(iii) What is the stroke volume?

.....

.....

(iv) State two instances where the blood pressure of a normal person increases and two instances where it decreases?

.....

.....

.....

.....

(v) (a) State the function of the surfactant present in the alveolar lining.

.....

(b) What is the damage caused to the respiratory system by Hydrogen Cyanide contained in cigarette smoke?

.....

(C) (i) (a) What are allergens?

.....

(b) Name an allergenic antibiotic.

.....

(c) Briefly state how a person dies due to the Human Immunodeficiency Virus(HIV).

.....

.....

.....

.....

.....

.....

.....



(ii) Name two capillary networks formed by the efferent arteriole.

.....

.....

(iii) What should be done to prevent the formation of stones in the urinary bladder?

.....

(iv) What are the components that make up the peripheral nervous system?

.....

.....

.....

(v) (a) State two negative feedback mechanisms that control sexual hormone production in males.

.....

.....

(b) How does the injection named Depo-Provera carry out birth control?

.....

.....

(03) (A) (i) (a) What is abortion?

.....

.....

(b) State two methods used to identify abnormalities during pregnancy.

.....

.....

(ii) How is the connection between the hypothalamus and the lobes of pituitary maintained?

.....

.....

(iii) (a) What is resting potential?

.....

(b) What is the resting potential of a neuron?

.....

(iv) Name the factors that maintain the resting membrane potential.

.....

.....

.....

(v) Name a sensory structure that acts as both a pressure receptor and a vibration receptor.

.....



(vi) State one function fulfilled by each of the following parts present in the human eye.

- Viterious fluid -
- Aqueous fluid -

(vii) State the function of the hormone secreted by the pineal body.

.....

(B) (i) What is a dominant allele?

.....
.....

(ii) Name **two** non-Mendelian inheritance patterns that arise due to an allele not being completely dominant or recessive.

.....
.....

(iii) What is the probability of obtaining the genotype AaBbDD from a trihybrid cross of AaBbDd x AaBbDd?

.....

(iv) In *Drosophila* fruit flies, grey body color (G) is dominant over black body color (g). Normal wings (N) are dominant over vestigial wings (n). If the above genes show complete gene linkage, and a cross is made between a fly with a grey body and normal wings and a fly with a black body and vestigial wings:

(a) Write the genotypes of the fruit flies belonging to the parental generation.

.....

(b) Write the genotype of the F₁ generation obtained from the above cross.

.....

(c) Show how the F₂ progeny is obtained by crossing of two F₁ individuals, and calculate the genotypic and phenotypic ratios. (Assume that there were no crossing over occurred).

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.....

(C) (i) Write two properties of DNA that make it suitable to act as the essential genetic material in living beings.

.....
.....

(ii) (a) What is DNA replication?

.....

(b) How is the speed of the replication process of a large DNA molecule increased?

.....



(c) What is the role of RNA polymerases in DNA replication?

.....

(iii) (a) What is gene expression?

.....

(b) Write **three** molecules that act as end products of a gene.

.....

.....

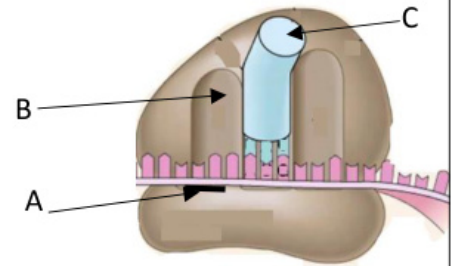
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(iv) (a) Identify the locations A, B, and C in the given diagram.

A –

B –

C –



(b) What is the reaction catalyzed by r-RNA associated with the above structure?

.....

(v) What is the objective of the Cartagena Protocol on Biosafety?

.....

.....

(04) (A) (i) (a) What is an ecosystem?

.....

.....

(b) What type of ecological pyramid describes the overall nature of an ecosystem?

.....

(c) Why is the recycling of matter considering an essential process in an ecosystem?

.....

(ii) What are the types of biomes that can be seen in the temperate zone?

.....

.....

.....

.....

(iii) Name **two** species of sea grasses found in Sri Lanka.

.....

.....



(iv) (a) What is a biodiversity hotspot?

.....
.....

(b) Name **two** regions belonging to the major biodiversity hotspot in South Asia.

.....
.....

(c) Name an endemic animal species in Sri Lanka.

.....

(B) (i) Name a cyanobacterium capable of fixing atmospheric nitrogen symbiotically.

.....

(ii) What are akinates?

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

(iii) (a) What is sterilization?

.....

(b) Write the most suitable method to sterilize each of the following items:

- Pipettes -
- Hospital mattresses -

(iv) (a) What is invasiveness?

.....
.....

(b) Mention **two** enzymes produced by pathogens and state one function of each.

Enzyme

Function

.....	
.....	

(v) (a) Why is industrial wastewater aerated during its purification process?

.....

(b) State two methods used to aerate water during wastewater treatment.

.....
.....



(C) (i) (a) What is an aquarium?

.....

(b) In aquaculture, environmental factors should be maintained within an optimum range. State **two** developmental stages of fish for which it is not essential to feed for a day per week.

.....

.....

(c) What is meant by the presence of blue-green plant plankton in an aquarium?

.....

(d) Name **two** common diseases caused by bacteria to ornamental fish.

.....

.....

(ii) (a) Name a vector mosquito species that transmits the Dengue virus.

.....

(b) What is the bacterial species used to control dengue vectors?

.....

(iii) (a) Who is the scientist introduced nanotechnology to the world?

.....

(b) Name a nanostructure used for bone replacement.

.....

(iv) (a) What is the source of embryonic stem cells?

.....

(b) What is the specificity of embryonic stem cells?

.....

Part B - Essays

Answer only four questions.

(05)

- (a) Describe the extracellular components of a typical plant cell.
- (b) Briefly describe the characteristic features of an enzyme showing allosteric regulation.

(06)

- (a) Describe the terrestrial adaptations of *Nephrolepis* with reference to its life cycle.
- (b) Explain the changes that occur in the components of the water potential equation when a plant cell is immersed in pure water.

(07)

- (a) Describe the process of gas exchange between the blood and tissues in the human body.
- (b) Describe how blood volume and pressure are regulated by the human kidney.

(08)

- (a) Describe the structure of human skin.
- (b) Describe the basic mechanism of skeletal muscle contraction.

(09)

- (a) Briefly describe the methods of entering foreign DNA into a cell.
- (b) Describe the interactions of soil microorganisms relevant to plant growth.

(10) Write short notes on:

- (a) Pleotrophy
- (b) Conservation of living species
- (c) Diatoms

