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தென் மாகாணக் கல்வித் திணைக்களம்
Southern Provincial Department of Education

අධ්‍යාපන පොදු සහතික පත්‍ර (උසස් පෙළ), 12 ශ්‍රේණිය, පළමු වාර පරීක්ෂණය, 2019 නොවැම්බර්
General Certificate of Education (Adv. Level), Grade 12, first Term Test, November 2019

පීච විද්‍යාව I
Biology I

09 E I

පැය එකයි
One hour

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 those carefully.
- In each of the questions **01** to **25**, 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.

01. Which one of the following is the **correct** order of the hierarchial levels of living organization ?

- (1) Mitochondria → proteins → Muscle cells → Muscle tissue → Stomach
- (2) Muscle cell → Mitochondria → Muscle tissue → Stomach → Digestive system
- (3) Mitochondria → Muscle cell → Muscle tissue → Stomach → Digestive system
- (4) Muscle tissue → Mitochondria → Muscle cell → Digestive system → Stomach
- (5) Stomach → Muscle tissue → Muscle cell → Mitochondria → Digestive system

02. Some trace elements found in the human body are,

- (1) F, Mo, Na, Mn, Fe
- (2) Mo, Mn, Cl, Cu, F
- (3) Mn, Cu, S, Mo, Fe
- (4) F, Fe, Mo, Mn, Cu
- (5) Cu, Mo, Fe, Mg, F

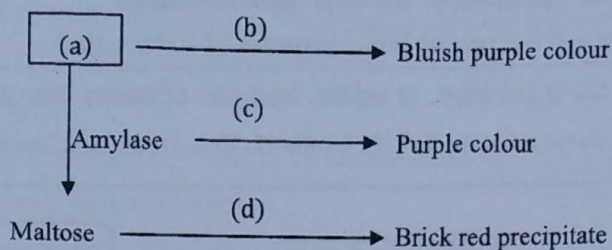
03. Which one of the following property is contributed to the water to act as a versatile solvent?

- (1) Polarity of the water molecule.
- (2) Cohesive forces between water molecules.
- (3) Adhesive forces between water molecules and other molecules.
- (4) Ionic nature of the water molecule.
- (5) Weak H bonds between water molecules.

04. Which one of the following is a common characteristic to all the cells?

- (1) Presence of 80s ribosomes.
- (2) Presence of RNA or DNA as genetic materials.
- (3) Presence of semi fluid jelly like substance called cytosol.
- (4) Being bounded by a cell wall.
- (5) Having the diameter of 10 μm – 100 μm .

05. Below diagram shows some tests that are done in the laboratory to identify certain organic compounds. What are the molecules/tests represented by a, b, c and d respectively?



- (1) Glucose, Benedict test, Iodine test, Biuret test
 - (2) Starch, Iodine test, Benedict test, Biuret test
 - (3) Glucose, Benedict test, Biuret test, Iodine test
 - (4) Starch, Iodine test, Biuret test, Benedict test
 - (5) Starch, Iodine test, Sudan test, Benedict test
06. Which one of the following shows the **correct** order of bond type and the monomer unit of the given A,B and C molecules?

Organic compound	Bond type	Monomer unit
(A) Nucleic acid	(x) Peptide	(p) Monosaccharide
(B) Polysaccharide	(y) Phosphodiester	(q) Nucleotides
(C) Protein	(z) Glycosidic	(r) Amino Acids

	A	B	C
(1)	zp	yq	xr
(2)	yq	zp	xr
(3)	yr	zp	xq
(4)	zq	xr	yp
(5)	xq	yp	zr

07. Select the **incorrect** statement regarding the cell junctions.
- (1) Plasmodesmata are nonliving connections between adjacent cytoplasm.
 - (2) Cell junctions connect the internal chemical environment of adjacent cells.
 - (3) Cell junctions in animal embryos, facilitate signal and material exchange between adjacent cells.
 - (4) Specific proteins in tight junctions connect the plasma membranes of adjacent cells.
 - (5) Anchor junctions mechanically connect the cytoskeletons of muscle tissues.

08. Which one of the following features, differs a mitochondrion from a chloroplast?

- (1) Being double membraned.
- (2) Absence of membrane system inside the matrix.
- (3) Presence of 70s ribosomes.
- (4) Presence of starch granules.
- (5) Presence of circular DNA.

09. Two incidents that occur during the mitosis of the cells are given below.

- (a) Movement of chromosomes in to back and forth by some microtubules that attach to the kinetochore.
- (b) Elongation of the cell due to the lengthening of non – kinetochore microtubules.

The phases where above (a) and (b) incidents occur respectively,

- (1) Metaphase and Anaphase.
- (2) Prometaphase and Metaphase.
- (3) Prometaphase and Anaphase.
- (4) Prophase and Prometaphase.
- (5) Prophase and Metaphase.

10. Which one of the following is **correct** regarding the occurrence of continuous cell division without responding towards the control mechanisms of the body?

- (1) It occurs by giving signals to continue cell cycle by the growth factors in the body.
- (2) The cells that arise due to this process are recognized and destroyed by the immune system of the body.
- (3) A malignant tumor is formed due to a deformation of a normal single cell and continuous division of that deformed cell at the same site.
- (4) The spread of a tumor in to various locations in the body by matastasis is a cancer.
- (5) All the tumors that arise due to this process can completely remove by a surgery.

11. Which one of the following statement is **correct** regarding the enzymatic activity?

- (1) The active site of an enzyme is formed by few amino acids and other amino acids are not participated.
- (2) An active site of an enzyme is always tightly bounded to a specific substrate.
- (3) Biotin is an organic cofactor which is essential for the enzymatic activity.
- (4) Pepsin works best at P^H 8.
- (5) ADP functions as an allosteric inhibitor in the anabolic reactions.

12. Which one of the following is **correct** regarding the Allosteric regulation of enzymes?

- (1) The molecules that naturally regulate enzymatic activity, act as reversible competitive inhibitors.
- (2) Most enzymes regulated by allosteric regulation are made up of two or more subunits.
- (3) Regulatory molecules affect the function and shape of the enzyme by binding to the active site of an enzyme.
- (4) In order to affect active sites of the enzyme, either activator or inhibitor should bind with the regulatory sites of all subunits.
- (5) An end product of an enzymatic activity, can bind as an activator and proceed the metabolic pathway further.

13. Which one of the following statement shows the **correct** pathway of electron transportation in photosynthesis?

- (1) Water \longrightarrow Photosystem I \longrightarrow Photosystem II \longrightarrow Calvin cycle
- (2) Chlorophyll \longrightarrow Photosystem I \longrightarrow Photosystem II \longrightarrow NADPH
- (3) NADPH \longrightarrow Electron transport chain \longrightarrow Calvin cycle
- (4) Photosystem I \longrightarrow Photosystem II \longrightarrow Electron transport chain \longrightarrow Calvin cycle
- (5) Photosystem II \longrightarrow Electron transport chain \longrightarrow Photosystem I \longrightarrow NADP⁺

14. Which one of the following statement is **incorrect** regarding the photosynthetic pigments?

- (1) Chlorophyll a directly participates in the light reaction of photosynthesis.
- (2) Chlorophyll b effectively absorbs specific range of wavelengths corresponding to different colours.
- (3) Chlorophyll a absorbs blue and red light effectively.
- (4) Chlorophyll b absorbs and dissipates excessive high light energy.
- (5) Carotenoids prevent the formation of harmful reactive oxidative molecules which are dangerous to the cell.

15. Which one of the following components are associated **only** with the C₄ pathway of photosynthesis?

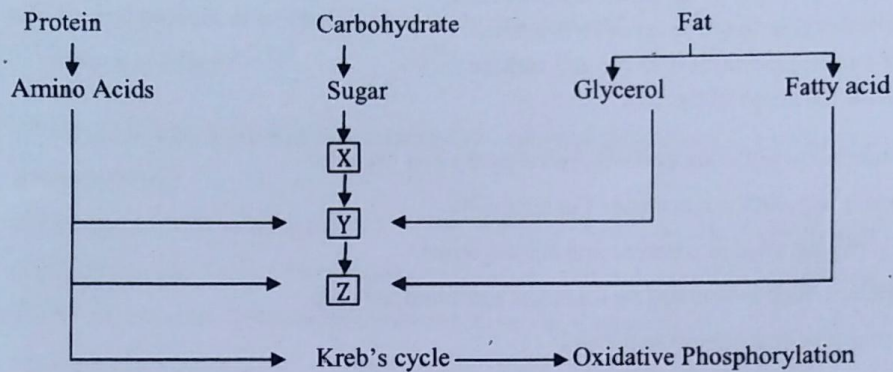
- | | |
|--------------------|------------------------|
| (a) NADP Reductase | (c) Carbonic anhydrase |
| (b) RUBISCO | (d) PEP Carboxylase |
- (1) a and b only
 - (2) b and c Only
 - (3) c and d only
 - (4) a, b and c Only
 - (5) All of the above

16. Which one of the following statement is **correct** regarding the Glycolysis?

- (1) The enzymes that catalyze this process are found in the Mitochondria.
- (2) This process does not depend on molecular oxygen. (O₂)
- (3) At the end of the Glycolysis, two ATP molecules are produced.
- (4) The H⁺ that are released from breakdown of glucose are used to oxidize two NAD⁺ molecules.
- (5) 6C Glucose molecule is broken down in to two pyruvate molecules simultaneously.

17. Which one of the following statement is **incorrect** regarding the biochemical evolution?
- (1) Origin of life on earth occurred before 3.5 billion years ago.
 - (2) Simple organic molecules polymerized and synthesized organic macromolecules.
 - (3) Primitive soup in the ancient ocean was a solution comprised with inorganic molecules.
 - (4) Protocells are formed by accumulation of RNA in to lipid bounded vesicles.
 - (5) The RNA which acted as early genes were enabled to replicate.

18. The diagram below shows the use of proteins, carbohydrates and fats in respiration.



The X,Y,Z compounds are,

X	Y	Z
(1) Glucose	Glyceraldehyde 3P	Acetyl Co A.
(2) Glyceraldehyde 3P	Pyruvate	Acetyl Co A.
(3) Pyruvate	Glyceraldehyde 3P	Acetyl Co A.
(4) Glucose	Pyruvate	Acetyl Co A.
(5) Pyruvate	Acetyl Co A	Citrate

19. **Correct** statement regarding the history of classification is,

- (1) Theophrastus classified plants as biennials and perennials only.
- (2) Ernest Haeckel introduced the kingdom protista.
- (3) Aristotle introduced plant and animal kingdoms.
- (4) Prokaryotic and Eukaryotic cellular organizations are originated after discovery of microorganisms.
- (5) Robert Whittaker introduced the three Domain system of classification.

20. Which one of the following statement is **incorrect** regarding the evolution of organisms?

- (1) Mesozoic era – Dominance of cone bearing plants.
- (2) Palaeozoic era – Origin of mammals.
- (3) Cenozoic era – Dominance of Angiosperms.
- (4) Hadean eon – Origin of earth.
- (5) Proterozoic eon – Diversification of Algae.

- For each of the questions 21 to 25 one or more of the responses is/are correct. Decide which response/ responses is/are correct and then select the correct number.

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

21. Which of the following is/are the function/s of the Extracellular Matrix?
- (A) Influences the cell behaviour by involving in the mechanical and chemical signaling.
 - (B) Links the extracellular matrix and cytoskeleton.
 - (C) Controls the entering of water in to the cells.
 - (D) Forms a protective layer over the cell surface.
 - (E) Maintains the shape of the cell.
22. Which of the following is/are **correct** regarding the cell vacuole?
- (A) Important to maintain the shape of animal cells.
 - (B) Store pigments such as carotene and anthocyanine.
 - (C) A structure which is bounded by tonoplast and filled with sap.
 - (D) Give turgidity and support to the cell.
 - (E) A double membraned organelle.
23. In the electron transport chain,
- (A) Co-enzymes which are produced in the early stages of cellular respiration are oxidized.
 - (B) Final electron acceptor is molecular oxygen (O₂).
 - (C) Produce ATP by substrate phosphorylation.
 - (D) Oxidization of NADH or FADH₂, produce 2.5 ATP molecules.
 - (E) The total number of ATP molecules that produce in a cardiac muscle cell are 32.
24. Select **correct** statement/s regarding the theories of evolution.
- (A) Organisms acquire adaptations during their life time according to the needs of the environment.
 - (B) The organs which are used by the organisms extensively grow larger and stronger.
 - (C) Theory of Lamark's theory was based on the overproduction and variations.
 - (D) Organisms resistivity against diseases was advantageous for their reproduction and survival.
 - (E) Neo Darwinism is an integration of Lamark's theory and Darwin's theory of natural selection.
25. **Correct** statement/s regarding the binomial nomenclature is/are
- (A) The name of an organism has two parts as the specific epithet and the generic name respectively.
 - (B) Closely related species have the same generic name.
 - (C) Scientific name is a combination of generic name and specific epithet.
 - (D) Two species of organisms cannot have the same specific epithet.
 - (E) This was proposed by the Carolous Linnaeus.

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 General Certificate of Education (Adv. Level), Grade 12 First Term Test, November 2019

පීට විද්‍යාව II
Biology II

09 E II

පැය එකයි මිනිත්තු තිහයි
 One and half hours

Index No :

Instructions :

- * This question paper consists of 06 questions in 05 pages.
- * This question paper comprises Part A and Part B. The time allocated for both parts is three hours.
 - Part A - Structured Essay (pages 02 – 05)**
- * Answer all four questions on this paper itself.
- * Write your answer 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 06)**
- * Answer four questions only. Use the papers supplied for this purpose. At the end of the time allocated for this paper, before handing over to the supervisor tie two parts together so that part A is on the top Part B.
- * You are permitted to remove only part B of the question paper from the examination hall.

For Examiners' Use only.

Part	Question No	Marks
A	01	
	02	
B	03	
	04	
	05	
Total		
Percentage		

Final Marks

In Number	
In Letters	

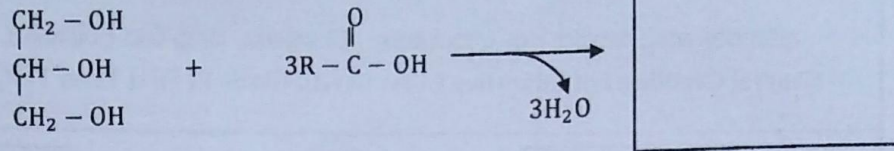
Code Numbers

Marks checked by	
Supervised by	

Part A - Structured Essay

- Answer both questions on this paper itself.

01. (A) (i) Mention the structure of the end product of the chemical reaction given below.



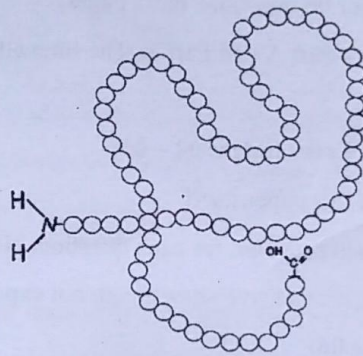
(ii) Mention the compound(s) that contribute to the each of the functions given below.

- (a) Maintain the fluid nature of the plasma membrane
- (b) Act as signal molecules that circulate throughout the body

(iii) What are the reasons for Artherosclerosis?

.....

.....



(iv) What is the macromolecule mentioned above?

.....

(v) Mention the structural unit of the above macromolecule and draw the common structure of it.

Structural unit :

Structure :

(vi) What is meant by protein denaturation?

.....

.....

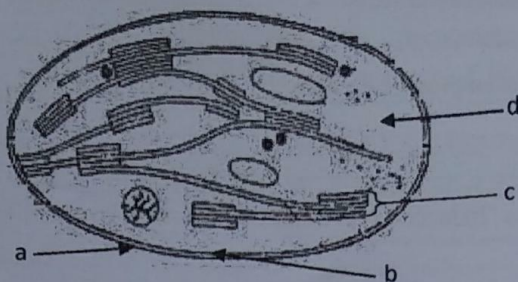
(vii) Write **two** agents that affect on protein denaturation.

.....

.....

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any thing in
this column.

(B) A diagram of a structure of a chloroplast is given below.



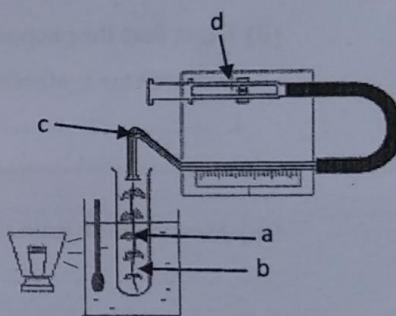
(i) Name a, b, c and d parts of the diagram.

(a) (c)
 (b) (d)

(ii) Mention the places in the above organelle where each of the following substances present.

RUBISCO :
 Photosynthetic Pigments :
 Electron acceptors :

- An apparatus which is used to determine the rate of photosynthesis in the laboratory is given below.



(iii) Identify the instrument.

.....

(iv) Name a, b, c and d parts.

(a) (c)
 (b) (d)

(v) What is the assumption you use when determining photosynthetic rate by using above instrument?

.....

(vi) How do you use this instrument to study the effect of CO₂ concentration on photosynthetic rate?

.....

(C) (i) What are co – factors?

.....
.....

(ii) Write **two** examples for organic co – factors.

.....
.....

(iii) Explain the "Induced fit mechanism" regarding enzymatic activity.

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

02. (A) (i) Mention **four** gases that released to the early earth's atmosphere due to volcanic eruptions.

.....
.....

(ii) Other than the phenomenon given above, mention other **four** natural phenomena that favoured the synthesis of simple organic compounds in the early earth.

1. 2.
3. 4.

(iii) Mention **four** main steps that contributed to the formation of the first cell.

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

(iv) What was the compound that acted as enzymes in the protocell?

.....

(B) (i) What are the subject areas that provide evidences about the first living cell?

.....
.....

(ii) Mention the first group of photosynthetic organisms

.....

(iii) Mention the main reasons for the each of the phenomenon given below.

a) Oxidizing of (Fe^{2+}) in early earth.

b) Acceleration of the origin of the chloroplast

Do not write
any thing in
this column.

(iv) Mention important phenomena that took place during the evolution of biological diversity on the earth at the time periods given below.

- a) Late – Proterozoic Period
- b) Before 365 million years ago

(v) Mention the first person who classified the organisms according to a scientific basis?

.....

(vi) Write **three** similarities between Archaea & Eukarya Domains.

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

(C) (i) Mention the importance of discovering electron microscope in classification process.

.....
.....

(ii) What are the facts that affect to use natural systems in interpretation of evolutionary relationships?

.....
.....

(iii) Linnaeus introduced the binomial nomenclature due to the confusions arisen during the use of common names. Mention these confusions.

.....
.....

(iv) Complete the below given dichotomous key using the animals given below.

Centipede, Cobra, Turtle, Earthworm, Sea star, Weevil

1. Possess jointed legs
2. Possess elongated body
- No elongated body
3. Possess clitellum
- No clitellum
4. Possess penta radial symmetry
- No penta radial symmetry
5. Possess Poisonous stings
- No Poisonous stings

Part B – Essay

- Answer **two** questions only.
Give clear labeled diagrams where necessary
(Each question carries 15 marks)

03. (a) Compare the main features of light microscope and electron microscope.

(b) Describe the structure & the functions of the plasma membrane.

04. (a) Describe the structure & importance of the ATP molecule as the universal energy transaction unit.

(b) Describe the process of ATP synthesis, When there is no O_2 within living cells.

05. Write short notes on,

(a) Polysaccharides

(b) Endoplasmic Reticulum

(c) Methods of classification of organisms