



First Term Test - June 2023

Grade 11

Biology 1

09 E I

One hour

Answer all questions.

- 1) Select the response that contains only communicable diseases
 - 1) AIDS, Chronic renal disease, Cancer
 - 2) AIDS, Covid 19, Dengue
 - 3) Diabetes, Heart diseases, Dengue
 - 4) Heart diseases, Covid 19, Cancer
 - 5) AIDS, Dengue, Diabetes
- 2) Select the correct statement from following
 - 1) There are about 100 million to over 1000 million of living species in the world.
 - 2) Sustainable food production is the production of sufficient amount of food for the human population
 - 3) Order and organization is not an essential characteristic of organism to perform their biological activities efficiently.
 - 4) All organisms begin their life as a single cell.
 - 5) Some nonliving entities show all the characteristics of organisms.
- 3) Select the correct statement
 - 1) Around 25% of elements are essential to continue healthy life and reproduction.
 - 2) Around 25% of elements are essential for humans and about 17% of elements for plant.
 - 3) Ca, P, K and S make up 4 % of the mass of the organism.
 - 4) Na, Cl, Mg, B, Co, Cu, Cr, F, I and Fe are the elements which are only found in humans in minute amount.
 - 5) Oxygen, Carbon, Hydrogen and Nitrogen are the most abundant elements in living matter.
- 4) Select the incorrect statement about the water
 - 1) Water molecule is a small, polar and angular molecule.
 - 2) Weak attractions between the hydrogen atom of one water molecule and polar oxygen atom of adjacent water molecules are known as hydrogen bonds.
 - 3) When the water is in liquid form its hydrogen bonds form, break and reform with great frequency.
 - 4) Adhesion between water molecules and cell walls helps in conduction of water and dissolved substances.
 - 5) Due to the high heat of vaporization organisms can prevent from over heating.
- 5) Which of the following is correct regarding the carbohydrates with keto group?
 - 1) It is a structural compound in plant cell wall.
 - 2) It acts as a main storage compound in fungi
 - 3) It contains in germinating seeds.
 - 4) It can be obtained by hydrolyzing a storage compound starch in some plant organs.
 - 5) It is a structural compound in plasma membrane.

6) Which of the following is not relevant regarding the disaccharides made up of different types of monomer units?

- 1) Storage sugar in milk
- 2) Translocation in phloem.
- 3) Storage sugar in sugarcane stems
- 4) Main energy source in animals
- 5) When it is hydrolyzed, monomer unit of inuline can be obtained.

7) Incorrect statement regarding unsaturated fat is,

- 1) Fatty acids with hydrocarbons having one or more double bonds.
- 2) Cis unsaturated fats contribute for the increase of thickness of artery walls.
- 3) Plants contain this type of fat.
- 4) They are liquid in room temperature.
- 5) Vegetable oils consist of unsaturated fats.

8) Incorrect relationship regarding different types of proteins, functions and examples is,

	Type of proteins	Function	Example
1)	Hormone	Regulate blood glucose level	Glucagon
2)	Storage	Stored in milk	Casain
3)	Motor	Contraction of muscle fibers	Myosin
4)	Transport	Transport nucleic acids	Serum albumin
5)	Catalytic	Catalyze biochemical reactions	Pepsin

9) Incorrect statement regarding NADP⁺ is

- 1) Oxidizing agent in photosynthesis
- 2) Acts as an electron carrier.
- 3) It is a coenzyme
- 4) It is a nucleotide
- 5) Oxidizing agent in cellular respiration

10) Incorrect statement regarding biological compounds is

- 1) All the monosaccharides are reducing sugar and water soluble
- 2) All the biological compounds consist of C, H, O, and N as elements.
- 3) Fatty acids and glycerol bind with ester bonds when forming triacylglycerol.
- 4) Most of enzymes have tertiary structure of proteins and can have disulphide bonds and ionic bonds.
- 5) ATP is a ribonucleotide with three phosphate groups.

11) Elemental composition of the main component of the plasma membrane which is responsible for fluid nature is

- 1) C, H, O, P
- 2) C, H, O, N
- 3) C, H, O, N, P
- 4) C, H, N, P
- 5) C, H, O, N, S

12) Which of the following takes place in the telophase of mitosis?

- 1) Two genetically identical daughter cells are produced.
- 2) Sister chromatids act as whole chromosomes
- 3) Cell elongates as the non-kinetochore microtubules are lengthen
- 4) Spindle microtubules are rearranged allowing the cell for next cell division
- 5) Nuclear envelope reforms around each set of chromosomes.

13) Incorrect statement regarding enzymes is

- 1) They decrease the activation energy of bio-chemical reactions.
 - 2) Most of the enzymes are globular proteins.
 - 3) Enzymes participated for reactions are used up due to the formation of enzyme substrate complex.
 - 4) Enzymes are highly specific to the substrate
 - 5) Rate of reactions can be reduced by inhibitors.
- 14) Which of the following places is not responsible for phosphorylation to take place?
- 1) Stroma of chloroplast
 - 2) Thylakoid membranes of chloroplasts
 - 3) Cytosol
 - 4) Matrix of mitochondria
 - 5) Cristae of mitochondria
- 15) Select the incorrect statement regarding C_4 photosynthesis
- 1) Rubisco catalyzes reactions more efficiently in bundle sheath cells than in C_3 plants.
 - 2) Calvin cycle does not take place in mesophyll cells of C_4 plants.
 - 3) PS II is depleted in mesophyll cells
 - 4) PEP carboxylase enzyme is more efficient than Rubisco for fixation of CO_2
 - 5) The nitrogen usage is more efficient in C_4 plants than that of C_3 plants.
- 16) The Calvin cycle
- 1) does not occur in C_4 plants.
 - 2) must take place three times for the net synthesis of one Glyceraldehyde 3-phosphate for one glucose molecule.
 - 3) requires PEP carboxylase
 - 4) produces 3-PGA as the first product.
 - 5) is a catabolic reaction.
- 17) Incorrect statement regarding glycolysis is
- 1) This takes place in the cytosol of the cell.
 - 2) Two ATP molecules are used up for the initiative step.
 - 3) Glycolysis takes place in the mesosome of bacteria.
 - 4) Four hydrogen ions and electrons released from one glucose molecule breakdown reduce two NAD^+ and produce two NADH.
 - 5) This is oxygen independent process.
- 18) Mis-matched pair regarding cellular respiration when considering one glucose molecule is,
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|--|---|--|
| 1) Oxidation of pyruvate | : | Two CO_2 molecules are released. |
| 2) Converting citrate into 5C compound | : | One NADH is produced. |
| 3) Converting citrate into 5C compound | : | Two CO_2 molecules are released. |
| 4) Oxidation of pyruvate | : | Two NADH are produced |
| 5) Krebs cycle | : | Two ATP and two $FADH_2$ are produced. |
- 19) Which of the following is correct regarding different respiratory substrates?
- 1) Fat is hydrolyzed into glycerol and fatty acids and converts into acetyl co-A and enters glycolysis respectively.
 - 2) When amino acids are converted to pyruvate NH_3 is removed.
 - 3) Amino acids participate by converting only into pyruvate.
 - 4) Pyruvate oxidation does not take place when protein is used as the substrate.
 - 5) Glycolysis does not take place when fat is used as the substrate.

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According to the theory of natural selection, which one is not a favourable characteristics for survival and reproduction is

- and reproduction is,
- 1) Defense
 - 2) Fertilizing probability
 - 3) Obtaining food
 - 4) Production of limited number of offspring
 - 5) Resistance against disease

• 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.

- | | | |
|---|-------|---|
| 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 only correct | _____ | 4 |
| If any other response or combination of response 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

- 21) Which of the following is correct regarding Trypsin?
- A) This is pH sensitive and works best at basic pH range.
 - B) Activity of this depends on the temperature and the maximum rate of reaction is only at optimum temperature.
 - C) This enzyme catalyzes the reaction only in living cells.
 - D) Substrate is hydrolyzed into fatty acids by the activity of this enzyme.
 - E) Elemental composition of this enzyme is C, H, O, N and P.
- 22) Which of the following statement/ statements is/are correct regarding cellular organelles?
- A) The basal body which anchors the cilium has 9 + 0 arrangement of microtubules.
 - B) Matrix of mitochondria consists of phosphate granules and enzymes for oxidative phosphorylation.
 - C) Trans face gives rise to secretory vesicles which will form as lysosomes.
 - D) Glyoxysomes are found in fat storing tissues in plants.
 - E) Rough endoplasmic reticulum stores Ca^{2+} ions.
- 23) Which of the following is correct regarding the number of ATP produced for one glucose molecule?
- A) Glycolysis : 4 ATP
 - B) Krebs cycle : 2 ATP
 - C) Electron transport chain : 20 ATP
 - D) Ethyl alcohol fermentation : 2 ATP
 - E) Calvin cycle : 2 ATP
- 24) Which one of the following is correct regarding *Salmonella typhi*
- A) Presence of introns in some genes
 - B) Peptidoglycan is present as cell wall component
 - C) Growth is inhibited by streptomycin
 - D) Diverse in habitats
 - E) Initiator amino acids for protein synthesis is methionine.
- 25) Which one of the following / followings are common characteristics for both *Paramecium* and *Amoeba*.
- A) Aquatic
 - B) Lack of cell wall
 - C) Oral groove is present
 - D) Food vacuoles and contractile vacuoles are present

Part - A Structured Essay

Answer all the Questions

Answer all the questions.

- (I) A) i) Arrange the following compounds in ascending order according to their molecular mass. (Use the letters)

- A - Fatty acids contained in triacylglycerol.
- B - Cytosine
- C - Phospholipids
- D - Adenine
- E - Cellulose

ii) Write the elemental composition of hemoglobin.

iii) One of a DNA strand contains 10,000 nucleotides. 60% out of them is purine bases. Out of pyrimidine bases 15% is cytosine. What is the amount of thymine bases?

iv) You are provided four solutions of amylase, sucrose, maltose and starch which are not labeled. How can you identify each solution by using only Benedict's reagent?

B) i) Define two parameters used in compound microscopes.

ii) State two differences between two main types of electron microscopes.

iii) a) What is known as cytoskeleton?

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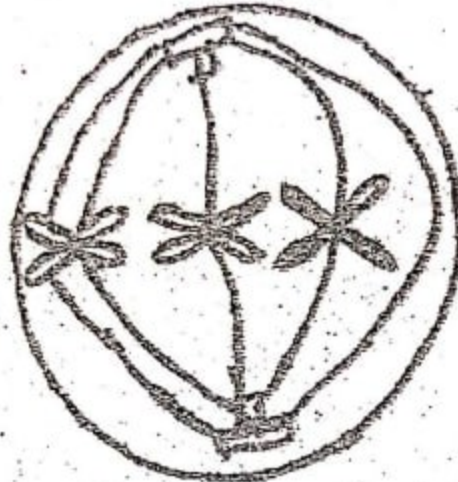
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b) What are the protein subunits contained in the cytoskeleton?

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iv)



a) Which phase of the cell division is indicated by the above diagram?

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b) State two significance of above type of cell division.

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v) What is known as metastasis?

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C) i) a) Name the elemental composition of proteins.

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b) What is the type of bond formed in the polypeptide chain?

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c) What is the reason for the amphoteric nature of the polypeptide chain?

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ii) a) Write in four steps of the test used in identification of storage egg.

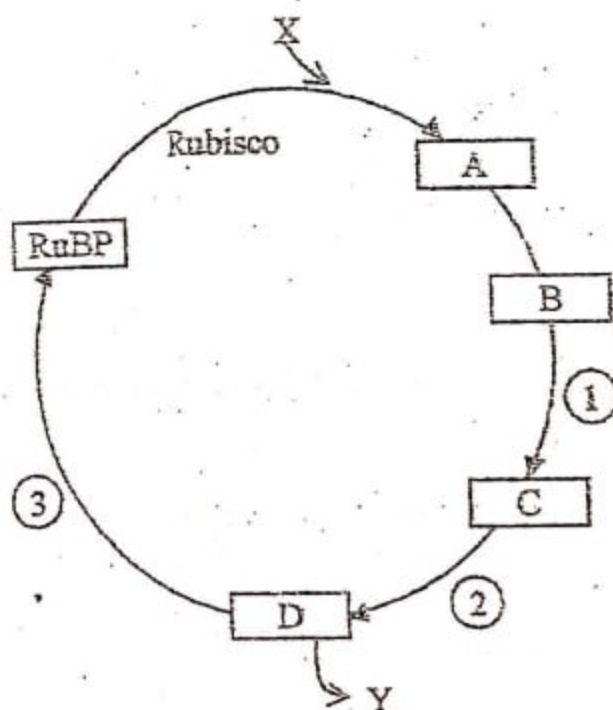
b) What is the observation of above test?

iii) a) What is known as cooperativity?

iv) a) Name a type of molecule which acts as an allosteric activator.

b) Briefly explain the activity of above molecule.

(2) A) i)



a) What is indicated by A in above diagram?

b) State the molecules used in 1, 2, 3 places of above diagram.

1.

2.

3.

c) Which substances represented by X and Y.

X

Y

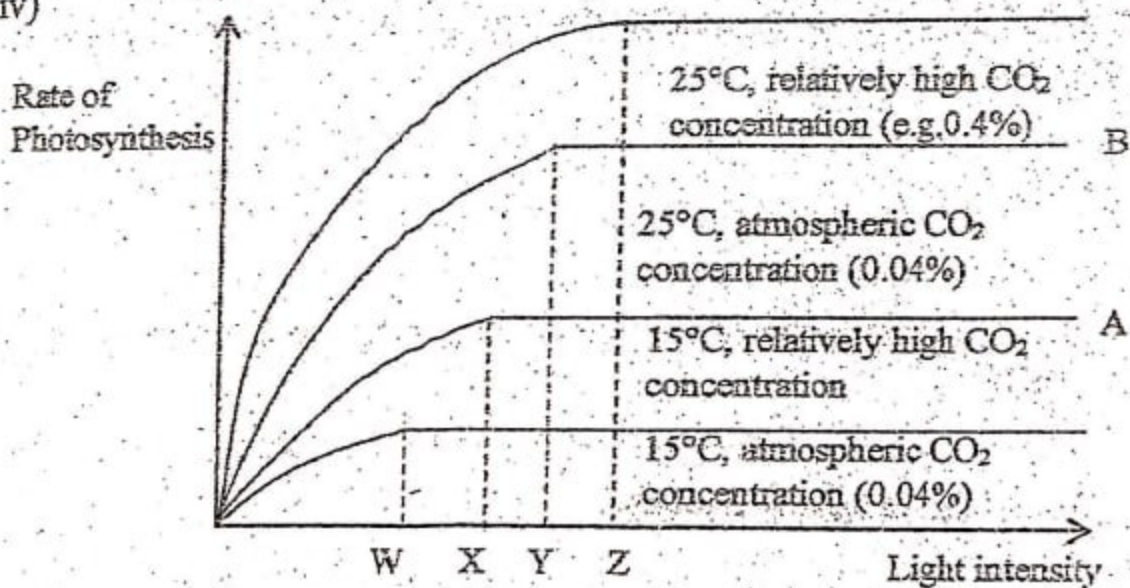
d) How many times this cycle should take place to produce one glucose molecule?

e) How is it called the reaction catalyzed by Rubisco in Calvin cycle?

ii) How does Rubisco contribute for photorespiration?

iii) State two disadvantages of photorespiration.

iv)



a) What is the limiting factor up to X in above graph A?

b) What is the limiting factor from Y onward in graph B?

c) State the principle that explains above phenomenon?

B) i) What is known as cellular respiration?

ii) State the conditions needed to enter and products of glycolysis to mitochondria?

iii) How many ATP molecules are produced by oxidative phosphorylation in cellular respiration?

iv) a) What is meant by fermentation?

b) What is the type of fermentation takes place in yeast?

c) How does the above process contribute to prevent the limitation of NAD^+ needed for glycolysis?

v) State the final hydrogen acceptor in the type of fermentation which does not contribute for photosynthesis?

vi) a) What is known as respiratory quotient?

b) What is the reason that respiratory quotient becomes 0.8 in protein?

C) i) What is meant by taxonomy?

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ii) Write three important taxonomic criteria used in present system of classification.

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iii) a) Write the name of the Sri Lankan leopard according to the binomial nomenclature.

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b) State the phylogenetic species concept.

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iv) a) Define polyphyletic group and state one example.

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b) State the modes of nutrition seen in kingdom Protista giving example for each.

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v) Write the types of cell wall components seen in following organisms.

a) *Gelidium*

b) *Sargassum*

c) Diatoms



Royal College -- Colombo

First Term test -- June 2023
Grade -- 12

Biology II

Part B -- Essay

- Answer all the questions
Give clear labelled diagrams where necessary
(Each question carries 150 marks)

3.
 - a) Explain the process of photosynthesis taking place through both photosystems.
 - b) Describe the step of aerobic cellular respiration which uses molecular oxygen.
4. Write short notes on following
 - a) RNA
 - b) Mitochondria
 - c) Protocell