



Second Term Examination – November 2022
Conducted by
Field Work Centre, Thondaimanaru.

Biology - I

Three Hours and
10 minutes

09

E

I

Gr -12 (2023)

- ❖ Answer **all** questions.
- ❖ In each of the question 1-50, 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 (X)** on the number.

01) Correct sequence of hierarchical levels of organizations of living organisms.

1. Cell, organ, organ system, individual.
2. Organelle, cell, tissue, organ.
3. Tissue, organ, organ system, species.
4. Individual, population, community, biosphere.
5. Biosphere, ecosystem, community, population.

02) Due to high heat of vaporization,

1. water act as a thermal buffer in the living systems.
2. the density of water can be reduced.
3. an organism can release low heat energy with its minimum loss of water.
4. organisms can be prevented from overheating.
5. can only be contributed to moderate the temperature.

03) Elemental combination of C, H, O, N and P

1. found in proteins.
2. found in some carbohydrates.
3. found in all lipids.
4. make up the 96% living matter.
5. found in co-enzymes.

04) Which of the following is the smallest carbohydrate?

1. Phospho glyceraldehyde.
2. Acetaldehyde.
3. Erythrose.
4. 3 – phospho glycerate.
5. NADH.

05) All proteins

1. are non-polymers.
2. have different 21 amino acids in the formation.
3. have inter - molecular interactions.
4. have peptide bonds.
5. have four structural levels.

06) A. participates in photorespiration.

B. Detoxification of peroxide.

C. Synthesis of steroids.

D. Exocytosis.

Organelles for the above functions respectively.

1. Peroxisome, smooth ER, rough ER, lysosome.
2. Chloroplast, peroxisome, smooth ER, Golgi complex.
3. Mitochondrion, peroxisome, smooth ER, lysosome.
4. Mitochondrion, glyoxisome, smooth ER, lysosome.
5. Golgi complex, peroxisome, lysosome, smooth ER.

07) Correct statements regarding cell junctions.

1. They join the cell walls of the adjacent cells.
2. There are four types of cell junctions found in animal cells.
3. Tight junctions connect the plasma membranes of adjacent cells tightly bound by specific proteins forming continuous seals around the them.
4. Communication junction found in embryos.
5. Desmosomes mechanically attach the cytoskeleton of adjoining cells by protein filaments such as microfilaments.

08) Chromosomes of the cell get attached to kinetochore microtubule at the centromere in

1. prophase.
2. telophase.
3. S phase.
4. G₂ phase.
5. metaphase.

09) Some of the molecule found in the photosystem are given below.

- a. 1,3-bis phosphoglycerate.
- b. RuBISCO.
- c. Glyceraldehyde-3-phosphate.
- d. 3-phosphoglycerate.
- e. PEP.

Of these molecules, involves in the carbon fixation in C₃ plants, precursor molecule for synthesis of carbohydrates and first stable product in carbon fixation are respectively,

1. e, d, a
2. b, c, d
3. b, d, c
4. b, a, d
5. e, c, d

10) Correct statement regarding cellular respiration.

1. It occurs only in aerobic conditions.
2. Glucose is the only substrate used in cellular respiration.
3. Generation of energy from oxidation of NADH and FADH₂ takes place only in aerobic respiration.
4. Oxidative phosphorylation takes place in the matrix of mitochondria.
5. Only in the presence of molecular oxygen, pyruvate diffuses into mitochondria.

11) One of the favorable characteristics for survival and reproduction in a population for Darwin's natural selection.

1. Use
2. Disuse
3. Resistant against diseases.
4. Competition
5. Inheritance of acquired characteristics.

12) Character that distinguishes archaeobacteria from other prokaryotes.

1. Presence of circular chromosomes.
2. Unicellular.
3. Presence of cell wall.
4. Membrane lipids have branches.
5. Absence of mitosis and meiosis.

13) Only marine forms of protists found in

1. *Ulva*, *Euglena* and *Amoeba*
2. *Gelidium*, *Ulva* and Diatom
3. *Ulva*, *Gelidium* and *Sargassum*
4. *Sargassum*, *Euglena* and *Paramecium*
5. *Amoeba*, *Euglena* and Diatom.

14)

- All species are homosporous.
- Bisexual gametophytes.
- Both gametophytes and sporophytes are photosynthetic.

Select the plant found in the phylum for the above descriptions.

- | | | |
|----------------------|-----------------------|---------------------|
| 1. <i>Lycopodium</i> | 2. <i>Nephrolepis</i> | 3. <i>Pogonatum</i> |
| 4. <i>Anthoceros</i> | 5. <i>Marchantia</i> | |

15) a. Mesoglea

Cnidaria

b. Gastro vascular cavity

Platyhelminthes

c. Pseudocoelom

Nematoda

d. Book lung

Arthropoda

e. Mouth downward

Echinodermata

Correct combination regarding **specific feature – phylum**.

- | | | |
|--------------------|--------------------|--------------------|
| 1. Only a, c and e | 2. Only a, c and d | 3. Only c, d and e |
| 4. Only a, d and e | 5. Only b, d and c | |

16) **Tissue**

Function

Apical meristem

A. prevent desiccation

Dermal tissue

B. elongates in length

Intercalary meristem

C. provide mechanical support

Sclerenchyma

D. rapid growth of damaged leaves.

Correct sequence regarding **tissue - function**.

- | | | |
|---------|---------|---------|
| 1. BACD | 2. BADC | 3. BDAC |
| 4. BCDA | 5. CADB | |

17) Correct regarding young dicotyledonous plant stems.

1. A large pith is found at the centre and which are made up of parenchyma cells.
2. In its vascular bundle, xylem is located towards the cortex and phloem towards the centre.
3. Its vascular bundles are surrounded by sclerenchyma cells.
4. Vascular bundles are surround by bundle sheath cells.
5. A group of collenchyma cells found exterior to vascular bundle.

18) Companion cells

1. All of them participate in phloem loading.
2. are non-conducting cells.
3. are dead at functional maturity.
4. connects with sieve tube element by numerous desmosomes.
5. are found alongside in each xylem vessel.

19) **Element****Significance****Deficiency syndrome**

- | | | |
|--------------|------------------------------|---------------------------------|
| A. Cl | P. Nitrogen metabolism | X. Chlorosis in older leaves. |
| B. Mg | Q. Osmosis and ionic balance | Y. Death of shoot and root tip. |
| C. Mo | R. Activator of enzymes | Z. Leaf mottling. |

Correct sequence regarding the above.

- | | | |
|------------|------------|------------|
| 1. A, Q, Y | 2. B, R, Z | 3. C, R, Z |
| 4. A, R, Z | 5. A, Q, Z | |

20) Water potential

1. of pure water is defined as 1.0 MPa, when any external pressure is not exerted on it.
2. determines the direction of the water movement between cells.
3. is the difference between the solute potential and pressure potential.
4. increases when the solute potential increases.
5. decreases when the pressure potential increases.

21) Factor induces the opening of stomata.

1. High temperature.
2. Decrease in available soil water.
3. Decrease in CO₂ concentration in sub stomatal cavities.
4. Drought.
5. Wind speed.

22) In the life cycle of *Pogonatum*

1. sporophytes are always depended on gametophytes.
2. spores germinate to give gametophytes.
3. sperms swim in external water and fertilize externally.
4. embryo gets its nutrients from female gametophyte.
5. gametophytes are bisexual.

23) Correct regarding gametophytes of flowering plants.

1. Female gametophytes have more cells than male gametophytes.
2. They are unicellular.
3. They form from meiosis.
4. They are non-microscopic.
5. They have dormant periods.

24) Thigmotropism

1. strengthen photosynthesis.
2. helps the roots grow down.
3. occurs in the leaflets of *Mimosa pudica*.
4. occurs due to differential growth of tendrils in vines.
5. occurs with the participation of blue light receptors.

➤ Follow the instructions to questions 25 – 30.

A, B, D correct 1 st Answer.	A, C, D correct 2 nd Answer.	A, B correct 3 rd Answer.	C, D correct 4 th Answer.	Any other responses 5 th Answer.
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25) Which of the following / followings can be found in more than one group of organisms?

- A. Chitin
- B. Cellulose
- C. Inulin
- D. Glycogen
- E. Hemi cellulose

26) Which of the following/ followings may be found in both prokaryotic and eukaryotic cellular organization?

- A. Flagellum
- B. Cytoskeleton
- C. Plasma membrane
- D. Cell wall
- E. Nuclear envelope

27) Characteristic / Characteristics can be seen in phylum Zygomycota.

- A. Conidium
- B. Ascocarp
- C. Coenocytic
- D. Zygosporangium
- E. Exogenous spores

28) P – Scales.

Q – Ectothermic.

R – Limbs.

T – Bony endoskeleton.

Correct combination / combinations regarding the above characteristics.

- | | | | |
|---------------------|--------------|------------------------|--------------|
| A. P – Carangid | Q – Lizard | R – Toad | T – Whale |
| B. P – Humming bird | Q – Shark | R – Bat | T – Lizard |
| C. P – Shark | Q – Toad | R – <i>Ichthyophis</i> | T – Tortoise |
| D. P – Toad | Q – Carangid | R – Crocodile | T – Monkey |
| E. P – Skate | Q – Parrot | R – Whale | T – Cow |

29) Correct response / responses regarding a plant cell at flaccid stage.

- A. Its water potential and solute potential are equal.
- B. Its pressure potential is 0 MPa.
- C. Its solute potential and pressure potential are equal.
- D. Its pressure potential and solute potential become equal when placing in pure water and reaches the equilibrium.
- E. Solutes and water escaped from this cell.

30) Which of the following statement / statements is / are correct regarding seed plants?

- A. Origin of seed plants occurs about 305 million years ago.
- B. All the seed plants show pollination and double fertilization.
- C. Male gametophyte of these plants enclosed within the pollen wall.
- D. All seed plants do not require external water for fertilization.
- E. All have the dispersal unit as seeds and which are enclosed within fruits.



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Biology**- II**

Gr -12 (2023)

09**E****II**

Index No:

Instructions:

- ❖ This question paper consists of **07** questions in **11** pages.
- ❖ This question paper - **Part II** comprises Part **A** and **B**. The time allotted for **Part I and II** is **three hours**. (Additional reading time is **10 minutes**)
- ❖ Use additional reading time to go through the question paper, select the questions and decide on the questions that you give priority in answering.

Part A – Structured essay (Pages 2 – 10)

- * 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 11)

- * Answer **two** 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**.
- * You are permitted to take only Part B of the question paper from the examination hall. (**Detach it**)

For examiner's use only**Final Marks**

Part	Question No.	Marks
A	01	
	02	
	03	
	04	
B	05	
	06	
	07	
Total		

In numbers	
In words	

Examiner	
Checked by	1
	2
Supervised by	

A – Structured Essay

❖ **Answer all questions in this paper itself.**

(Each question carries 100 marks)

01. A) i) What is meant by adaptation?

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

ii) What are the characteristics of water for moderate the temperature?

.....
.....

iii) Give **one** disaccharide and **one** poly saccharide which are made up of different monomeric units.

Disaccharide :

Polysaccharide :

iv) Name an organelle that has enzymes and found only in plants and indicate a function.

Organelle :

Function :

v) Name the structure that helps to maintain the shape of the animal cells and provide strength to the cytoplasm and indicate its structural components.

Structure :

Structural components :

vi) Write the cell wall components of sclerenchyma cell.

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

B) i) Which protein joins the chromosomal arms of sister chromatids?

.....

ii) Indicate the phase of the eukaryotic cell cycle for the following events.

a) Micro tubules that attach to the kinetochore of the chromosomes move the chromosomes back and forth:

Agaram.LK - Keep your dreams alive!

Agaram.LK - keep your dreams alive!

b) Equal and complete set of chromosomes found opposite poles surrounded by nuclear envelope:

iii) How the anaphase I is differ from anaphase II?

.....

iv) Give **two** significances of meiosis.

.....
.....

v) a. Briefly indicate what happens during the hydrolysis of ATP.

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

b.What is the approximate value of free energy yield of the above-mentioned reaction in v). a?

.....

vi) What is substrate level phosphorylation?

.....
.....

C) i) Why enzymes are considered as biological catalysts?

.....

ii) What are enzyme cofactors?

.....
.....

iii) Why the enzyme activity rapidly declines when the temperature reaches a high value?

.....
.....

iv) What is action spectrum?

.....
.....

v) a. What are photo systems?

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

b. What are the main parts of a photo system?

.....
.....

02. A) i) Indicate the types of electron flow and participating photo system /systems in the light dependent reactions and indicate the product/s form from them that can be used in Calvin cycle.

Type	Photo system / photo systems participates/participate	Products/s
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.....
.....

ii) a. Which molecule is used to compensate the electrons that could be excited from photo system II?

.....

b. Give **one** biproduct which is form from the reactions of your mentioned molecule in ii) a.

.....

iii) Which is the exact location of glycolysis which is the first step in cellular respiration?

.....

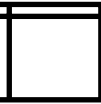
iv) Give the products form from the oxidation reactions of Krebs cycle when **one glucose** is considered.

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

B) i) Indicate the reduced co-enzymes form from aerobic respiration and number of ATP molecules produced when these coenzymes are being oxidized.

Co-enzymes	number of ATP molecules.
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.....
.....



ii) a. Give the products of alcohol fermentation.

.....
.....

b. Which is the most common organism that carries out alcohol fermentation?

.....

iii) a. What is respiratory quotient?

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

b. What is respiratory quotient value obtained during the seed germination seeds of lipid storage?

.....

iv). Which equipment used to measure the respiratory quotient?

.....

C) i) Define the term species regarding to phylogenetic species concept.

.....
.....

ii) Indicate the basis of the present systems of classification.

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

iii) a. Indicate briefly what is binomial nomenclature.

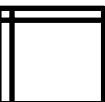
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b. Write the species name of an endemic species to Sri Lanka which consists of fruits with two wings.

.....

iv) Indicate unique characteristics of Domain bacteria.

.....
.....



03. A) i) Complete the following dichotomous key to distinguish the Protists given below.

Ulva, Diatom, Sargassum, Paramecium, Gelidium, Euglena.

- 1. Multi cellular thallus present
- Multi cellular thallus absent
- 2. Flagellum present
- Flagellum absent
- 3. Cilia present
- Cilia absent
- 4. Leaf like blade present
- Leaf like blade absent
- 5. Gas filled bulb shaped floats present
- Gas filled bulb shaped floats absent

ii) Which body part secrete the shell of animals of phylum Mollusca?

.....

iii) Which vertebrate class has no marine species?

.....

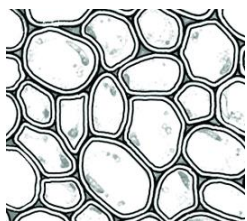
iv) Which animal class has animals that lay eggs on land?

.....

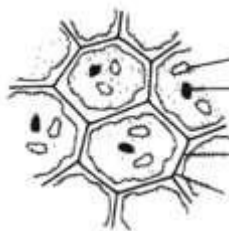
v) Which animal group show relatively long periods of parental care?

.....

B)



A



B

i) Identify A and B.

A :

B :

ii) Indicate how B is structurally differ from A.

.....



C



D

iii) How functionally C and D differ from each other?

.....

iv) Indicate **two** functions of cortex cells of plant root.

.....

.....

v) From which the cork cambium arises in the stems and roots of plants?

Stem.....

Root.....

vi) In the plants that do not show secondary growth, gaseous exchange takes place through a structure. Name that structure.

.....

vii) a. Indicate the **two** types of sclerenchyma cells.

.....

.....

b. Indicate a stain that can be used to identify sclerenchyma cells and the colour appears at staining.

.....

.....

C) i) a. What is phyllotaxy?

.....

b. Give one example plant for the vertically arranged leaves.

.....

c. What is the benefit of vertically arranged leaves?

.....

ii) a. Which epidermal cell contains chloroplasts?

.....

b. In which materials the walls of you - mentioned cell in ii) a., that have radially arranged to form inelastic hoops around, are made up?

.....

iii) a. What is osmosis?

.....

b. Briefly describe the water molecules that participates in osmosis.

.....

.....

iv) **Underline** the suitable word (**increases / decreases**) regarding the following statement.

If a flaccid cell is placed in pure water, its

a. pressure potential **increases / decreases**.

b. water potential **increases / decreases**.

v) If each of the following statement is correct or wrong, write as “**correct**” and “**wrong**” respectively.

a. Symplastic route requires substance to cross the plasma membrane once when they enter the plant. ()

b. Energy in the form of ATP is needed to lift the xylem sap. ()

c. Some species uses via the symplastic route passing through plasmodesmata for the phloem loading. ()

04. A) i) a. Which of the following / followings – **solute potential/ water potential/ pressure potential** can be determined in the experiment of using *Tradescantia* epidermal peel cells?

.....

b. Which cells can be observed in microscope and calculated in the above i) a. experiment?

.....

.....

c. To get results, a graph should be plotted regarding the readings obtained. Which quantities can be indicated in the X and Y axis of the graph?

X :..... Y :.....

ii) a. What would be done to determine the initial and final lengths of potato strips in the experiment to determine the water potential?

.....

b. State the time duration to reach the equilibrium of potato strips in the above experiment in

ii) a.

.....

- iii) a. Which apparatus can be used to measure transpiration in the laboratories?

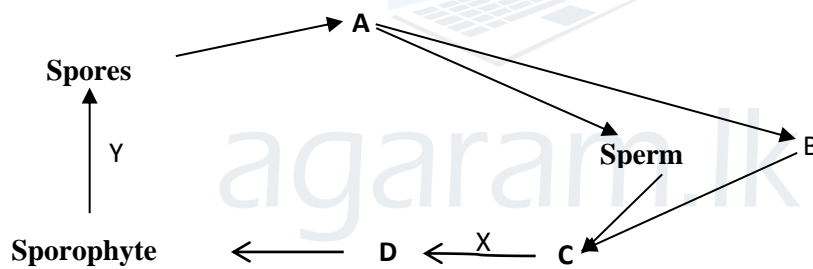
 b. In the apparatus mentioned in iii) a. the rate of transpiration would be compared to which of the reading you obtained?

 c. What is the aim that the vaseline / grease/ clay is applied to the apparatus you mentioned in iii) a.?

- iv) a. What is sugar source?

 b. Indicate **two** organs act as a source as well as a sink depending on its function.

B) The following diagram represents a life cycle of a terrestrial plant.



- i) Name A, C and D.
 A :..... C :..... D :.....
- ii) Indicate the type of cell divisions during X and Y.
 X :..... Y :.....
- iii) If A is the dominant generation, name the genera which represents A.

- iv) Indicate a tick (✓) or cross (✗) whether the following statements regarding *Sellaginella* is correct or incorrect respectively.
- a. The stem of sporophyte is dorsoventrally flattened. ()
 - b. Microsporophylls and megasporophylls are found in separate strobilus. ()
 - c. Female gametophytes are photosynthetic. ()
 - d. Developing embryos obtaining nutrients from female gametophyte. ()
 - e. Megasporophylls contain ovules. ()

v) What is the role of pollen tube in *Cycas*?

.....

vi) Following structures are seen in gymnosperms. Name the corresponding structure for each of them in the angiosperms.

a. Microsporophyll :.....

b. Megasporophyll :.....

c. Female gametophyte :.....

C) i) a. What is double fertilization which is the unique feature of flowering plants?

.....
.....

b. What is the significance of double fertilization?

.....

ii) Why seeds of anthophytes contain seed dormancy?

.....

iii) What is parthenogenesis in plants?

.....

iv) Briefly indicate what happens when plants exposed to direct sunlight.

.....
.....

v) a. What are essential elements of plants?

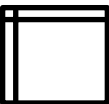
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b. Indicate the form/forms of intake of phosphorous from soil solution.

.....
.....

vi) Which element shows the deficiency symptom, light green colour throughout young leaves?

.....





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Biology - II

Gr -12 (2023)

09

E

II

B. Essay

- ❖ Answer only **two** questions.
- ❖ Draw fully labelled diagrams where necessary.

(Each question carries 150 marks)

- 05) a. Briefly describe the structure of chloroplast.
 b. Describe the physiological processes that take place in the stroma of chloroplast.
- 06) a. Describe the evolutionary trend of sporophytes of terrestrial plant life cycles.
 b. Briefly describe the nutritional diversity of plants.
- 07) Write short notes for the followings:
- a. Monosaccharides.
 - b. Zygosporangium.
 - c. Growth rings.

