



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

Biology - I

Three Hours and
10 minutes

09

E

I

Gr -12 (2022)

Part – I

- **Answer all questions.**
- **Select the suitable / most appropriate answer from the five alternatives and mark (X) on your answer sheet provided.**

01. First organisms evolved on the earth consists of
- 1) Photo phosphorylation, eukaryotic cellular organization and RNA.
 - 2) Prokaryotic cellular organization, glycolysis and RNA.
 - 3) Prokaryotic cellular organization, circular DNA and protein coat.
 - 4) Prokaryotic cellular organization, electron transport chain and enzymes.
 - 5) Plasma membrane, ribosome and Calvin cycle.
02. Correct combination regarding characters of water - functions
- 1) Ionic nature – glucose dissolve in water.
 - 2) Expansion upon freezing – having high density at 0 °C.
 - 3) High specific heat – cool the body surface of plants.
 - 4) High surface tension – water skaters can walk on the water surface.
 - 5) Cohesion – during winter, survival of organisms in the water bodies in the polar regions.
03. Polysaccharide that stores glucose as an energy source,
- 1) Glycogen
 - 2) Cellulose
 - 3) Inulin
 - 4) Chitin
 - 5) Hemi cellulose
04. Sister chromatids of each chromosome remain attached at the centromeres and move as a single unit towards the opposite poles, takes place
- 1) in prophase
 - 2) in anaphase II
 - 3) in telophase I
 - 4) in metaphase I
 - 5) in anaphase I
05. Enzymes'
- 1) allosteric activators always bind to the active sites.
 - 2) allosteric inhibitors are reversible competitive inhibitors.
 - 3) inhibitor binds with the regulatory site; it stabilizes the inactive form of enzyme.
 - 4) feedback inhibition prevents the wasting of ATP.
 - 5) cooperativity decreases the affinity to the substrate.
06. Which of the following statement is correct regarding photosynthesis?
- 1) PEP carboxylase contributes to the light reactions.
 - 2) High oxygen concentration inhibits the oxygenase reaction of the RuBISCO.
 - 3) Both C3 and C4 plants produce 2-phosphoglycolate.
 - 4) Both carboxylation and decarboxylation take place in the bundle sheath cells of C4 plants.
 - 5) RuBISCO is normally absent in the mesophyll cells.

07. One glucose molecule

- 1) produces 30 ATP within the mitochondria.
- 2) releases four hydrogen molecules and produces four NADH molecules during glycolysis.
- 3) produces 32 ATP molecules only in the active cells such as liver cells and cardiac muscle cells by oxidative phosphorylation.
- 4) undergo Krebs cycle and produces 10 NADH.
- 5) always yields CO₂ and water during cellular respiration.

08. Some statements regarding origin of protocell are given below.

P – Volcanic atmosphere and alkaline vents favour the abiotic synthesis of organic molecules.

Q – Only the RNA was collected into the protocell.

R – Growth occurred by addition of protein to the membrane by collision of vesicles.

Correct statement /statements

- | | | |
|------------|------------|-----------|
| 1) P and Q | 2) Q and R | 3) Q only |
| 4) P only | 5) P and R | |

09. A feature can be used to distinguish Domain Bacteria from other Domains.

- 1) Prokaryotic cellular organization.
- 2) Protein synthesis initiates with methionine.
- 3) Histone is not associated with DNA.
- 4) Extreme environmental habitats.
- 5) Microscopic.

10. Which of the following seedless vascular plant is evolutionally closest to seed plants?

- | | | |
|----------------------|-----------------------|-----------------------|
| 1) <i>Lycopodium</i> | 2) <i>Nephrolepis</i> | 3) <i>Selaginella</i> |
| 4) <i>Anthoceros</i> | 5) <i>Pogonatum</i> | |

11. The following features are found in an animal.

- Cilia found in the free-living adults.
- Some show regeneration as asexual reproduction.
- Bisexuality.

An animal phylum includes the above features

- | | | |
|-------------|--------------------|-------------|
| 1) Nematoda | 2) Arthropoda | 3) Annelida |
| 4) Cnidaria | 5) Platyhelminthes | |

12. When a plant cell immersed in pure water, and attained equilibrium,

- 1) it gets the maximum Ψ_p value.
- 2) it gets a positive water potential value.
- 3) its water potential and solute potential are equal.
- 4) it's in the flaccid stage.
- 5) water diffuse out from the cell.

13. Both secondary phloem and periderm

- | | | | | |
|---------|--------------|--------------|-------------|---------|
| 1) Cork | 2) Hard wood | 3) Soft wood | 4) Sap wood | 5) Bark |
|---------|--------------|--------------|-------------|---------|

14. Correct statement regarding phloem translocation.

- 1) Bulk flow occurs along the sieve tube due to a negative pressure.
- 2) The concentration of free sugar in sink is always lower than in the sieve tube.
- 3) Water diffuses from the adjacent xylem and a positive pressure is generated at the source.
- 4) Growing roots, fruits and tubers are the sources.
- 5) Both phloem loading and unloading actively takes place in between sieve tube and transferring cell.

15. Female gametophyte of *Selaginella*
- 1) is unicellular.
 - 2) contains archegonia at the superficial regions.
 - 3) is non photosynthetic.
 - 4) develops from the megaspores in the external environment.
 - 5) forms many eggs in an archegonium.
16. Plant growth substance that retards and promotes leaf abscission respectively.
- 1) Ethylene and auxin
 - 2) Abscisic acid and auxin
 - 3) Auxin and ethylene
 - 4) Gibberellin and cytokinin
 - 5) Ethylene and Abscisic acid
17. Correct statement regarding digestion and absorption of proteins
- 1) Activated pepsin initiates the chemical digestion of proteins in the stomach.
 - 2) Dipeptidase and amino peptidase are the only proteases secreted by the intestinal epithelium.
 - 3) Amino acids, end products of protein digestion diffuse into the blood capillaries.
 - 4) Some amino acids remain in the small intestine are then absorbed in the large intestine.
 - 5) Digestion of protein starts in the buccal cavity.
18. Mineral elements mainly required for maintaining acid base balance, act as enzyme cofactor and component of electron carrier in man in correct sequence are
- 1) Ca, Mg and Fe
 - 2) P, F and I
 - 3) K, Na and Fe
 - 4) Cl, Mg and Fe
 - 5) Na, Fe and Mg
19. An animal, oxygenated blood is supplied to the organs from the respiratory organ, is
- 1) Frog
 - 2) Skate
 - 3) Humming bird
 - 4) Bat
 - 5) Snake
20. Total lung capacity of a healthy adult is 6000ml. Residual volume of that person is 1200 ml. Correct combination regarding that person- vital capacity.
- 1) Male - 4400 ml
 - 2) Male - 3100 ml
 - 3) Male - 4800 ml
 - 4) Female - 4400 ml
 - 5) Female - 4800 ml
21. Participates in barrier defense of innate immunity in human,
- 1) Interferon
 - 2) Macrophages
 - 3) Complement protein
 - 4) Antibodies
 - 5) Secretion of sebaceous gland
22. Correct statement regarding auto immune diseases.
- 1) It affects males than females.
 - 2) Diabetes mellitus occurs due to the destruction of β cells in the pancreas.
 - 3) Multiple sclerosis occurs due to the destruction of myelin sheath by antibodies.
 - 4) In Rheumatoid arthritis immune system mistakenly sends antibodies to the tissues surrounding the joints and destroy them.
 - 5) Auto immune disease occurs due to the immune system becomes active against non-self-molecules.
23. When producing dilute urine
- 1) there is a high amount of secretion of ADH.
 - 2) the kidney actively reabsorbs salts without allowing water to be reabsorbed by osmosis.
 - 3) large amount of water reabsorbed in the proximal convoluted tubule.
 - 4) there is a high amount of secretion of aldosterone.
 - 5) secretion does not occur.
24. Which of the following can be reabsorbed as well as secreted in the human nephron?
- 1) Creatinine
 - 2) Urea
 - 3) K^+
 - 4) Water
 - 5) HCO_3^-

25. A short-term immunity obtaining naturally, from
- 1) infection of measles.
 - 2) polio vaccine.
 - 3) anti venin.
 - 4) colostrum.
 - 5) mono clonal antibodies.

❖ **For the questions 26 – 30 follow the following instructions**

A B D correct	A C D correct	A B correct	C D correct	Any other response corrects
1 st Answer	2 nd Answer	3 rd Answer	4 th Answer	5 th Answer

26. Functioning as signaling molecule / molecules that travel through the body.
- A) Lipids
 - B) Proteins
 - C) Carbohydrates
 - D) RNA
 - E) NAD⁺
27. Correct statement / statements regarding eukaryotic cell cycle.
- A) Proteins essential for mitotic phase will be synthesized in G₂ phase.
 - B) Check points available at G₁, G₂ and M to ensure that the cell cycle is ready for moving into upcoming phases of cell division.
 - C) Duplication of centromeres takes place in S phase.
 - D) If it does not receive a go ahead signal at G₁ check point, the cell entering into Go phase.
 - E) Inter phase cover about 10% of the cell cycle.
28. Structure / structures that produce/ produces genetically diverse haploid spores.
- A) Ascus
 - B) Sporangium
 - C) Zygosporangium
 - D) Basidium
 - E) Conidium
29. Guttation
- A) is the removal of condensed moisture of the atmosphere.
 - B) occurs due to transpiration pull.
 - C) does not occur through stomata.
 - D) occurs due to upward push of xylem sap.
 - E) even occurs at non vascular plants at night.
30. Correct combination / combinations regarding the events of human circulatory system.
- A) Complete cardiac diastole - some blood flows passively through to the ventricles.
 - B) Electric impulses spread over the atrial muscles - reaches AV node and then triggers its own electrical impulses.
 - C) Diastolic pressure - Blood pressure within the veins following ejection of blood at complete cardiac diastole.
 - D) Risk factor for hyper tension - Family history.
 - E) Consequence of hypotension - Stoke



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Biology - II

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09

E

II

Index No:

Instructions:

- ❖ This question paper consists of **07** questions in **11** pages.
- ❖ This question paper comprises Part **A** and **B**. The time allotted for **both parts including Biology I** 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 1	
Examiner 2	
Checked by	
Supervised by	

A – Structured Essay

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

01. A)

i) Indicate the hierarchical levels of order and organization of living things up to an organism / individual.

.....
.....

ii) Name **one** carbohydrate found in the followings:

a) Stores fructose as energy source.

b) Structural component that found only in plants.

.....

iii) How purines differ from pyrimidines?

.....
.....

iv) Give **two** functions of DNA molecule.

.....
.....

v) Indicate **two** nucleotides which are functioning as oxidizing agents.

.....

vi) a) How the loosely arranged proteins in the surfaces of the plasma membrane are termed?

.....

b) How some proteins in the plasma membrane help to maintain the shape of the cell?

.....

vii) a) Indicate the phase of mitosis where the formation of mitotic spindle begins.

.....

b) Name an organelle which could contribute to the division of cytoplasm of plant cells.

.....

B) i) a) What are enzyme co-factors?

.....
.....

b) Briefly explain in which ways the co-factors bind to the enzyme in the activities.

.....
.....

c) Indicate the **two** types of the cofactors and give **one** example for each.

.....
.....

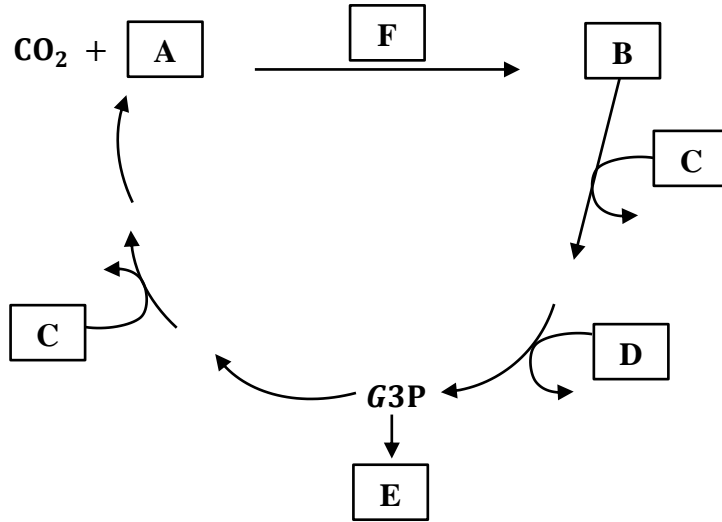
ii) Photo systems consists of a reaction centre complex and light harvesting complexes. Indicate the main components of them.

Reaction centre

.....

Light harvesting complexes

iii) a. The following diagram represents the main steps of the Calvin cycle of photosynthesis.



Name the substances labelled as A, B, C, D and E.

A **B**

C **D**

E

b. Name the **F** and briefly explain its role in **C3** plants.

Name

Role

.....

c. Give an example for a **C4** plant

C) i) What is Kranz anatomy?

.....

.....

ii) In **C4** plants, in which cell pyruvate is produced?

.....

iv) Indicate the location of oxidative phosphorylation of aerobic respiration and total number of ATP produced during the oxidation of NADH and FADH_2 per one glucose molecule.

Location

NADH oxidation

FADH₂ oxidation

iv) Which organic molecule is used to reduce acetaldehyde into ethanol in ethyl alcohol fermentation?
.....

v) Which molecule acts as the final electron acceptor in lactic acid fermentation?
.....

02 A)

i) Name the **eon** that the concentration of atmospheric oxygen begins to increase.
.....

ii) Indicate the **two** observations of Darwin in the theory of natural selection.
.....
.....

iii) a) What is the basis of natural classification?
.....

b) Indicate the criteria, that was used by Whittaker in the five-kingdom system of classification.
.....
.....
.....

iv) Complete the following dichotomous key to distinguish the animals given below.

Planaria, Squid, Jelly fish, Taenia, Mite, Clam.

1) Radial symmetry present.

Radial symmetry absent.

2) Eversible pharynx present.

Eversible pharynx absent.

3) Head present.

Head absent.

4) Jointed appendages present.

Jointed appendages absent.

5) Muscular foot present.

Muscular foot absent.

B)

i) a) How collenchyma cells structurally differ from parenchyma cells?

.....

b) State **two** locations of collenchyma cells.

.....

.....

ii) What is the special feature found in sieve tubes for the movement of nutrients more freely?

.....

iii) Complete the following statement with a **suitable word**.

“Cork cambium and tissues it produces are collectively called

iv) Indicate the orientation of leaves to capture light efficiently in low light conditions.

.....

v) Through which, the water and solutes move from cell to cell in symplastic route?

.....

vi) What is the hypothesis used to explain the phloem translocation in angiosperms?

.....

C)

i) Write in the brackets as “**correct**” or “**incorrect**” whether each of the following statements regarding terrestrial plants is correct or incorrect.

a) Seed plants do not need external water for fertilization. (.....)

b) Embryo which is retained and nourished by the gametophyte. (.....)

c) All the plants which produce homosporous are monoecious. (.....)

d) Delay of meiosis after fertilization results in creating a diploid sporophytic generation.(...)

e) Unisexuality in some plants show special type of adaptation of self-pollination. (.....)

ii) a) What is photomorphogenesis?

.....

.....

b) Why the small seeds often remain dormant for long periods?

.....

.....

iii) Indicate a plant growth substance for each of the following functions:

a) Functions in gravitropism.

b) Stimulate the pollen development

c) Delay leaf senescence

iv) a) What is the adaptation found in the plants that could be found in the soil environments of salinity.

.....
.....

b) Indicate **two** preexisting chemical defense mechanisms they could be found in plants to defend them from biological stress.

.....
.....



03. A)

i) Which epithelium often found in places where secretion or reabsorption is important?

.....

ii) What are the functions of mast cells found in the loose connective tissue?

.....
.....

iii) Which muscle cell type consists of both sarcomeres and involuntary contractions?

.....

iv) What is assimilation, one of the main steps of holozoic nutrition?

.....
.....

v) Briefly explain the chemical digestion which takes place in the buccal cavity.

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

vi) The blood found in the sinusoids of the liver is derived from which blood vessels?

.....
.....

vii) Deficiency of which vitamin shows the tingling of hands in human?

.....

B)

i) Which nutrient component facilitates proteins are not used to get energy (sparing) in human?

.....

ii) Which are the minerals needed for both maintenance in acid base balance and nerve function?

.....

iii) Indicate **three** functions of dietary fibers.

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

iv) Which vitamin act as an antioxidant and water soluble?

.....

v) What are the significances of closed circulatory system over to open circulatory system?

.....
.....

vi) Indicate the location of SA node.

.....
.....

vii) What is the advantage of separation of heart into left and right halves in Aves and Mammals?

.....

viii) a) Indicate the respiratory pigment/ pigments found in vertebrates.

.....
.....

b) What are the ways of transport of carbon dioxide in blood with the participation of erythrocytes?

.....

C)

i) During the blood transfusion it is vital that the recipient receive blood is compatible.

For this, which feature should be considered in the donor and recipient?

Donor

Recipient

ii) Indicate the characteristics of lungs as an effective respiratory surface.

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

iii) Name the respiratory structure of the following animals.

a) **Scorpion**

b) **Prawn**

iv) Indicate **two** respiratory structures in terrestrial animals, that have surface invaginations for efficient extraction of oxygen from the atmosphere.

.....
.....

v) Give **three** major functions of blood.

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

04. A)

i) Briefly describe how the sound is produced in the human larynx.

.....
.....

ii) Briefly explain what is mucus escalator and indicate its significance.

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

iii) **Underline** the word (**in bold**) in the following statement for the completion.

“Human employ what is referred to as negative pressure breathing where air is **pulled** or **pushed** into the lungs.

iv) Which muscles participate in the respiratory mechanisms in human at rest?

.....
.....

v) Indicate that the **sites** of each the internal and external respiration takes place.

Internal respiration
External respiration

vi) Briefly explain the effects of carbon monoxide found in cigarette smoke on the smooth functioning of the respiratory system.

.....
.....

vii) a) Which combinations of respiratory volumes are included in the functional residual capacity?

.....
.....



b) What is the significance of the above-mentioned capacity in (vii) a?

.....

B)

i) Indicate **three** major differences between the innate immunity and the adaptive immunity.

Innate immunity

adaptive immunity.

.....

.....

.....

.....

.....

.....

ii) In which ways the human skin, one of the barrier defenses, protect from microorganisms?

.....

.....

.....

.....

iii) Give the types of immune responses of the adaptive immunity and indicate the cell type involved for each.

Type of immune response

cell type

.....

.....

.....

.....

iv) What is meant by passive immunity?

.....

.....

C)

i) a) Name the excretory structure of insects.

.....

b) Briefly describe the excretory structure you mentioned above in i) a.

.....

.....

ii) What are the **three** areas can be seen in the longitudinal section of the human kidney, from outer most to inside?

.....

iii) What is the modification found in the glomerulus important for increasing blood pressure for ultra-filtration?

.....

iv) Indicate **two** nitrogenous wastes that can be secreted during the formation of urine.

.....

v) What is the major ion deposit for the renal calculi?

.....

vi) What are the measures can be taken to prevent chronic kidney disease (CKD)?

.....

.....

.....

.....





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Biology - II

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09

E

II

B – Essay

➤ Answer only **two** questions.

05. a) Briefly describe the different types of nutrition in plants.
b) Indicate the agricultural applications of plant growth substances.
06. a) Describe the digestion and absorption that takes place in the small intestine.
b) Indicate the contribution of the antimicrobial proteins in the innate immunity.
07. Write short notes for the followings:
a) Extra cellular matrix.
b) Mechanism of opening and closing of stomata.
c) Role of hormones in the functioning of kidneys.

-----***-----