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FOR GOD AND COUNTRY

ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

PRE-ANNUAL EXAMINATION- 2019

Sub: BIOLOGICAL SCIENCE **Class: XI** **F.M: 70**

Duration: 3 hours 15 Minutes **Date: 18.01.2019**

SECTION –I

1. **Choose the correct answer:** **1x14=14**

i) Which of the following contains information on any one taxon?
(1) Manuals
(2) Monographs
(3) Flora
(4) Journals

ii) *Albugo*belongs to which group of fungus?
(1) Phycomycetes
(2) Ascomycetes
(3) Dueteromycetes
(4) Basidiomycetes

iii) Floridean starch is the stored food in
(1) Rhodophyceae
(2) Chlorophyceae
(3) Phaeophyceae
(4) Cyanophyceae

iv) Choanocytes are related to which of the following phylum?
(1) Porifera
(2) Cnidaria
(3) Ctenophora
(4) Aschelminthes

v) In *Bougainvillea*, which part of the plant is modified into spine?
(1) Leaf
(2) Stem
(3) Roots
(4) Tendrils

vi) Casparian strips are present in-
(1) Dicot root
(2) Dicot stem
(3) Monocot root
(4) Monocot stem

vii) Which of the following belong to the male reproductive system of cockroach?
(1) Mushroom gland
(2) Spermatheca
(3) Genital chamber

(4) Vestibulum

viii) The rise per base pair in DNA is

(1) 34 A

(2) 38 A

(3) 3.4 A

(4) 3.8A

ix) Which of the following micronutrient is needed in synthesis of auxin?

(1) Chlorine

(2) Molybdenum

(3) Zinc

(4) Copper

x) When fats are used in respiration, RQ is

(1) Equal to 1

(2) More than 1

(3) Less than 1

(4) 0

xi) Heterophylly is observed in

(1) Rose

(2) Rice

(3) Hibiscus

(4) Cotton

xii) Which of the following is absent in saliva?

(1) Salivary amylase

(2) Electrolytes

(3) Lysozyme

(4) Lipases

xiii) Which is an occupational respiratory disorder

(1) Silicosis

(2) Emphysema

(3) Asthma

(4) Angina Pectoris

xiv) The skull contains _____ bones in total

(1) 4

(2) 14

(3) 8

(4) 22

SECTION-II

GROUP –A

Answer the following questions:- **1x4=4**

1. ***What do you mean by 'paurometabolous'?***

It is defined as the least possible amount of energy (minimum) which is required to start a reaction or the amount of energy available in a chemical system for a reaction to take place.

2. *What is 'cloaca'?*

Alimentary canal,urinary and reproductive tracts in amphibian open into a common chamber cloaca which opens to the exterior.

Or

What is 'prothallus'?

The spores in pteridophytes germinate to give rise to inconspicuous, small but multicellular, free-living, mostly photosynthetic, thalloid gametophyte called prothallus.

3. *What is 'activation energy'?*

It is defined as the least possible amount of energy (minimum), which is required to start a reaction or the amount of energy available in a chemical system for a reaction to take place.

Or

Give one example of a prosthetic group.

In peroxidase and catalase , which catalyze the breakdown of hydrogen peroxide to water and oxygen, haem is the prosthetic group.

4. *When is primary xylem said to be 'endarch'?*

GROUP-B

Answer the following questions: - **2x5=10**

5. *What do you mean by 'leg-haemoglobin'? Name one chemoautotroph.*

Leg-haemoglobin:The nodules in the roots of leguminous plants have adaptations that ensure that the enzyme nitrogenase is protected from oxygen by an oxygen- scavenger called the leg-haemoglobin. It is pink in colour.

What is vernalization? Name one long-day plant.

In some plants flowering depends qualitatively and quantitatively dependent on exposure to low temperature. This phenomenon is called vernalization.

One long day plant is Spinach/Radish, etc.

6. *What is 'Kranz anatomy'? Which is the primary CO_2 acceptor in C_4 pathway?*

The leaves of the C4 plants have a particular type of anatomy.It is the structure where the tissue equivalent to the spongy mesophyll cells is clustered in a ring around the leaf veins, outside the bundle-sheath cells. (The term 'Kranz' means wreath or ring in German).

The primary CO_2 acceptor is PEP Carboxylase.

Or

Mention any two limiting factors of photosynthesis. Name one C_4 plant.

Two limiting factors of photosynthesis are-

Light /Carbon Dioxide/Temperature/ Water

One C4 plant is corn, pineapple, sugarcane, etc.

7. *What are goblet cells?*

The intestinal mucosal epithelium has goblet cells, which secrete mucus.

Or

Name the two bones forming the coxal bones. How many coxal bones are present in the body?

Three bones forming the coxal bones are- Ilium, Ischium and pubis.

There are two coxal bones in the body.

8. *What is 'organ of corti'? What is its function?*

Organ of corti is a structure located on the basilar membrane, which contains hair cells that act as auditory receptors.

Or

Name ahyperglycaemic hormone. What is Addison's disease?

A hyperglycaemic hormone is Glucagon.

Underproduction of hormones by the adrenal cortex alters carbohydrate metabolism causing acute weakness and fatigue leading to a disease cslled addison's disease.

GROUP – C

Answer the following questions (Alternatives to be noted) : (3 X 9 = 27)

10. Differentiate between Myelinated& Non- myelinated nerve fibre? What is synaptic cleft?(2+1)

Myelinatednerve fibre	Non- myelinated nerve fibre
1.These are enveloped with Schwann cells which form a myelin sheath around the axon. 2.Nerve impulse conduction is relatively faster through these types of nerve fibre.	1.These are enveloped by Schwann cells that does not form a myelin sheath around the axon. 2.Nerve impulse conduction is slower through these types of nerve fibre.

Synaptic cleft : The gap between the Pre-synaptic & Post –synaptic neuron which at times consists of the neurotransmitter molecules released from the pre-synaptic neuron, is called the Synaptic Cleft.

Or

Mention one characteristic of Diakinesis. What do you mean by bivalent and tetrad? (1+2)

One of the distinct characteristics of Diakinesis is Terminalization of Chiasmata.The X-shaped structure that was formed earlier slowly moves towards the end of the chromosome to separate the homologous chromosomes of the bivalent entirely.

Bivalent & Tetrad: The pair of homologous chromosome which physically remain close to each other is known as bivalent and tetrad is considered as the four arms of the pair of homologous chromosome.

11. Define Bundle of His. Write two differences between Artery & Vein. (1+2)

Bundle of His is a broad band of heart muscle fibre which conducts electrical impulses from the AV node to the point of the apex of the heart.

ARTERY	VEIN
1.Usually Carries oxygenated blood from the heart to the tissues of the body except Pulmonary Artery. 2.Blood pressure is higher due to the lesser lumen width.	1.Usually Carries less oxygenated blood from the tissues to the heart except pulmonary vein. 2.Blood pressure is lower due to the greater lumen width.

12. What are nuclear pores? State two important functions of Endoplasmic Reticulum. *(1+2)*

Nuclear pore are large protein complex consisting of several subunits together spanning the nuclear envelop of the nucleus.It allows the entry and exit of specific molecules to pass through.

Functions of ER: 1.RER is actively involved in protein synthesis and secretion.

2.SER is involved in the synthesis of lipids.

3.Steroid hormone synthesis also get synthesized in the SER.

13. Describe the ' Kranz Anatomy' found in C4 plants. *(3)*

Kranz means wreath and is the reflection of the arrangement of bundle sheath cells in C4 plants.Bundle sheath cells are the large cells around the vascular bundles of the these plants.They form several layers around the vascular bundles.They are characterised of having a large number of chloroplasts, thick walls impervious.Plants like Maize,Sorghumetc.,show this kind of arrangement.

What is the other name of Coronary Artery Disease?Explain its causes. *(1+2)*

*Coronary Artery Disease*is also called Atherosclerosis.

It is caused by the deposits of calcium, fat, cholesterol & fibrous tissue which make the lumen of arteries narrower.

14. Why is cockroach considered to be Uricotelic?What are Ommatidia? *(1+2)*

Excretion in cockroach occurs through Malpighian tubules They absorb nitrogenous waste products & convert them into uric acid which is excreted out through the hindgut.Thus they are called Uricotelic.

Cockroach has compound eye and each eye consist of about 2000 hexagonal structures or units called Ommatidia.

15.Distinguish between Inspiratory Capacity & Expiratory Capacity. (3)

Inspiratory Capacity	Expiratory Capacity
1.It is the total volume of air that can be inhaled after a normal expiration. 2.Inspiratory capacity includes the Tidal volume and inspiratory reserve volume. 3.It is about 3000-3500 ml of air.	1.it is the total volume of air a person can expire after a normal inspiration. 2.Sum of tidal volume and Expiratory reserve volume. 3.It is about 1500-1600 ml of air.

Or Write two points of difference between Bone &Cartilage.Give one example of Unsaturated Fatty Acid. *(2+1)*

Bone	Cartilage
A bone is a rigid organ that forms part of the vertebral skeleton.	Cartilage is a flexible connective tissue that stops the bone from rubbing against each other.
Protect the body against mechanical damage, assist in the movement of the body, provide a framework and shape for the body, store minerals, and produce red blood and white blood cells.	Reducing friction at joints, supporting the respiratory tract, acting as shock absorbers between weight-bearing bones, and maintaining the shape and flexibility of fleshy appendages.
Hard, inelastic and tough.	Soft, elastic and flexible.
Bone cells are known as osteocytes	Cartilage cells are known as chondrocytes

Examples of unsaturated fatty acids are palmitoleic acid, oleic acid, myristoleic acid, linoleic acid, and arachidonic acid.

16.What kind of Vascular system is present in Echinoderms?State the functions of this Vascular system. ***(1+2)***

Water vascular system is present in Echinoderms.

Its function is help Echinoderms in locomotion,capture& transport of food and respiration.

17.Write two points of difference between Parenchyma &Sclerenchyma.Define Exarch. ***(2+1)***

Parenchyma	*Sclerenchyma*
1.Cells are isodiametric,spherical ,oval,polygonal. 2.Their walls are thin made of cellulose. 3.Function is storage,secretion,photosynthesis.	1.cells are narrow,elongated. 2.Thickwalled,elongated,pointed cells. 3. Function is to provide mechanical support to organs.

Exarch: In roots of plants the protoxylem lies towards the periphery &metaxylem lies towards the centre,such arrangement of primary xylem is called exarch.

18.What is the full form of RuBisCO? Describe in brief the Carboxylation step of Calvin Cycle. ***(1+2)***

Ribulosebisphosphate carboxylase oxygenase(*RuBisCO*)

Carboxylation step of Calvin Cycle:-Carboxylation is the fixation of CO_2 into a stable product called PGA.CO_2 is utilized in the carboxylation of RuBP,catalysed by RuBP Carboxylase which results in the formation of 2 molecules of 3 PGA.

18.Mention those steps in Glycolysis where ATP is utilized. ***$(1^{1/2}+1^{1/2})$***

1.Glucose to Glucose-6-phosphate

2.Fructose-6-phosphate to Fructose-1,6-bisphosphate

Or *Define Respiratory Quotient. What is the approximate RQ value of Proteins?* ***(2+1)***

It is the ratio of the volume of CO_2 evolved to the volume of O_2 consumed in respiration.

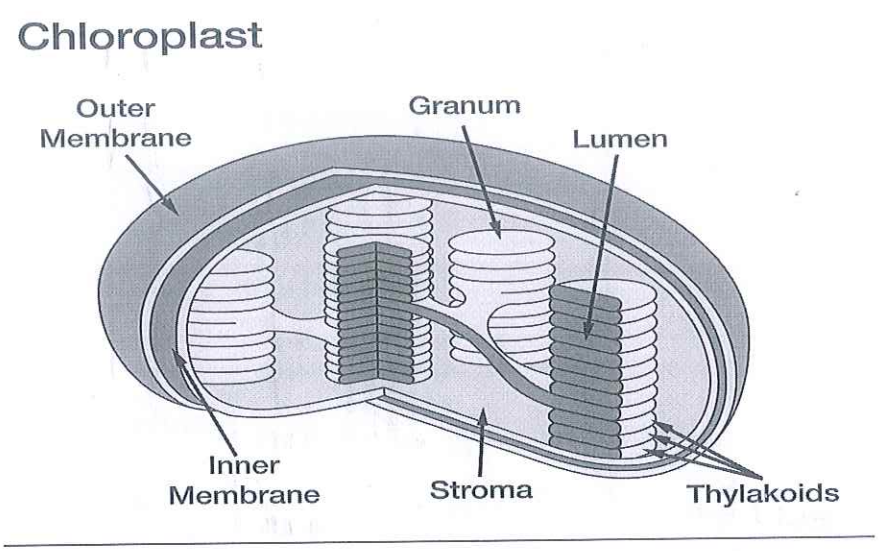
The approximate RQ value of Proteins is 0.9.

GROUP – D

Answer the following questions (Alternatives to be noted) : **(5 X 3 = 15)**

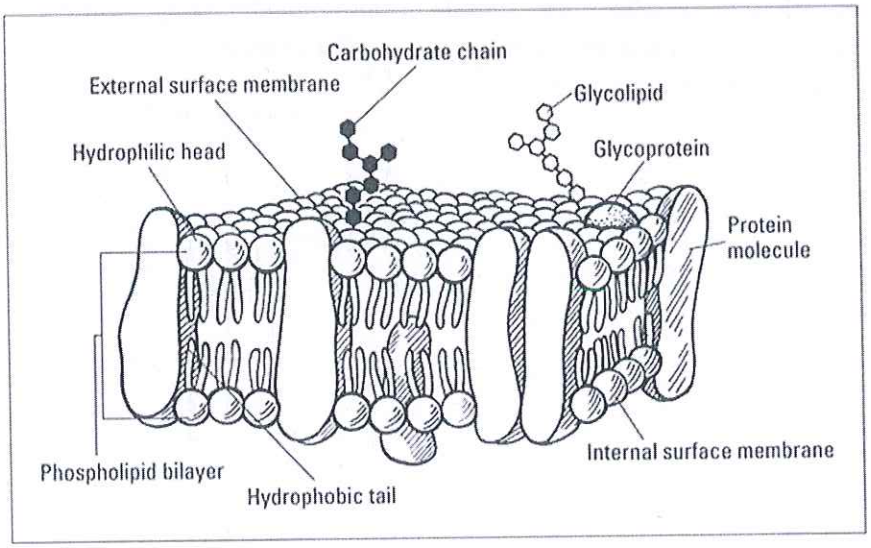
19.Describe the structure of Chloroplastid with a suitable diagram. **(5)**

Structure of chloroplastid: These are lens shaped,oval,spherical,discoid or even ribbon like organelles having variable length(5-10 mm)& width (2-4 mm).Their number varies from 1 per cell of the *Chlamydomonas* ,a green algae to 20-40 per cell in the mesophyll.These are double membrane bound organelle having inner & outer membrane & the space enclosed by inner membrane is called stroma.Presence of organised flattened membranous sacs called thylakoids present in the stroma,& piles of stacked coin like structures called grana.There membrane bound channel like sturctures joining two grana called stromalamellae.Stroma contains enzymes for synthesis of carbohydrates & proteins & contains DNA &ribosomes.Chlorophyll pigments are present in the thylakoids.

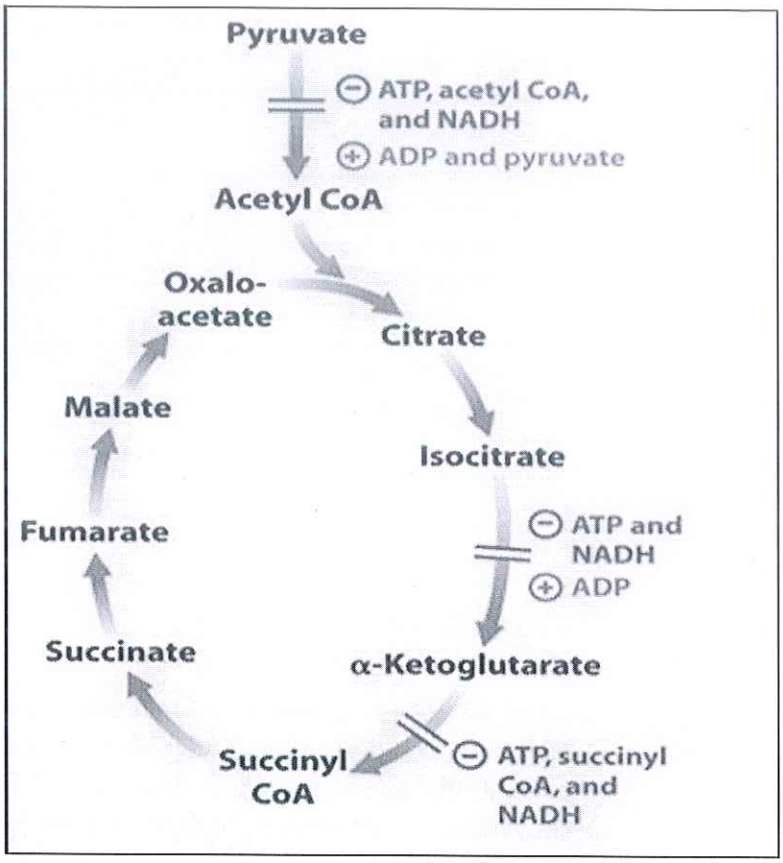


Or Fluid Mosaic Model:

The fluid mosaic model explains various observations regarding the structure of functional cell membranes. According to this model, there is a lipid bilayer in which the protein molecules are embedded. The lipid bilayer gives fluidity and elasticity to the membrane. Small amounts of carbohydrates are also found in cell membrane. The model, which was devised by SJ Singer and GL Nicolson in 1972, describes the cell membrane as a two-dimensional liquid that restricts the lateral diffusion of membrane components. Such domains are defined by the existence of regions within the membrane with special lipid and protein composition that promote the formation of lipid rafts or protein and glycoprotein complexes. Another way to define membrane domains is the association of the lipid membrane with the cytoskeleton filaments and the extracellular matrix through membrane proteins.



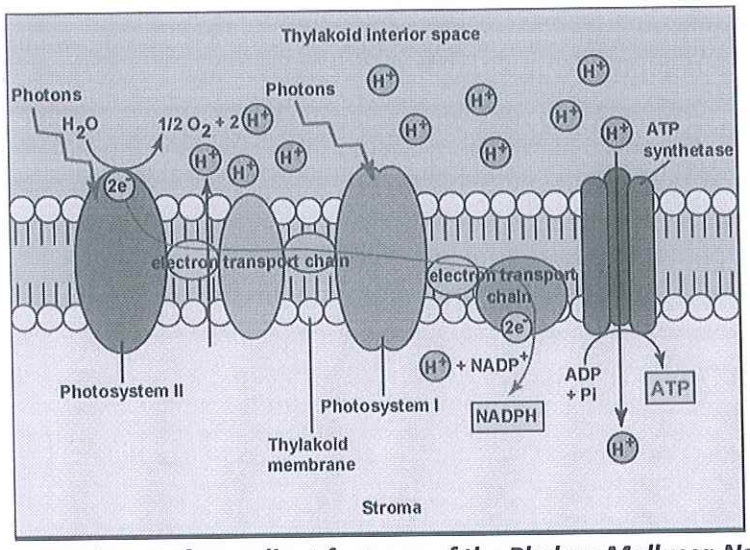
20.Represent the process of Tricarboxylic Acid Cycle with a flowchart. *(5)*



Or

Describe the process of ATP synthesis through Chemiosmosis with the help of a diagram. ***(5)***

Hydrogen ions in the matrix space can only pass through the inner mitochondrial membrane through a membrane protein called ATP synthase. As protons move through ATP synthase, ADP is turned into ATP. The production of ATP using theprocess of chemiosmosis in mitochondria is called oxidative phosphorylation.Chemiosmosis is the movement of ions across a semipermeable membrane, down their electrochemical gradient. An example of this would be the generation of adenosine triphosphate (ATP) by the movement of hydrogen ions (H^+) across a membrane during cellular respiration or photosynthesis.



21.Write any four salient features of the Phylum Mollusca.Name one animal which belongs to Phylum Mollusca. ***(4+1)***

1.They are terrestrial or aquatic having an organ system level of organisation.

2.They are bilaterally symmetrical,triploblastic coelomate animals.

3.Body is divided into head,muscular foot and visceral hump.

4.The space between Hump and mantle is called mantle cavity in which feather like gills are present

5.The anterior head region has sensory tentacles.

6.The mouth contains a file –like rasping organ called radula.

Example-*Pilaglobosa* (apple snail),*Pinctada*(oyster)

Or Write any four salient features of Kingdom Fungi.Give an Example of an organism belonging to Class Phycomycetes. ***(4+1)***

1.Members of the kingdom Fungi are eukaryotes, meaning they have complex cells with a nucleus and organelles,multicellular, with the exception of single-celled yeast.

2.Structurally, fungi are made up of individual feathery filaments called hyphae.

3.The hyphae group together to form a conglomerate called the mycelium.it is actually made up of a mass of very tightly packed hyphae, and thus, is not exactly solid.

4.All fungi are heterotrophic, meaning that they cannot make their own food like plants. Like us, they must gain nutrition from other organisms.

5.Reproduction on fungi can be fragmentation,budding,fission.Asexual reproduction by spores called conidia,orsporangiospore or zoospores & sexual reproduction by Ascospores ,basiodiospores etc.

Organismsbelonging to Class Phycomycetes are *Mucor,Rhizopus.*

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