



ST. LAWRENCE HIGH SCHOOL



A JESUIT CHRISTIAN MINORITY INSTITUTION
FIRST TERM EXAMINATION

Sub: BIOLOGY

Class: XI A1

F.M: 75 70 / 4

Duration: 3 hours 15 Minutes

Date: 08.08.2018

Section -I

1. Choose the correct answer

1x14=14

- i) Spindle fibres are made up of
 - (1) Microbodies
 - (2) Microtubules
 - (3) Microfilaments
 - (4) Microfibrils
- ii) A group of related genera is
 - (1) Family
 - (2) Class
 - (3) Order
 - (4) Kingdom
- iii) The fungal component of a lichen is known as
 - (1) Phycobiont
 - (2) Mycobiont
 - (3) Mycorrhiza
 - (4) Prions
- iv) The stored food in Phaeophyceae is
 - (1) Starch
 - (2) Mannitol
 - (3) Floridean starch
 - (4) Glucose
- v) Metameric segmentation is present in
 - (1) Annelia
 - (2) Aschelminthes
 - (3) Arthropoda
 - (4) Mollusca
- vi) The pseudocoelomate belongs to
 - (1) Annelida
 - (2) Aschelminthes
 - (3) Platyhelminthes

- (4) Echinodermata
- vii) Lemon has _____ placentation
- (1) Parietal
 - (2) Axile
 - (3) Marginal
 - (4) Basal
- viii) The disc shaped structure present by the sides of the centromere are called
- (1) Chromatid
 - (2) Kinetochore
 - (3) Secondary constriction
 - (4) Centrosome
- ix) Which of the following is not a secondary metabolite?
- (1) Carotenoids
 - (2) Trypsin
 - (3) Morphine
 - (4) Codeine
- x) Which of the following is not a type of enzyme?
- (1) Transferase
 - (2) Ligase
 - (3) Lipids
 - (4) Lyase
- xi) Spindle fibres attach to kinetochore in _____ phase
- (1) Prophase
 - (2) Metaphase
 - (3) Anaphase
 - (4) Telophase
- xii) At the end of meiosis _____ cells are formed
- (1) 1
 - (2) 2
 - (3) 4
 - (4) 3
- xiii) Which micronutrient is essential for the formation of chlorophyll
- (1) Calcium
 - (2) Magnesium
 - (3) Iron
 - (4) Potassium
- xiv) Enzyme nitrogenase is highly sensitive to
- (1) Hydrogen
 - (2) Oxygen
 - (3) Carbon
 - (4) Argon

Section-II

Group –A

Answer the following questions:-

1x4=4

1. Define hypogynous flower.
2. Name the type of fruit formed without fertilization.

Or

What is mycorrhiza?

3. Name the phylum of the animal kingdom which has the property of bioluminescence.

Or

Mention the excretory organs in Arthropoda .

4. Mention two functions of the golgi apparatus.

Group-B

Answer the following questions:-

2x5=10

5. Distinguish between marginal and axial placentation.
6. What is nucleoside? How is it different from nucleotides?
7. Give two important features of the Phylum Chordata.

Or

Give two characteristics of the Phylum Echinodermata.

8. What are gemmae?

Or

Mention two features of the class Phycomycetes

9. What is ammonification? What do you mean by leg-haemoglobin?

Group –C

Answer the following questions:-

3x9= 27

10. What do you understand by the term 'chiasma'? Mention the most important feature of the Pachytene stage of cell division.

1+2

Or

Describe the interphase stage of cell division? What is G₀ phase?

1+2

11. What are secondary metabolites? How is a peptide bond formed?

1+2

12. Mention any four characteristic of the kingdom Fungi. Give one example of an economically important fungus? 2+1
13. Distinguish between racemose and cymose inflorescence. What is palmately compound leaf? 2+1
14. How is Potassium obtained by the plants? What is its function? 2+1
- Or
- What is critical concentration? Write any two deficiency symptoms caused by deficiency of nutrients. 1+2
15. Describe the functions of polysaccharides. 3
- Or
- What is the basic structure of amino acids? Write the name of any two amino acids. 2+1
16. Describe the basic structure of chromosomes. What are satellites? 2+1
- Or
- Describe the basic structure of flagellum. 3
17. What is vexillary aestivation? Name a flower with vexillary aestivation. 2+1
- Or
- What are the different regions of the root? 3
18. How is calyx and corolla represented in a floral formula? Describe the structure of a dicotyledonous seed. 1+2

Group- D

Answer the following questions:- 5x3=15

19. What are the major characteristic of the dinoflagellates? How are they different from diatoms? (two points) 3+2
- Or
- Describe the morphological structure of the viruses. What is a bacteriophage? 4+1
20. Describe the ultra structure of chloroplast. (with diagram) 5
- Or
- Describe the ultra structure of mitochondria with labelled diagram. 5
21. Describe the structure of proteins. Name one important protein and write its function. 3+2
- Or
- What are the factors on which enzyme activity depends? What is 'active site' of an enzyme? 3+2



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Section -I

1. Choose the correct answer

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- i) Microtubules
- ii) Family
- iii) Mycobiont
- iv) Mannitol
- v) Annelida
- vi) Aschelminthes
- vii) Axile
- viii) Kinetochore
- ix) Trypsin
- x) Lipids
- xi) Metaphase
- xii) 4
- xiii) Magnesium
- xiv) Oxygen

Section-II

Group -A

Answer the following questions:-

1x4=4

1. Hypogynous flower: a flower in which the gynoecium occupies the highest position while the other parts are situated below it. Example- Mustard
2. The type of fruit formed without fertilization is Parthenocarpic fruit.

Or

Mycorrhiza:-

The roots in some genera have fungal association in the form of mycorrhiza. E.g - *Pinus*

3. The phylum of the animal kingdom which has the property of bioluminescence is Ctenophora or Cnidaria.

Or

The excretory organs in Arthropoda is Malpighian Tubules.

4. Two functions of the golgi apparatus are –
- Secretion
 - Packaging
 - Synthesis of glycoproteins and glycolipids

Group-B

Answer the following questions:-

2x5=10

5. Marginal and Axile placentation:

MARGINAL	AXILE
<ul style="list-style-type: none"> • Placenta forms a ridge along the ventral suture of the ovary • The ovules are borne on the ridge forming two rows • Example- pea 	<ul style="list-style-type: none"> • Placenta is axial • Ovules are attached to it in multilocular ovary • Example- China rose, tomato, lemon

6. Nucleoside: a nucleoside consists of heterocyclic ring or nitrogenous bases and sugar .It has no phosphate group.E.g – Adenosine, Guanosine, etc

Difference nucleosides and nucleotides:

NUCLEOSIDES	NUCLEOTIDES
<ul style="list-style-type: none"> • Consists of heterocyclic rings and sugar 	<ul style="list-style-type: none"> • Consists of heterocyclic rings, sugar and phosphoric acid or phosphate

7. Two important features of the Phylum Chordata:(any two)
- Presence of a notochord
 - A dorsal hollow nerve cord
 - Paired pharyngeal gill slits
 - Bilaterally symmetrical, triploblasti, coelomate

Or

Two characteristics of the Phylum Echinodermata are : (any two)

- Endoskeleton of calcareous ossicles or spines
- All are marine with tissue level organisation
- Adult echinoderms are radially symmetrical but larvae are bilaterally symmetrical.
- Digestive system is complete with mouth on the ventral side and anus on the dorsal side

- Presence of water vascular system.
- Excretory system is absent
- Sexes are separate
- Reproduction is sexual
- Fertilization is external
- Development is indirect.
- Example- *Asterias*, *Echinus*, etc

8. Gemmae: They are green, multicellular, asexual buds which develop in small receptacles called gemma cups located on thalli. They are units of asexual reproduction in liverworts. They become detached from the parent body and germinate to form new individuals.

Or

Two features of the class Phycomycetes are :(any two)

- Found in aquatic habitats and on decaying wood in moist and damp places
 - May be obligate parasite in plants
 - The mycelium is aseptate and coenocytic
 - Asexual reproduction takes place by zoospores(motile) or by aplanospores(non-motile)
 - Spores are endogenously produced in sporangium
 - Zygosporangium is formed by fusion of two gametes
 - Example- *Rhizopus*, *Mucor*, *Albugo*
9. Ammonification: Decomposition of organic nitrogen by dead plants and animals into ammonia is called ammonification. Some of these ammonia volatilises and re-enters the atmosphere but most of it is converted into nitrate by soil bacteria
- 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.

Group – C

Answer the following questions:-

3x9= 27

10. Chiasma: The dissolution of the synaptonemal complex and the tendency of the recombined homologous chromosomes of the bivalents to separate from each other except at the sites of cross overs. These x-shaped structures are called chiasmata.

The most important features of the Pachytene stage of cell division :

- During this stage, the four chromatids of each bivalent chromosome become distinct and clearly appear as tetrads.
- Appearance of recombination nodules, sites of crossing-over.

- Recombination is completed by the end of this phase.

Or

The interphase stage of cell division: The interphase is the time duration, during which cell is preparing for division by undergoing cell-growth and DNA- replication in an orderly manner. It is divided into three phases-

- G1 (Gap 1)
- S phase (synthesis phase)
- G2 (Gap 2)

G1- during this phase cell is metabolically active and continuously grows but does not replicate its DNA.

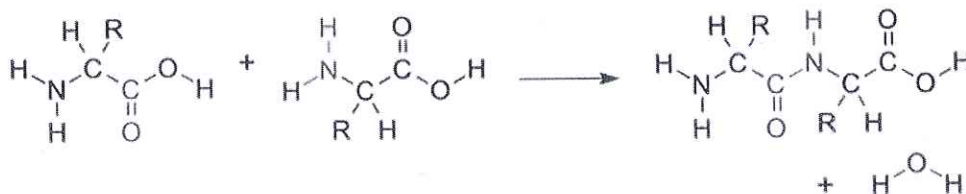
S phase marks the period during which DNA synthesis or replication takes place

G2- proteins are synthesized in preparation for mitosis while cell growth continues.

G0 phase- inactive or quiescent stage of the cell cycle . cells in this stage remain metabolically active but no longer proliferates unless called on to do so depending on the requirement of the organism.

11. Secondary metabolites: Substances of human welfare and ecological importance which are produced from plants, fungus and other microbes. Example- Carotenoids, Curcumin, etc. is a Peptide bond formation-

It is formed when the carboxyl group of one amino acid reacts with the amino group of the next amino acid with elimination of a water moiety by the process of dehydration.



12. Four characteristic of the kingdom Fungi:

- One example of an economic important fungus is *Penicillium notatum* (prepare medicine- Penicillin), Yeast (prepare bread and beer)

13. Racemose and Cymose inflorescence.

RACEMOSE	CYMOSE
<ul style="list-style-type: none"> • The main axis continues to grow and the flowers are borne laterally • Flowers have acropetal arrangement • Example- Mustard 	<ul style="list-style-type: none"> • Main axis terminates in a flower • Flowers are borne in a basipetal arrangement • Example- Hibiscus

Palmately compound leaf: leaflets are arranged at a common point that is at the tip of the petiole.
Example-silk cotton

14. Potassium is obtained by the plants in the form of Potassium ions. (K^+)

Functions of Potassium –

- Potassium helps to maintain an anion- cation balance in cells
- Involved in protein synthesis.
- Opening and closing of stomata
- Activation of enzymes
- Maintenance of turgidity of the cells
- Required in meristematic parts of the plants.

Or

Critical concentration: The concentration of essential elements below which the plant growth is retarded is called critical concentration. The element is said to be deficient when it is below the critical concentration.

Any two deficiency symptoms caused by deficiency of nutrients are:

- Chlorosis – loss of chlorophyll leading to yellowing in leaves; caused by deficiency of elements – N, K, Mg, S, Fe, Mn, Zn and Mo.
- Necrosis- death of tissue ; caused by deficiency of Ca, Mg, Cu, K.
- Inhibition of cell division- Caused by low level of N, K, S, Mo
- Delay of flowering – caused by low level of N, S, Mo

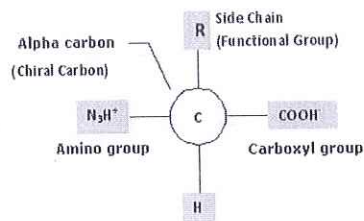
15. The functions of polysaccharides are :

- Cellulose- homopolymer that helps in formation of the plant cell walls. Paper made from plant pulp and cotton fibre is cellulosic.
- Starch –store house of energy in plant tissues
- Glycogen- stores energy in animals
- Insulin- a polymer of fructose; regulates the glucose- balance in the body
- Chitin- makes up the exoskeleton of arthropods.

Or

Basic structure of amino acids:

- They are organic compounds containing an amino group and an acidic group as substituents on the same carbon i.e. alpha-carbon. Hence they are called alpha amino acids.
- There are four substituent groups occupying the four valency positions. These are Hydrogen, carboxyl group, amino group and a variable group.
- Based on the variable or R group, there are many amino acids.
- Example- a hydrogen in the R group will give Glycine, A methyl Group in Alanine, Hydroxy methyl in Serine.



Any two amino acids – Glycine, Alanine, etc

16. The basic structure of chromosomes:

- Chromatin has DNA and some basic proteins called histones, some non-histones and also RNA which condense to form Chromosomes.
- Every chromosome (visible only in dividing cells) essentially has a primary constriction or the centromere on the sides of which disc shaped structures called kinetochores are present.
- Centromere holds two chromatids of a chromosome.
- Based on the position of the centromere the chromosomes are classified into four types :
 1. Metacentric- middle centromere forming two equal arms
 2. Sub- metacentric- has a centromere slightly away from the middle of the chromosome resulting into one short and one long arm
 3. Acrocentric- centromere is situated close to its end
 4. Telocentric- chromosome has a terminal centromere.

Satellites: some chromosomes have a non-staining secondary constrictions at a constant location. This gives the appearance of a small fragment called satellite.

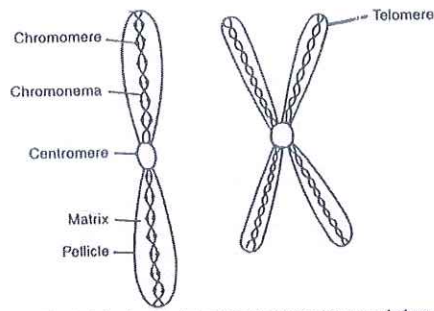
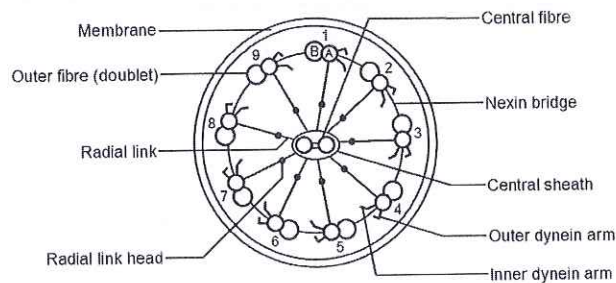


Fig. 4.1. A simplified structure of chromosome and chromatid.

Or

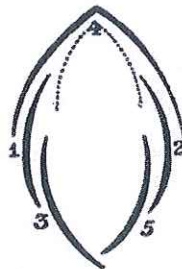
Basic structure of flagellum:

- They are covered with plasma membrane
- Their core is called axoneme . it has nine pairs of doublets of radially arranged peripheral microtubules, a pair of centrally located microtubules. Such arrangement is called the 9+2 array.
- The central tubules are connected by bridges and is also enclosed by a sheath which is connected to one of the tubules of each peripheral doublets of the radial spoke . Thus there are nine radial spokes
- The peripheral doublets are also interconnected by linkers.
- The flagellum emerge from centriole- like structure called the basal bodies.



17. Vexillary aestivation: the arrangement where there are five petals , the largest (standard) overlaps the two lateral petals (wings) which in turn overlays the two smallest anterior petals (keel). This is called vexillary or papilionaceous.

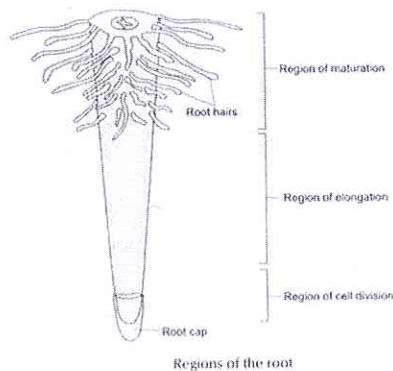
A flower with vexillary aestivation- Pea and Bean.



Or

Different regions of the root:

- The root is covered at the apex by a thimble- like structure called the ROOT CAP. It protects the tender apex of the root as it makes its way through the soil.
- REGION OF MERISTEMATIC ACTIVITY- this is located above the root cap. The cells of this region are very small, thin- walled and with dense cytoplasm. They divide repeatedly.
- REGION OF ELONGATION- the cells here undergo rapid elongation and enlargement and are responsible for the growth of the root in length. They gradually differentiate and mature.
- REGION OF MATURATION- this zone is proximal to the region of elongation and contains matured cells.
- ROOT HAIRS- some of the epidermal cells form fine root hairs that absorb water and minerals from the soil.



18. Calyx and Corolla are represented in a floral formula by K and C respectively.

The structure of a dicotyledonous seed:

- The outermost covering is the seed coat
- The seed coat has two layers – Testa and the inner – Tegmen.
- The Hilum is a scar on the seed coat through which the developing seeds were attached to the fruit.
- Micropyle is a small pore above the hilum.
- Within the seed coat is the embryo, consisting of an embryonal axis and two cotyledons.
- Radicle and plumule are present at the two ends.
- Endosperm is also present in some seeds.

Group- D

Answer the following questions:-

5x3=15

19. The major characteristics of the dinoflagellates are:

- These organisms are marine and photosynthetic.
- They appear yellow, green, brown, blue or red depending on the main pigments present in their cells.
- The cell wall has stiff cellulose plates on the surface. Most of them have two flagella; one lies longitudinally and the other transeversely in a furrow between the wall plates.
- Toxins released by such large numbers may even kill other marine animals such as fishes.

Difference with diatoms (two points)

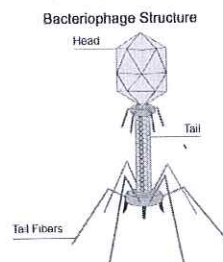
DINOFLAGELLATES	DIATOMS
<ul style="list-style-type: none"> • The cell plates are made up of cellulose • Two flagella are present 	<ul style="list-style-type: none"> • Cell walls are made up of silica • No flagella are present

Or

The morphological structure of the viruses is as follows:

- Viruses are non-cellular organisms that are characterised by having an inert crystalline structure outside the living cell.
- They have a protein coat called capsid which have small units called capsomeres protecting the nucleic acid.
- In addition to proteins they have genetic material that could be RNA or DNA.
- They have either single or double stranded RNA or double stranded DNA.

Bacteriophage- they are viruses that infect bacteria.



20. Ultra structure of chloroplast:

- The chloroplasts contain chlorophyll and carotenoid pigment which are responsible for trapping light energy essential for photosynthesis.
- In chromoplasts fat soluble carotenoid pigments like carotene, xanthophylls and others are present.
- Majority of the chloroplasts are found in the mesophyll cells of the leaves. These are lens shaped, spherical, discoid or even ribbon-like organelles having variable length and width.

- They are double-membrane bound; inner membrane is less permeable .
- The space limited by the inner chloroplast membrane is called stroma.
- A number of flattened membranous sacs called the thylakoids are present in the stroma.
- Thylakoids are arranged like stacks of coins called grana .
- The membrane of the thylakoids enclose a space called a lumen.
- Stroma also contains small, double-stranded circular DNA molecules and ribosomes.
- Chlorophyll pigments are present in the thylakoids.

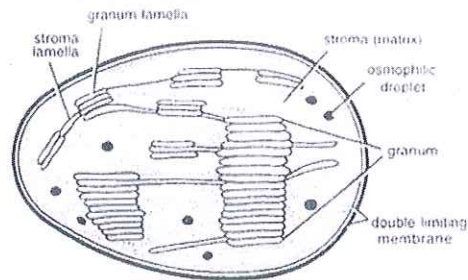
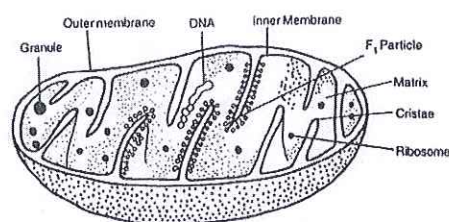


Fig. 295. Structure of chloroplast (redrawn after electron micrograph).

Or

The ultra structure of mitochondria with labelled diagram.:

- Double membrane bound structure with the outer membrane and the inner membrane dividing its lumen distinctly into two aqueous compartments.
- The inner compartment is filled with dense homogeneous substance called the matrix
- The outer membrane is continuous
- The inner membrane forms a number of infoldings called cristae which increases the surface- area.
- They have their own specific enzymes and DNA.



Mitochondrion cut open to show the inner structures.

21. THE STRUCTURE OF PROTEINS:

- Proteins are polymers of amino acids linked through peptide bonds into a chain.
- There are 20 amino acids that make up essentially all proteins.
- Each amino acid has a central carbon(called alpha carbon) bonded to –
 - i. A hydrogen

- ii. A carboxyl group
- iii. An amino group
- iv. A unique side chain

- The sequence of amino acids i.e the positional information is called the primary structure
- In proteins only right handed helices are observed. And some are modified to pleated sheets. These are secondary structures.
- The long protein chains are also folded upon itself like a hollow woolen ball. This is the tertiary structure.
- Some proteins are an assembly of more than one polypeptide units this architecture is called quaternary structure of proteins.

One important protein is haemoglobin and it helps in transporting oxygen and carbon dioxide by combining with them in blood.

Or

The factors on which enzyme activity depends are :

- Temperature- enzymes normally function in a narrow range of temperature. Each enzyme has its highest activity at a particular temperature called the optimum temperature. Low temperature makes the enzyme inactive and high temperature denatures the enzyme.
- pH- enzymes function the best at its optimum pH.
- Concentration of substrate- with increase in substrate concentration, the velocity of the reaction increases at first and becomes stable thereafter .

Active site :it is a crevice or pocket into which the substrate fits.thus enzymes through their active sites catalyse reactions at a high rate.
