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Loyola

Bio - Botany & Botany

11

(Short Version - Long Version)

This special guide is prepared on the basis of New Syllabus and Govt. Key

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FOREWORD

- ❖ It is high time to have a change over in our Thinking, Learning & Teaching.
- ❖ Yes the SCERT of Tamil Nadu Government, strived hard to achieve these high ideals. In this light it perceive.

STUDENTS - as partness in Creative Learning.

TEACHERS - as ever learning students with fiery passion & vision.

SUBJECTS - as ever expanding, shattering all sharp boundaries between other disciplines.

EDUCATION - as never restricting students as receiving end of a fixed body of knowledge.

EC / Botany - as a friend now tailored smart with the C/S of the text giving minutest details in its best.

- ❖ Must Learn First
- ❖ Made Easy Diagrams
- ❖ MVPs (Multi Various Patterns) in MCQs.
- ❖ Exhaustive Additional VSA, SA, LA etc.,
- ❖ Fore taste of Competitive Exams like NEET.

These value Additions add Face lift to EC / Botany.

Dear student Community & Beloved Teaching Fraternity,

We Welcome You to Work EC with EC / Botany.

Yes Students,

Positive Attitude can take you to great Attitude.

Best Wishes & Prayers

Mrs. Helen Cronans M.Sc., M.Ed., M.Phil.,

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CHAPTER 1

UNIT - I

Diversity of Living World

Living World

Part I – Evaluation (Book Back Questions)

1. Which one of the following statement about virus is correct? L.V. Sep - 2020

a. Possess their own metabolic system
b. They are facultative parasites
c. They contain DNA or RNA
d. Enzymes are present

Ans: c) They contain DNA or RNA

2. Identify the incorrect statement about the Gram positive bacteria. L.V. Sep - 2020 S.V. Aug-2022

a. Teichoic acid absent
b. High percentage of peptidoglycan is found in cell wall
c. Cell wall is single layered
d. Lipopolysaccharide is present in cell wall

Ans: a) Teichoic acid absent

3. Identify the Archaebacterium S.V.May-2022

a. Acetobacter b. Erwinia L.V.Mar-2023
c. Treponema d. Methanobacterium

Ans: d) Methanobacterium

4. The correct statement regarding Blue green algae is _____ L.V.Mar-2020

a. lack of motile structures
b. presence of cellulose in cell wall
c. absence of mucilage around the thallus
d. presence of floridean starch

Ans: a) lack of motile structures

5. Identify the correctly matched pair S.V.Mar-2023

a. Actinomycete - a) Late blight
b. Mycoplasma - b) lumpy jaw
c. Bacteria - c) Crown gall
d. Fungi - d) sandal spike

Ans: c) Bacteria -Crown gall

6. Differentiate homoiomerous and heteromerous lichens S.V. HY - 2018

Homoiomerous	Heteromerous
1. algae cells are evenly distributed in the thallus	1. A distinct layer of algae and fungi present in the thallus.

7. Write the distinguishing features of Monera. S.V. Mar - 2020

	Features	Monera
1.	Cell type	Prokaryotic
2.	Level of organisation	Mostly Unicellular, rarely multicellular
3.	Cell wall	Present (made up of Peptidoglycan and Mucopeptides)
4.	Nutrition	Autotrophic (Phototrophic, Chemoautotrophic) Heterotrophic (parasitic and saprophytic)
5.	Motility	Motile or non-motile
6.	Organisms	Archaebacteria, Eubacteria, Cyanobacteria, Actinomycetes and Mycoplasma

8. Why do farmers plant leguminous crops in crop rotations / mixed cropping?

- Rhizobium Clastridium, Azotobacter are Nitrogen fixing bacterias,
- Living in the root nodules of leguminous plants has **symbiotic association** with fix atmospheric nitrogen and convert it into nitrates, there by increase the fertility of the soil.

9. Briefly discuss on five kingdom classification. Add a note on merits and demerits. S.V. Sep. - 2020 S.V.Mar-2023

- Proposed by **R.H. Whittaker** (American taxonomist)
- Criteria considered cell structure, Thallus Organization, Mode of Nutrition, Reproduction, and Phytogenetic Relations.
- 5 kingdom classifications include:-
  a. Monera b. Protista c. Fungi
  d. Plantae e. Animalia

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Criteria	Monera	Protista	Fungi	Plantae	Animalia
Cell type	Prokaryotic	Eukaryotic	Eukaryotic	Eukaryotic	Eukaryotic
Level of organization	Mostly unicellular rarely multicellular	Unicellular	Multicellular and unicellu-lar	Tissue / organ	Tissue / organ /organ system
Cell wall	Present (made up of peptidoglycan and Mucopeptides)	Present in some (made up of cellulose), absent in others	Present (made up of chitin or cellulose)	Present (made up of cellulose)	absent
Nutrition	Autotrophic (phototrophic, Chemoautotrophic) Heterotrophic (parasitic and saprophytic)	Autotrophic - photosynthetic, Heterotrophic	Heterotrophic - parasitic or Saprophytic	Autotrophic (Photosynthetic)	Heterotrophic (Holozoic)
Motility	Motile or non-motile	Motile or non-motile	Non-motile	Mostly non - motile	Mostly motile
Organisms	Archaebacteria, Eubacteria, Cyanobacteria, Actinomycetes and Mycoplasma	Chrysophytes, Dinoflagellates Euglenoids, Slime molds, Amoeba, Plasmodium, Trypanosoma, Paramecium	Yeast, Mushrooms and Molds	Algae, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms	Sponges, Invertebrates and Vertebrates.

Merits

- The classification is based on the complexity of cell structure and organization of thallus.
- It is based on the mode of nutrition.
- Separation of fungi from plants
- It shows the phylogeny of the organisms.

Demerits

- The Kingdom Monera and protista accommodate both autotrophic and heterotrophic organisms, cell wall lacking and cell wall bearing organisms thus making these two groups more heterogeneous.
- Viruses were not included in the system.

10. Give a general account on lichens. S.V.Mar-2020 L.V.May-2022 S.V.Aug-2022

1. The symbiotic association between algae and fungi is called **lichens.**
2. The algal partner is called **phycobiont,** and the fungal partner is called **mycobiont.**
3. Algae provide nutrition for fungal partner in turn fungi provide protection and also help to fix the thallus to the substratum through **rhizinae.**
4. Asexual reproduction takes place through fragmentation, soredia and isidia. Phycobionts reproduce by akinetes, hormogonia, aplanospore etc.,
5. Mycobionts undergo sexual reproduction and produce ascocarps.

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Part II – GMQ & GOVT. EXAM QUESTION AND ANSWERS

I. Match the following

1.

	List I		List II
A	Athlete's foot	(i)	Viral disease
B	Diphtheria	(ii)	Protozoic disease
C	Rabies	(iii)	Bacterial disease
D	Amoebic dysentry	(iv)	Fungal disease

a) A (iii), B (iv), C (ii), D (i) S.V. QY - 2019
b) A (iv), B (iii), C (i), D (ii)
c) A (iv), B (iii), C (ii), D (i)
d) A (ii), B (i), C (iv), D (iii)

Ans: b) A (iv), B (iii), C (i), D (ii)

2.

	List I		List II
A	Green Sulphur Bacteria	(i)	Chromatium
B	Purple Sulphur Bacteria	(ii)	Methano bacterium
C	Purple Non-Sulphur Bacteria	(iii)	Chlorobium
D	Archae Bacteria	(iv)	Rhodopirillum

a) A (i), B (ii), C (iii), D (iv) S.V. HY - 2019
b) A (ii), B (iii), C (iv), D (i)
c) A (iii), B (i), C (iv), D (ii)
d) A (iv), B (i), C (ii), D (iii)

Ans: c) A (iii), B (i), C (iv), D (ii)

II. Choose the correct answer

1. Which one of the following is not the characteristic feature of cyanobacteria ? S.V. GMQ-2018
a) they are multicellular
b) they form colonies
c) they form blooms in polluted water bodies
d) they can fix atmospheric nitrogen

Ans: a) they are multicellular

2. Approximate number of capsomeres in TMV is S.V.QY - 2018
a) 3120 b) 1203
c) 2130 d) 3021

Ans: c) 2130

3. Fusion of both morphologically and physiologically dissimilar gametes called _____. S.V.QY-2018
a) Isogamy b) Anisogamy
c) Oogamy d) Syngamy

Ans: b) Anisogamy

4. The integrated phage DNA is called _____. S.V.HY-2018
a) prophage b) bacteriophage
c) cyanophage d) mycophage

Ans: a) prophage

5. Which one is called as a "Biological puzzles"? L.V.Mar-2019
a) Virus b) Algac
c) Bacteria d) Fungi

Ans: a) Virus

6. The reserved food of Rhodophyceae is _____ L.V.Mar-2020
a) Paramylon b) Laminarin starch
c) Cyanophycean starch d) Floridean starch

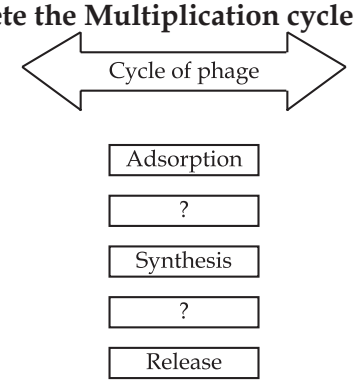
Ans: d) Floridean starch

7. The micro-organism which lack cell-wall and appear like "Fried Egg" in culture L.V.Aug-2022
a) Archae bacteria b) Actinomycetes
c) Cyano bacteria d) Mycoplasma

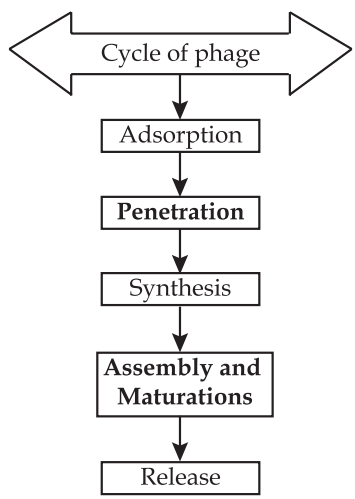
Ans: d) Mycoplasma

III. Two Mark Questions

1. Complete the Multiplication cycle of Phage. S.V.GMQ-2018



Ans:



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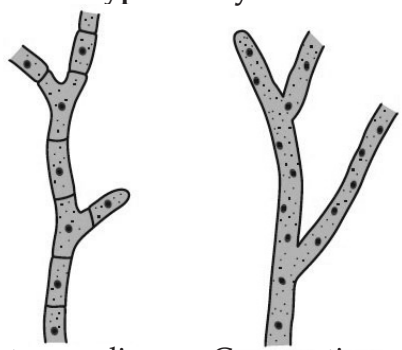
2. Refer the diagram of septate mycelium given. With that reference draw coenocytic mycelium. S.V. GMQ-2018

Types of mycelium



Septate mycelium Coenocytic mycelium

3. What is Virion ? (or) Define Virion. S.V.QY-2018 S.V.May-2022 L.V. Aug-2022

Virion is an intact infective virus particle which is non-replicating outside a host cell.

4. A few hours after taking food, a person feels hungry. Name the metabolic activity that is responsible for this. Justify your answer. S.V.QY-2019

Metabolism activity responsible for this is catabolism. It is breaking down process from larger molecule into smaller units. The stored chemical energy is released and used so the person feels hungry.

5. What are the types of respiration present in bacteria ? L.V. Mar-19

Two types of respiration is found in bacteria :

1. Aerobic respiration :

These bacteria require O_2 as terminal acceptor and will not grow under anaerobic conditions. ex. streptococcus

2. Anaerobic respiration :

These bacteria do not use O_2 for growth and metabolism but obtain their energy from fermentation reactions, ex. clostridium.

6. What is Fimbriae or Pili ? L.V. Mar-20

Pili or Fimbriae are hair like t found on surface of cell wall of gram-negative bacteria.

Eg : Enterobacterium.

7. What are Magnetosomes ? L.V. Mar-20

1. Intracellular chains of 40 - 50 magnetite (Fe_3O_4) particles found in bacterium - ***Aquaspirillum magnetotacticum.***
2. Helps the bacterium to locate nutrient rich sediments.

8. Write the importance of Mycorrhizae. S.V. May-22

- Helps to derive nutrition in Monotropa, a saprophytic angiosperm.
- Improves the availability of minerals and water to the plants.
- Provides drought resistance to the plants protects roots of higher plants from the attack of plantpathogens.

9. What is Capnophilic bacterium? L.V. Mar-2023

Bacteria which require CO_2 for their growth are called as capnophilic bacteria.

Ex : Campylobacter

IV. Three Mark Questions

1. Explain Binary Fission in bacteria. S.V. Aug-2022

- Under favourable conditions the cell divides into two daughter cells.
- The nuclear material divides first and it is followed by the formation of a simple median constriction which finally results in the separation of two cells.

2. What is heterocyst ? Mention its function. L.V. Aug-2022

- In some forms a large colourless cell is found in the terminal or intercalary position called Heterocysts.
- They are involved in nitrogen fixation.

V. Five Mark Questions

1. (i) A Danish Physician, Christian Gram developed a staining procedure to differentiate bacteria. List the various steps involved in that procedure.

ii) Distinguish between Deoxy viruses and Ribo viruses with example. S.V. QY-18 S.V. Mar-19

i) Gram staining Techniques :

1. Prepare a smear of bacterial culture.
2. Stain with Crystal violet for 30 seconds.
3. Rinse in distilled water for 2 seconds.
4. Grams Iodine for 1 minute.
5. Rinse in distilled water.
6. Wash in 95% ethanol or acetone for 10 to 30 seconds.
7. Rinse in distilled water.
8. Safranin for 30-60 seconds.
9. Rinse in distilled water and blot.
10. Observe under microscope.

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ii) Distinguish between Deoxy viruses and Ribo viruses :

	Deoxy viruses	Ribo viruses
1	The viruses possessing DNA	Viruses possessing RNA
2	Ex: Majority of animal viruses (OR) Cauliflower Mosaic virus	Ex: Majority of Plant viruses (OR) HIV viruses

2. Write the steps involved during the phage multiplication in which the disintegration of host bacterial cell occurs. Draw a diagram. S.V. QY-19

Lytic Cycle : During lytic cycle of the phage, the disintegration of host bacterial cell occurs and the progeny virions are released. The steps are:

1. Adsorption :

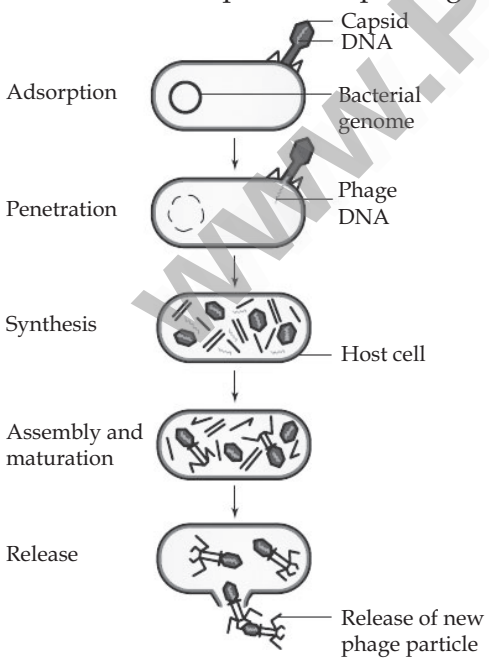
(i) Phage (T_4) particles interact with cell wall of host (E. coli).

(ii) The phage tail makes contact between the two, and tail fibres recognize the specific receptor sites present on bacterial cell surface.

(iii) The lipopolysaccharides of tail fibres act as receptor in phages.

(iv) The process involving the recognition of phage to bacterium is called landing.

(v) Once the contact is established between tail fibres and bacterial cell, tail fibres bend to anchor the pins and base plate to the cell surface. This step is called pinning.



Lytic cycle

2. Penetration :

- This process involves mechanical and enzymatic digestion of the cell wall of the host. At the recognition site phage digests certain cell wall structure by viral enzyme (lysozyme).
- After pinning the tail sheath contracts (by using ATP energy) and appears shorter and thicker.
- The base plate through the centre enlarges after contraction of sheath.
- Thereafter DNA is injected into the cell wall without requiring metabolic energy.
- Such an empty protein coat leaving the outside cell is known as 'ghost'.

3. Synthesis :

(i) Degradation of bacterial chromosome.
(ii) Protein synthesis and
(iii) DNA replication.

- The phage nucleic acid takes over the host biosynthetic machinery.
- Host DNA gets inactivated and breaks down.
- Phage DNA suppresses the synthesis of bacterial protein and directs the metabolism of the cell to synthesis the proteins of the phage particles and simultaneously replication of phage DNA also takes place.

4. Assembly and Maturation :

- DNA of the phage and protein coat are synthesized separately, assembled to form phage particles.
- This assembling process of the phage particles is known as maturation.
- After 20 min of infection about 300 new phages are assembled.

5. Release :

- Maturation of phage particles starts and accumulate inside the host cell.
- The phage particles are released by the lysis of host cell wall.

3. Explain sexual reproduction in Bacteria.

Sexual Reproduction in Bacteria : S.V. HY-19

Typical sexual reproduction involving the formation and fusion of gametes is absent in bacteria. However gene recombination can occur in bacteria by three different methods. They are :

(i) Conjugation (ii) Transformation
(iii) Transduction

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(i) Conjugation

- In this method of gene transfer the donor cell gets attached to the recipient cell with the help of pili.
- The pilus grows in size and forms the conjugation tube.
- The plasmid of donor cell which has the F^+ (fertility factor) undergoes replication.
- Only one strand of DNA is transferred to the recipient cell through conjugation tube.
- The recipient completes the structure of double stranded DNA by synthesizing the strand that complements the strand acquired from the donor.

(ii) Transformation

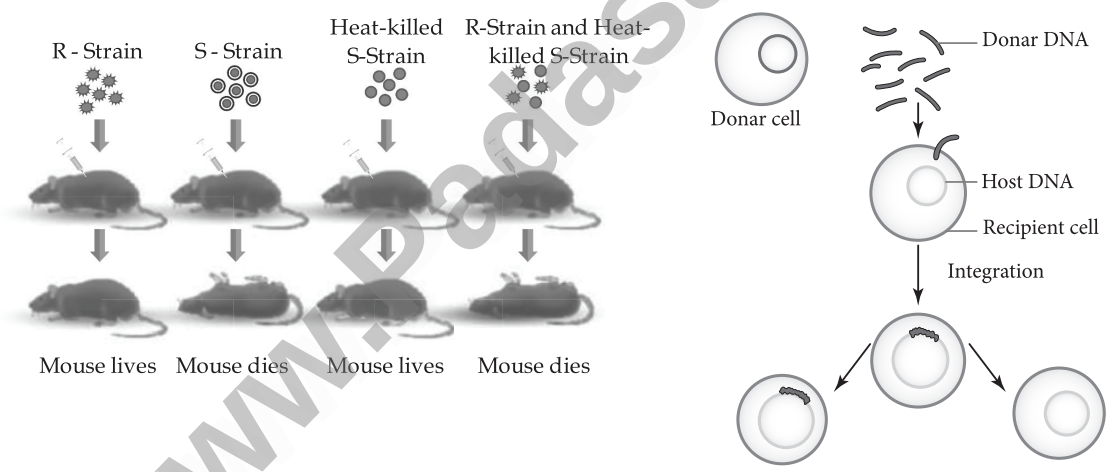
- Transfer of DNA from one bacteria to another is called transformation.
- 1928 Fredrick Griffith demonstrated it in mice using Diplococcus pneumoniae
- 2 strains

1. Smooth colonies - virulent type (S)
2. Rough colonies - Avirulent type (R)

S type (virulent)	injected into the mouse	mouse died because it is virulent
R type (avirulent)	injected into the mouse	mouse died because it is avirulent
Heat killed S type virulent	injected into the mouse	mouse lived
Heat killed S type virulent + R type avirulent	injected into the mouse	mouse died

Conclusion :

Thus one strains host character (host) is changed by the donar DNA. This process is Transformation.



(iii) Transduction

Phage mediated DNA transfer is called Transduction.

Transduction is of two types

(i) Generalized transduction

(ii) Specialized or Restricted transduction.

(i) Generalized Transduction

The ability of a bacteriophage to carry genetic material of any region of bacterial DNA is called generalised transduction.

(ii) Specialized or Restricted Transduction

The ability of the bacteriophage to carry only a specific region of the bacterial DNA is called specialized or restricted transduction.

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4. List out bacterial diseases caused to plants, animals & human brings. L.V.Mar-2020

Plant diseases caused by bacteria

S. No.	Name of the Host	Name of the disease	Name of the pathogen
1.	Rice	Bacterial blight	Xanthomonas oryzae
2.	Apple	Fire blight	Erwinia amylovora
3.	Carrot	Soft rot	Erwinia caratovora
4.	Citrus	Citrus canker	Xanthomonas citri
5.	Cotton	Angular leaf spot	Xanthomonas malvacearum
6.	Potato	Ring rot	Clavibacter michiganensis subsp. Sepedonicus
7.	Potato	Scab	Streptomyces scabies

Animal diseases caused by bacteria

S. No.	Name of the Animal	Name of the disease	Name of the pathogen
1.	Sheep	Anthrax	Bacillus anthracis
2.	Cattle	Brucellosis	Brucella abortus
3.	Cattle	Bovine tuberculosis	Mycobacterium bovis
4.	Cattle	Black leg	Clostridium chanuvoei

Human diseases caused by Bacteria

S. No.	Name of the disease	Name of the pathogen
1.	Cholera	Vibrio cholerae
2.	Typhoid	Salmonella typhi
3.	Tuberculosis	Mycobacterium tuberculosis
4.	Leprosy	Mycobacterium leprae
5.	Pneumonia	Diplococcus pneumoniae
6.	Plague	Yersinia pestis
7.	Diphtheria	Corynebacterium diptheriae
8.	Tetanus	Clostridium tetani
9.	Food poisoning	Clostridium botulinum
10.	Syphilis	Treponema pallidum

5. What is Archaebacteria ? L.V.Mar-2020

- Archaebacteria are primitive prokaryotes and are adopted to thrive in extreme environments like hot springs, high salinity. Low pH and like and so on.
- They are mostly chemoautotrophs.
- The unique feature of this group is the presence of lipids like glycerol & isopropyl ethers in their cell membrane.
- Due to the unique chemical composition the all membrane show resistance against cell wall antibiotics and lytic agents.
- Example : Methanobacterium, Halobacterium, Thermoplasma.

6. Write any five economic importance of bacteria. L.V.Sep-2020

Beneficial aspects	Bacteria	Role
1. Soil fertility		
Ammonification	1. Bacillus ramosus 2. Bacillus mycoides	Convert complex proteins in the dead bodies of plants and animals into ammonia which is later converted into ammonium salt.
Nitrification	1. Nitrobacter 2. Nitrosomonas	Convert ammonium salts into nitrites and nitrates.
Nitrogen fixation	1. Azotobacter 2. Clostridium 3. Rhizobium	(i) Converting atmospheric nitrogen into organic nitrogen. (ii) The nitrogenous compounds are also oxidized to nitrogen. (iii) All these activities of bacteria increase soil fertility.

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2. Antibiotics		
1. Streptomycin	Streptomyces griseus	It cures urinary infections, tuberculosis, meningitis and pneumonia.
2. Aureomycin	Streptomyces aureofaciens	It is used as a medicine to treat whooping cough and eye infections.
3. Chloromycetin	Streptomyces venezuelae	It cure typhoid fever.
4. Bacitracin	Bacillus licheniformis	It is used to treat syphilis.
5. Polymyxin	Bacillus polymyxa	It cure some bacterial diseases.
3. Industrial Uses		
1. Lactic acid	Lactobacillus lactis and Lactobacillus bulgaricus	Convert milk sugar lactose into lactic acid.
2. Butter	Lactococcus lactis, Leuconostoc citrovorum	Convert milk into butter, cheese, curd and yoghurt.
3. Cheese	Lactobacillus acidophilus, Lactobacillus lactis	Convert milk into butter, cheese, curd and yoghurt.
4. Curd	Lactobacillus lactis	
5. Yoghurt	Lactobacillus bulgaricus	
6. Vinegar (Acetic acid)	Acetobacter aceti	This bacteria oxidizes ethyl alcohol obtained from molasses by fermentation to vinegar (acetic acid).
7. Vitamins	Escherichia coli	Living in the intestine of human beings produce large quantities of vitamin K and vitamin B complex.
	Clostridium acetobutylicum	Vitamins B_2 is prepared by the fermentation of sugar.

7. Write the economic importance of fungi. S.V. Mar-23

1. Food :

(i) Mushrooms like *Lentinus edodes, Agaricus bisporus, Volvariella volvaceae* are consumed as food for their high nutritive value.

(ii) Yeasts provide vitamin B.

2. Medicine :

(i) Fungi produce antibiotics, arrest the growth or destroy the bacteria. Some of the antibiotics produced by fungi. Penicillin *(Penicillium notatum)*. Cephalosporins *(Acremonium chrysogenum)* etc.,

(ii) **Ergot alkaloids** *(Ergotamine)* produced by *Claviceps purpurea* is used as vasoconstrictors.

3. Industries :

Production of Organic acid : For the commercial production of organic acids fungi are employed in the Industries. Eg : Citric acid and Gluconic acid by *Aspergillus niger.*

4. Bakery and Brewery :

(i) **Yeast** *(Saccharomyces cerevisiae)* is used for fermentation of sugars to yield alcohol. Bakeries utilize yeast for the production of bakery products like bread, buns, rolls etc.,

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(ii) *Penicillium roquefortii* and *Penicillim cammemberti* are employed in cheese production.

5. Production of enzymes :

(i) *Aspergillus Oryzae, Aspergillus niger* were employed in the production of enzymes like **Amylase, Protease, Lactase** etc.

(ii) **'Rennet'** which helps in the coagulation of milk in cheese manufacturing is derived from and *Mucor spp.*

Part III – ADDITIONAL QUESTIONS

I. Match the following

1.

List I		List II	
I	Five kingdom system of classification	A	Carl Linnaeous
II	Three kingdom system of classification	B	Copeland
III	Four kingdom system of classification	C	R.H. Whittaker
IV	Two kingdom system of classification	D	Ernst Haechel

a) I - C, II - D, III - B, IV - A
b) I - D, II - C, III - B, IV - A
c) I - D, II - C, III - A, IV - B
d) I - C, II - D, III - A, IV - B

Ans: a) I - C, II - D, III - B, IV - A

2.

List I		List II	
I	TMV Discovered by world	A	C.G. Ehrenberg
II	Bacterium word coined by	B	Dimitry Ivanowsky
III	Father of Mycology	C	David Balt more
IV	Classification virus given by	D	E.J. Butler

a) I - D, II - C, III - B, IV - A
b) I - B, II - D, III - A, IV - C
c) I - D, II - B, III - C, IV - A
d) I - D, II - B, III - A, IV - C

Ans: b) I - B, II - A, III - D, IV - C

II. Choose the Correct Answer

1. Father of botany is
a. Carl Linnaeus b. Charles Darwin
c. Theophrastus d. Aristotle
Ans: c. Theophrastus

2. Recombination is the result of
a. Binary fission
b. Asexual reproduction
c. Sexual reproduction
d. Vegetative propagation
Ans: c. Sexual reproduction

3. Find out the odd man out
a. Ebola b. Zika
c. Sars d. Alkaligenes
Ans: d. Alkali genes

4. Red tide occur due to the toxic bloom of
a. Red algae b. Gymnodinium breve
c. Water hyacinth d. Laminaria
Ans: b. Gymnodinium breve

5. Blister like pustules occur due to
a. Chickenpox b. Rust
c. Smut d. Mumps
Ans: a. Chickenpox

6. Bacterial chlorophyll is also known as
a. Chlorophyll b. Bilirubin
c. Chromatium d. Chloridin
Ans: c. Chromatium

7. Expand Bt-toxin
a. Biotechnology b. Bio toxin
c. Beta-toxin d. Bacillus thuringiensis
Ans: d. Bacillus thuringiensis

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8. **This drug is also known as wonder drug.**
   a. Streptomycin b. Aureomyciin
   c. Bacitracin d. Pencillin
   Ans: d. Pencillin

9. **Discovery of ..... is a serendipity in the world of medicine.**
   a. Bacitracin b. Polymycin
   c. Streptomycin d. Pencillin
   Ans: d. Pencillin

10. **Bacillus thuringiensis is a**
    a. Bio fertilizer b. Bio-fuel
    c. Bio-pesticide d. Bio-medicine
    Ans: c. Bio-pesticide

11. **C.H. Blackley proved that _____ could also cause allergy in human beings**
    a. Mycoplasma b. Monocytes
    c. Fungi d. Virus
    Ans: c. Fungi

12. **Genetic trait carried in the bacterial**
    a. Cell wall b. Nucleotide
    c. Plasmid d. Mesosome
    Ans: c. Plasmid

III. Find out the wrong statement

1. **Which one of the following is a wrong statement regarding ehemolithotrophs**
   a. Sulphur bacteria b. Iron bacteria
   c. Methane bacteria d. Hydrogen bacteria
   Ans: c. Methane bacteria

2. **Which one of the following is not a Ribovirus?**
   a. Tobacco mosaic virus
   b. Cauliflower mosaic virus
   c. Human immune deficiency virus
   d. Wound tumour virus
   Ans: d. Wound tumour virus

3. **Which one of the following is not a zygomycetes fungi**
   a. Mucor b. Rhizopus
   c. Yeast d. Pilobolus
   Ans: c. Yeast

IV. Choose the correct pair

1. a. Yeasts – Vitamin A
   b. Coagulation of milk – Penicilin
   c. Anti Biotic – Rennet
   d. Erimothecium Ashbyii – Vitamin B_{12}
   Ans: d. Erimothecium Ashbyii - Vitamin B_{12}

2. a. Pseudothecium – False fruit body
   b. Cleistothecium – Flask shaped with ostiole
   c. Apothecium – Completely closed
   d. Perithecium – Cup shaped, open type
   Ans: a. Pseudothecium - False fruit body

V. Choose the Incorrect pair

1. a. Binary fission – Bacteria, Amoeba
   b. Protonema – Mosses
   c. Budding – Hydra, yeast
   d. Conidia – Planaria
   Ans: d. Conidia - Planaria

2. a. Complex shape – Bacterio phage
   b. A typical shape – Herppus virus
   c. Cuboidal shape – Adino virus
   d. Spherical shape – Influenza virus
   Ans: b. A typical shape - Herppus virus

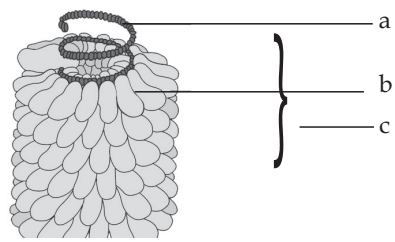
VI. Assertion and Reason

1. **Assertion 'A' :** Some bacteria have the capacity to retain gram stain after treatement with acid alcohol.
   Reason 'R' : Known as gram +ve as attracted towards positive pole under the influence of electric current.
   a. A & R correct R is explaining A
   b. A & R correct R is not explaining A
   c. A is true but R is wrong
   d. A is true but R is not explaining A
   Ans: c. A is true but R is wrong.

2. **Assertion 'A' :** Aflatoxin produced by Aspergillus flavus.
   Reason 'R' : These toxin are useful to mankind to cure few disease.
   a. A & R correct R is explaining A
   b. A & R correct R is not explaining A
   c. A is true but R is wrong
   d. A is true but R is not explaining A
   Ans: c. A is true but R is wrong.

VII. Draw the diagram and mark the parts

1. **Structure of TMV.**



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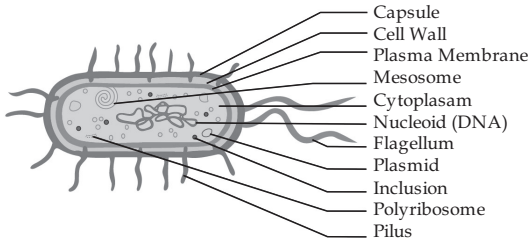
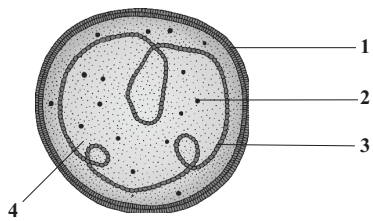
Ans :
a. RNA b. Capsomere c. Capsid

2. Ecoli bacteria.

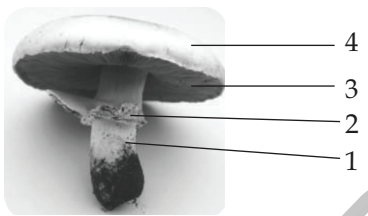


3. Mycoplasma.



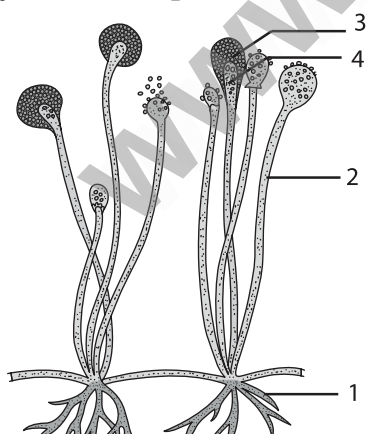
Ans:
1. Cell membrane 2. Ribosome
3. DNA Strand 4. Cytoplasm

4. Basidiocarp of Agaricus.



Ans:
1. Stipe 2. Annulus 3. Gill 4. Pileus

5. Zygomycetes-Rhizopus.



Ans:
1. Rhizoids 2. Sporangiophore
3. Sporangium 4. Columella

VIII. Two Mark Questions

1. Define Homeostasis.
Property of self regulation and tendency to maintain a steady state within an internal environment which is liable to change is called Homeostasis.

2. Tabulate Milestones in Virology.

Year	Name of the Scientist	Achievement
1796	Edward Jenner	Vaccination for small pox.
1886	Adolf Mayer	Proved infectious nature of TMV from mosaic leaves sap
1892	Dimitry Ivanowsky	Viruses are smaller than bacteria.

3. What is Chromista ?
'Chromista' is a new kingdom added later to include algae with chlorophyll a,c, colourless algae, diatom, brown algae, cryptomonads and oomycetes.

4. Bacteria is a indeed friend - discuss.
Even though Bacteria cause many diseases to plants animals and human beings they are beneficial to day to day life also.
Ex: Milk (lactobacillus acidophobus) / (lactobacillus lacti)
a. Curd b. Butter c. Cheese d. Yoghurt
These are few of the beneficial activities.

5. What are Prions.
- Discovered by B. Prusiner - 1982
- Protanaceous infections particles
- Causative agent for a dozen fatal degenerative disorders of C N system of humans and animals. E.g. (BSE) - Bovine spongiform Encephalopathy - mad cow disease.

6. Why is it essential to do classification ?
- To relate on the basis of common features
- To define, on the basis of salient features
- To know the relationship among different groups.
- To understand evolutionary relationship.

7. What is Prophage ?
- In the lysogenic cycle, the injected phage DNA become circular and integrates into the bacterial chromosome by recombination.
- The integrated DNA of phage and bacteria is known as Prophage.

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8. Distinguish between Cyanophage and Mycophage.

	Cyanophage	Mycophage
1.	Virus infecting blue green Algae are known as Cyanophage	Virus attacking fungi are called Mycoviruses or Mycophages
2.	1st reported by Safferman and Morris (1963)	1st reported by Holling (1962)
3.	Eg. Lyngbuya, Plectonema	Eg. Mycovirus attacking Mushrooms.

9. Differentiate between Photo lithotrophs and Photo organotrophs.

	Photo lithotrophs	Photo organotrophs
1.	Hydrogen donor is an inorganic substance	They utilize organic acid or alcohol as hydrogen donor
2.	**i. Green sulphur bacteria :** The Hydrogen donor is H_2S Possess pigment called bacteriovirudin. **Eg.** chlorobium	E.g. purple non sulphur bacteria - Rhodospirillum
	ii. Purple sulphur bacteria : The hydrogen donor is thiosulphate, Bacteriochlorophyll is present. Chlorophyll containing chromosomes are present **Eg :** Chromatium	

10. Write any 2 vitamin yielding bacteria.

Escherichia coli	Live in human intestine produce large quantities of vitamin K & B - complex
Clostridium acetobutylicum	Vitamin B_2 is prepared by the fermentation of sugar.

11. Name any 2 bacteria diseases affecting Potato.

	Name of disease	Causative organism
1.	Ringrot	Clavibacter michiganensis sub sp sepedonicus
2.	Scab	Streptomyces scabies

12. What is meant by probiotics.

- Microorganism such as lactobacillus, Bifido bacterium when consume as a dietary supplement help to maintain or restores beneficial bacteria to the digestive tract.
- They are called friendly or good bacteria. They keep our gut healthy.
- They help to increase the immunity of the body.
- Eg. Probiotic Yoghurt
- Probiotic tooth paste.

13. What is the meant by Ray fungi? Give example.

- Actinomycetes are called as ray fungi due to their mycelia like growth.
- They are anaerobic or facultative anaerobic
- They are gram +ve
- Don't produce aerial mycelium
- DNA contain high guanine and cytosine content
- Eg. Streptomyces

14. Give the name of any 4 edible mushroom.

1. Lentinus edodes
2. Agaricus bisporus
3. Volvariella volvaceae
4. Yeast and Eremothecium ashbyii - Rich source of vitamin B_{12}.

15. Define aflatoxin.

Aspergillus, Rhizopus, Mucor and Penicillium are involved in spoilage of food material. Aspergillus flavus infest dried food & produce carcinogenic toxin known as **aflatoxin.**

16. Name 3 Dermatophytes.

1. Trichophyton
2. Tinea
3. Microsporum
4. Epidermophyton are some fungi causing skin problems.

IX. Three Mark Questions

1. State the living and Non-living character of Virus.

(i) Living characters

- Presence of nucleic acid & protein
- Capable of mutation

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- Ability to multiply with living cells
- Able to infect and cause diseases
- Show irritability and host specific.
- Actinom

(ii) Non living characters

- Can be crystallized
- Don't have metabolic machinery or functional autonomy
- In active outside the host
- Energy producing enzyme system is absent.

2. What are the economic importance of Cyanophyceae ?

S. No.	Name of the Organism	Economic Importance
1.	Microcystis aeruginosa, anabaena, Anabaena Flos aquae	Waterbloom-release toxins - affect aquatic organisms
2.	Nostoc, Anabaena	Fix atmospheric nitrogen (bio fertilizer)
3.	Spirulina	Used to prepare SCP

3. Tabulate animal diseases caused by bacteria.

No.	Name of the animal	Name of the diseases	Name of the pathogen
1.	Sheep	Anthrax	Bacillus anthracis
2.	Cattle	Brucellosis	Bacillus abortus
3.	Cattle	Bovine Tuberculosis	Mycobacterium bovis
4.	Cattle	Black leg	Clostridium Chauvoei

4. Distinguish between Ammonification & Nutrification.

	Ammonification	Nutrification
1.	Convert complex proteins in the dead bodies of plants and animals into ammonia which is later converted into ammonium salt.	After Ammonification the ammonium salts converted into Nitrites & nitrates.
2.	Eg. 1. Bacillus ramosus 2. Bacillus mycoides	Eg. 1. Nitrobacter 2. Nitrosomonas

5. Define Transduction and explain.

The three types of Transduction

- Phage mediated DNA transfer is Transduction
- Zinder and Lederberg (1952) discovered it in Salmonella typhimurum.
- 2 types - Generalised and Specialised.

I. Generalised Transduction :

Ability of bacteriophage to carry genetic material of any region of bacterial DNA is called generalized transduction.

II. Specialised Transduction :

Ability of bacteriophage to carry only a specific region of the bacterial DNA is called Specialized or Restricted Transduction.

6. Define biopesticides and give 2 examples from fungi.

- The substances derived from microbes and plants can be used to kill or eradicate pests weeds and diseases causing germs of crops. This is known Bio-pesticide. They are eco-friendly, non hazardous, non phytotoxic.

e.g. Beauveria bassiana, Metarhizium anisopliae.

7. Write down any 4 uses of Mycorrhiza.

1. Helps to derive nutrition in monotropa, a saprophytic angiosperm.
2. Improves the availability of minerals and water to the plant.
3. Provides drought resistance to the plants.
4. Protects roots of higher plants from the attack of plant pathogens.

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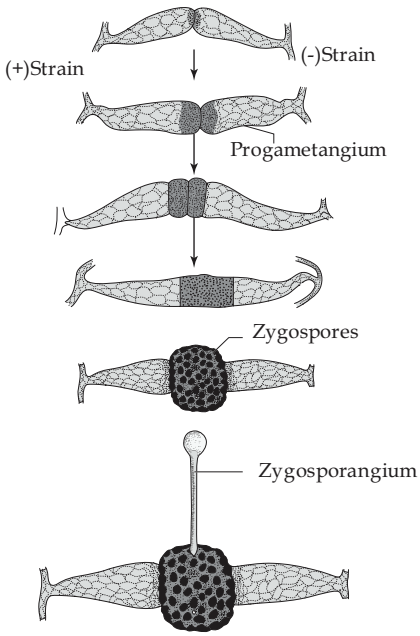
8. Explain gametangial copulation in Rhizopus with the help of diagrams.

- In rhizopous & in Mucor there occur hetero thallism - there are 2 strains of the hyphae.
- In a sexual copulation only the 2 opposite strains, +ve and -ve strains come together.



9. Explain briefly the characteristics of Oomycetes.

Mycelium	Coenocytic mycelium is present
Cellwall	multinucleate made up of Glucan & Cellulose
Asexual reproduction (Zoospore)	Zoospore with one whiplash & one tinsel flagellum is present.
Sexual reproduction	Oogamous in nature E.g. Albugo.

10. Explain briefly the characteristics of zygomycetes.

Nutrition cellwall	Mostly saprophytic
Cellwall	Chitin and Cellulose
Mycelium	Branched and Coenocylic
Asexual reproduction	Spores produced in sporangia
Sexual reproduction	Fusion of gametangia result in zygospores.

11. Write about the harmful activities of fungi.

1	Amanita phalloides, Amanita verna, Boletus satanus, known as toad stools	Poisonous toxins are produced.
2	Aspergillus, Rhizopus, Mucor, Penicillium	Cause food spoilage
3	Aspergillus flavus	Infest dried foods produce carcinogenic toxin called Aflatoxin.
4	Patulin ochratoxin A	Toxins produced by fungi
5	Fungi	Various diseases are caused to plants & human beings.

12. Name the Antibiotics derived from fungi.

Organism	Antibiotic	Uses
Penicillium notatum	Penicillin	To treat Pneumonia and throat infections
Penicillium griseofulvum	Griseofulvin	To treat ring worm athletes foot & fungal infections of scalp.
Acremonium chrysogenum	Cephalosporins	To treat respiratory tract infections skin infections & UTI (urinary tract infections)
Claviceps purpurea	Ergotamine	To treat migraine head aches induce uterus contraction at the time of child birth.

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X. Five Mark Questions

1. Economic Importance of Lichens.

I. Lichens Secrete acids		Uses
1.	Oxalic acid	It corrodes the rock surface and helps in weathering of rocks.
2.	Usnic acid	It is used to antibiotics.
II. Pollution Indicator		Lichens are sensitive to air pollutants especially to sulphur-di-oxide.
1.	Rosella Montagnei	The dye present in litmus paper used as acid base indicator in the laboratories.
2.	Cladonia rangiferina	It is used as food for animals living in Tundra regions.

2. Tabulate the salient features of cyanophyceae?

1	Thallus	Unicellular in Chroococcus, Colonial in Gloeocapsa and filamentous trichome in Nostoc
2	Movement	Gliding movement is noticed in some species. Eg : Oscillatoria
3	Protoplasm	Central region called centroplasm and peripheral region bearing chromotophore
4	Photosynthetic pigments	c - phyocyanin and c - phycoerythrin along with myxoxanthin and myxoxanthophyll.
5	Reserve food	Cyanophycean starch
6	Nitrogen fixation	Large colourless cell is found in the terminal or intercalary position called Heterocysts.
7	Reproduction	Vegetative methods and produce Akinetes, Hormogonia, fission and endospores.
8	Mucilage	Around the thallus is characteristic feature of this group because of it is known as Myxophyceae
9	Sexual reproduction	Absent

3. Give an account of Mycoplasma as Mollicutes

1	Size	0.1 - 0.5 µm
2	Shape	Pleomorphic
3	Discoverer	first isolated by Nocard and co-workers in the year 1898
4	Isolated by	pleural fluid of cattle affected with bovine pleuropneumonia.
5.	Cell Wall	absent
6.	growth appearance	Fried egg
7.	DNA characteristics	low guanine and cytosine content than true bacteria.
8.	Plant diseases	brinjal - Little leaf disease Legumes plants - witches broom disease Cloves - Phyllody disease Sandal - Spikes disease
9.	Animal disease	pleuropneumonia is caused by mycoplasma mycoides.

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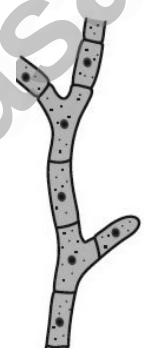
4. Differentiate between Gram positive and Gram Negative bacteria.

S.No.	Characteristics	Gram Positive Bacteria	Gram Negative Bacteria
1.	Cell wall	Single layered with 0.015 µ.m - 0.02 µ.m	Triple layered with 0.0075 µ.m. - 0.012 µ.m thick
2.	Rigidity of cell wall	Rigid due to presence of peptidoglycans	Elastic due to presence of lipoprotein -polysaccharide mixture
3.	Chemical composition	Peptidoglycans - 80% Polysaccharide - 20% Teichoic acid present	Peptidoglycans - 3 to 12% rest is polysaccharides and lipoproteins. Teichoic acid absent
4.	Outer membrane	Absent	Present
5.	Periplasmic space	Absent	Present
6.	Susceptibility to pencillin	Highly susceptible	Low susceptible
7.	Nutritional requirements	Relatively complex	Relatively simple
8.	Flagella	Contain 2 basal body rings	Contain 4 basal body rings
9.	Lipid and lipoproteins	Low	High
10.	Lipopolysaccharides	Absent	Present

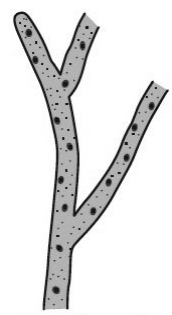
5. Explain General characteristics of fungi.

- The plant body is made up of thin, filamentous branched structures called hyphae.
- A number of hyphae get interwoven to form mycelium.
- Cell wall is made up of chitin (Polymer N-acetyl gluco samine) and fungal cellulose.
- Mycelium has two types

1. Septate mycelium Eg : Fusarium
2. Coencytic mycelium Eg : Albuco



Septate mycelium



Coenocytic mycelium

Plecetenchyma :

The mycelium is organised into lossely or compactly interwoven fungal tissues.

Two types :

1. Prosenchyma :

In the former type the hyphae are arranged lossely but parallel to one another.

2. Pseudoparenchyma :

In the former type the hyphae are compactly arranged and losse their identity.

Holocarpic : Entire thallus is converted into reproductive structure.

Eucarpic : Some regions of the thallus are involved in the reproduction other regions remains vegetative.

Reproduction has three methods :

i. Asexual phase (Anamorph) ii. Sexual phase (Teleomorph) iii. Holomorph

Sexual Reproduction has three steps :

i. Plasmogamy ii. Karyogamy iii. Meiosis

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Asexual Reproduction has 6 methods :

i. Zoospores - chytrids
ii. Conidia - Aspergillus
iii. Oidia - Erysiphe
iv. Fission - yeast
v. Budding - yeast
vi. chlamydospore - Fusarium

Sexual Reproduction has 4 methods :

1. Planogametic Copulation :
   i. Isogamy
   ii. Anisogamy
   iii. Oogamy
2. Gametangial contact
3. Gametangial copulation
4. Spermatization
5. Somatogamy

6. Tabulate various types of Mycorrhizae.

Ectotrophic Mycorrhizae	Endotrophic Mycorrhizae	Ectendomycorrhizae Mycorrhizae
The fungal mycelium forms a dense sheath around the root called mantle. The hypha network penetrate the intercellular spaces of the epidermis and cortex to form Hartignet. Example: *Pisolithus tinctorius*	The hyphae grows mainly inside the roots, penetrate the outer cortical cells of the plant root. A small portion of the mycelium is found outside the root. This form is also called Vesicular Arbuscular Mycorrhizal fungi (VAM Fungi) due to the presence of Vesicle or arbuscle like haustoria 1. Arbuscular mycorrhizae(AM) Example: *Gigaspora* 2. Ericoid mycorrhizae -Example: *Oidiodendron* 3. Orchid mycorrhizae -Example: *Rhizoctonia*	The fungi form both mantle and also penetrates the cortical cells.

7. List out diseases caused by fungi.

Diseases caused by fungi

S. No.	Name of the disease	Causative organism
	Plant diseases	
1.	Blast of paddy	Magnaporthe grisea
2.	Red rot of sugarcane	Colletotrichum falcatum
3.	Anthracnose of beans	Colletotrichum lindemuthianum
4.	White rust of crucifers	Albugo candida
5.	Peach leaf curl	Taphrina deformans
6.	Rust of wheat	Puccinia graminis tritici
	Human diseases	
1.	Athlete's foot	Epidermophyton floccosum
2.	Candidiasis	Candida albicans
3.	Coccidiodomycosis	Coccidioides immitis
4.	Aspergillosis	Aspergillus fumigatus

8. Give an account of Basidiomycetes (club fungi).

1. **Basidiomycetes types :** Puffballs, toad stools, bird nest's fungi. Bracket fungi, stink horns, rusts, smuts etc.
2. **Habitat :** Mostly terrestrial, Saprophytic, Parasitic mode of life.
3. **Mycelium has 3 types :** 1. Monokaryotic mycelium, 2. Dikaryotic mycelium (Primary & Secondary) 3. Tertiary mycelium
4. Asexual reproduction is by means of conidia, oidia or budding.
5. Sexual reproduction is present but sex organs are absent. Somatogamy results in plasmogamy
6. Karyogamy is delayed and dikaryotic phase is prolonged.
7. The four nuclei thus formed are transformed into basidiospores which are borne or sterigmata outside the basidium.
8. The basidium is club shaped with four basidiospores, thus this group of fungi is popularly called "Club fungi".
9. The fruit body formed is called Basidiocarp 1. agaricus, 2. Geaster, 3. Dolipore septum

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9. Describe the classification of Lichens.

Features	Types	
Habitat	Corticolous Lignicolous Saxicolous Terricolous Marine type Freshwater type	➢ On Bark ➢ On wood ➢ On rocks ➢ On ground ➢ On siliceous rockof sea ➢ On siliceous rock of fresh water.
Basis of morphology	Leprose Crustose Foliose Fruticose	➢ a distinct fungal layer is absent ➢ crust ➢ leaf ➢ branched pendulous shrub
Distribution of algal cells	Homoiomerous Heteromerous	➢ Algal cells evenly distributed in the thallus. ➢ a distinct layer of algae and fungi present.
Char's of fungal partner	Ascolichen	➢ If the fungal partner of lichen belongs to ascomycetes it is called Ascolichen. ➢ If it is basidiomycetes it is called Basidiolichen.

LONG VERSION QUESTIONS (FOR PURE SCIENCE GROUP)

Part I - Evaluation

Q. No. 1 to 10 - Refer Evaluation

11. Write the outline of the life cycle of Agaricus.

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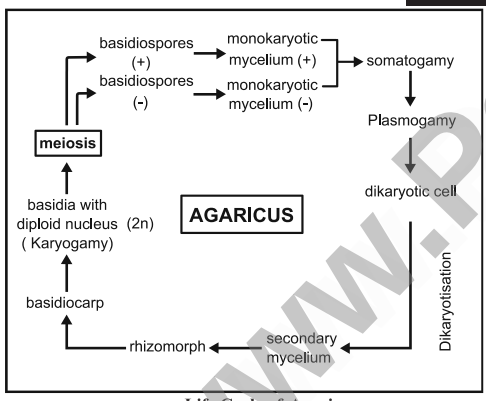
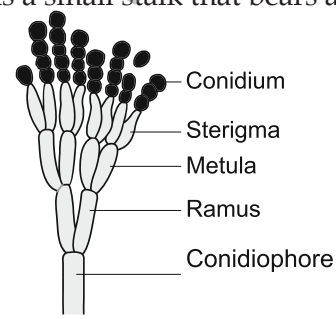


Life Cycle of Agaricus

12. What is Sterigma ?

Sterigmata is a small stalk that bears a conidia.



Conidia formation - Penicillium

13. Name the types of mycelium found in Agaricus.

The thallus is made up of branched structures called hyphae. A large number of hyphae constitute the mycelium.

Types of mycelium :

- **Primary mycelium :** The primary mycelium develops from the germination of basidiospore. It is septate, uninucleate and haploid. It is also called **monokaryotic mycelium.**
- **Secondary mycelium :** Fusion of two primary mycelium of opposite strains give rise to secondary mycelium or **dikaryotic mycelium.** The dikaryotic mycelium develops into hyphalcords called **Rhizomorphs** and perennates the soil for a long period.
- **Tertiary mycelium :** The tertiary mycelium is found in the fruit body called basidiocarp. Each cell of the hyphae possess a cell wall made up of chitin and cell organelles like mitochondria, golgibodies, Endoplasmic reticulum etc., are also present.

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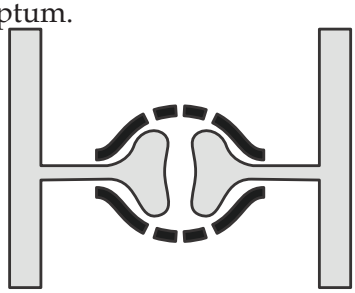
14. Differentiate oidium and Chlamydospore.

	Oidium	Chlamydospore
1	The hypha divide and develop into spores are called **oidia and oidium.**	Thick walled resting spores are called **chlamydospores.**
2	Produced by asexual reproduction Eg. Erysiphe	Produced by asexual reproduction Eg. Fusarium

15. Name the fungal group which possess dolipore septum.

Basidiomycetes is the fungal which possess dolipore septum.



Dolipore septum

16. Mention the diseases caused by fungi in plants.

No	Name of the disease	Casual organism
1.	Blast of Paddy	Magnaporthe grisea
2.	Red rot of sugarcane	Colletotrichum falcatum
3.	Anthracnose of Beans	Colletotrichum lindemuthianum
4.	White rust of crucifers	Albugo candida
5.	Peach leaf curl	Taphrina deformans
6.	Rust of wheat	Puccinia graminis tritici.

17. Give two examples for mycorrhizae forming fungi.

1. Pisolithus tinctorius
2. Oidiodendrom
3. Gigaspora
4. Rhizoctonia

18. Differentiate Gram positive and Gram negative bacteria L.V.MAR - 2023

No	Characteristics	Gram positive Bacteria	Gram negative Bacteria
1	Cell Wall	Thick layered with 0.015 µm - 0.02µm	Thin layered with 0.0075 µm + 0.012 µm thick
2	Rigidity of cell wall	Rigid due to presence of peptidoglycans	Elastic due to presence of lipoprotein- polysaccharide mixture
3	Chemical composition	Peptidoglycans - 80% Polysaccharide - 20% Teichoic acid present	Peptidoglycans - 3 to 12% rest is polysaccharides and lipoproteins. Teichoic acid absent
4	Outer membrane	Absent	Present
5	Periplasmic space	Absent	Present
6	Susceptibility to penicillin	Highly susceptible	Low susceptible
7	Nutritional requirements	Relatively complex	Relatively simple
8	Flagella	Contain 2 basal body rings	Contain 4 basal body rings
9	Lipid and lipoproteins	Low	High
10	Lipopolysaccharides	Absent	Present 2

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Part II - Additional Questions

I. Choose the correct Answers

1. Which one of the following is not the characteristic feature of cyanobacteria ?
a) they form blooms in polluted water bodies
b) they are multicellular
c) they can fix atmospheric nitrogen
d) they form colonies
Ans: b) they are multicellular

2. Which one of the following is a rod-shaped bacteria ?
a) Bacillus b) Coccus
c) Vibrio d) Spirillum
Ans: a) Bacillus

3. Which is the fastest growing cyanobacteria ?
a) Spirulina b) Thermoprotens
c) Halobacterium d) Methanobacterium
Ans: a) Spirulina

4. Who discovered plasmid ?
a) Joshua Lederberg b) Griffith
c) David d) Koch
Ans: a) Joshua Lederberg

5. Who discovered the transformation process ?
a) Ehrenberg b) Hooke
c) Griffith d) Pasteur
Ans: c) Griffith

6. Who introduced the Gram staining method ?
a) Christian Gram b) Lederberg
c) Bergy d) Ehrenberg
Ans: a) Christian Gram

7. Which of the following is called 'true bacteria'?
a) Halobacterium b) Archaebacteria
c) Eubacteria d) Methanobacterium
Ans: c) Eubacteria

8. Fusion of both morphologically and physiologically dissimilar gametes called
a) Oogamy b) Syngamy
c) Isogamy d) Anisogamy
Ans: d) Anisogamy

9. Which one of the following organisms completely lacks a cell wall ?
a) Mycoplasma b) Fungi
c) Archaebacteria d) Eubacteria
Ans: a) Mycoplasma

II. Match the following

1.
1) Antibiotics - Mushrooms
2) Coagulation of Milk - Rennet
3) Nutritious food - Yeast
4) Single celled fungus - Penicillin

	1	2	3	4
a)	ii	iii	iv	i
b)	i	iv	iii	ii
c)	iv	ii	i	iii
d)	iii	ii	iv	i

Ans: c) 1 - iv, 2 - ii, 3 - i, 4 - iii

2.
1) Ascomycetes - club fungi
2) Deuteromycetes - Bread mold fungi
3) Zygomycetes - Sac fungi
4) Basidomycetes - Imperfect fungi

	1	2	3	4
a)	ii	iii	i	iv
b)	iii	iv	ii	i
c)	iv	iii	ii	i
d)	i	ii	iii	iv

Ans: b) 1 - iii, 2 - iv, 3 - ii, 4 - i

III. Identify the correct Statement

1. Identify the correct statements from the below about. "T_4 bacteriophage".
i) T_4 phage is rod shape.
ii) Consist of 2000 identical subunits.
iii) T_4 phage is tadpole shape
iv) Consists of head, collar,tail, base plates and fibers.
a) ii, iii and iv only b) i, ii and iii only
c) i, ii and iv only d) i, ii and iv only
Ans: a) ii, iii and iv only

2. Identify the correct statements from the below about "Gram negative bacteria".
i) Thin layered with 0.0075 µm - 0.012 µm thick
ii) Rigid due to presence of peptidoglycans.
iii) Elastic due to presence of lipoprotein - polysaccharide mixture.
iv) Contain 4 basal body rings.
a) i, ii and iii only b) i, iii and iv only
c) i, ii and iv only d) ii, iii and iv only
Ans: b) i, iii and iv only

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IV. Identify the Wrong Statement

1. Identify the wrong statement from the below about "Fungi".

a) Fungi cause food poisoning due to the production of toxins.
b) Fungi do not cause diseases in Human Being.
c) Fungi produce antibiotics like penicillin.
d) Fungi provide delicious and nutritious food called mushrooms.

Ans: b) Fungi do not cause diseases in Human Being.

2. Identify the wrong statement from the below.

a) Majority of animal and bacterial viruses are DNA viruses.
b) The viruses possessing DNA are called Deoxy viruses.
c) Cauliflower mosic virus possess DNA.
d) HIV possess DNA.

Ans: d) HIV possess DNA

V. Identify the correct Assertion and Reason

1. Assertion (A) : Prokaryote takes a joy ride on polar bear.
Reason (R) : Cynobacterium is a prokaryotic organism, grows on the fur of a polar bear.

a) (A) is wrong and (R) is correct.
b) Both (A) and (R) are wrong
c) (A) is correct and (R) explains (A)
d) (A) is correct and (R) is wrong

Ans: c) (A) is correct and (R) explains (A)

2. Assertion (A) : The history of world war II recorded the use of penicillin.
Reason (R) : Pencillin is an antibiotic, used in the form of yellow powder to save lives of soldiers.

a) (A) is correct and (R) explains (A)
b) (A) is wrong and (R) is correct
c) Both (A) and (R) are wrong
d) (A) is correct and (R) is wrong

Ans: a) (A) is correct and (R) explains (A)

VI. Identify the Incorrect Pair from the Below

1. a) Green sulphur Bacteria - Bacterioviridin
b) Capnophilic Bacteria - O_2
c) Nucleoid - Genophore
d) Micrococcus - Obligate aerobes

Ans: b) Capnophilic Bacteria - O_2

2. a) Salmonella typhi - Typhoid
b) Glycocaly X - Capsule
c) Cell wall - Lipoprotein
d) Lactobacillus lactis - Curd

Ans: c) Cell wall - Lipoprotein

VII. Two Mark Questions

1. What are cyclosis ? with example.
The movement of Cytoplasm is called Cytoplasmic streaming (or) Cyclosis.
Example :
Vallisneria leaf cells or chara thallus movements.

2. Define Geosmin.
Streptomyces is a mycelial forming Antibacteria which lives in Soil they import "earthy odour" to soil after rain which is due to the presence of Geosmin (Volatile Organic Compound).

VIII. Three Mark Questions

1. What is the function of Mesosomes ?

- These are localized infoldings of plasma membrane produced into the cell in the form of vesicles, tubules and lamellae.
- They are clumped and folded together to maximize their surface area.
- It helps in respiration and binary fission.

2. What is Gycocalyx (or) Capsule ?

- Some bacteria are surrounded by a gelatinous substance which is composed for polysaccharides (or) polypeptide or both.
- A thick layer of glycocalyx bound tightly to the cell wall is called capsule (or) Glycocalyx.

3. What is annulus ?
The upper part of the stipe possess a membranous structure called annulus.

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4. Write a note on "Fairy rings".

- It is a saprophytic fungus found on wood logs, manure piles, fresh litter, pastures etc.,
- The fruit bodies are the visible part of the fungi.
- They are found in rings in some species like Agaricus arvensis.
- Agaricus tabularis and hence popularly called "Fairy rings".

IX. Five Mark Questions

1. Explain the general characteristic features of Actinomycetes.

- Actinomycetes are also called 'Ray fungi' due to their mycelia like growth.
- They are anaerobic or facultative anaerobic microorganisms and are Gram positive. They do not produce an aerial mycelium.
- Their DNA contain high guanine and cytosine content. Eg : Streptomyces.
- **Frankia** is a symbiotic actinobacterium which produces root nodules and fixes nitrogen in non leguminous plants such as **Alnus and Casuarina.**
- It produces multicellular sporangium.
- **Actinomyces bovis** grows in oral cavities and cause lumpy jaw.
- Streptomyces is a soil inhabiting actino bacterium and produces antibiotics like **streptomycin, Tetracycline,** etc.,

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GOVT. QUESTION PAPER - MARCH 2023

BIO-BOTANY

Time Allowed : 3.00 Hours Maximum Marks : 35

SECTION - 1

Note : i) Answer All the questions.

ii) Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer. **8 x 1 = 8**

1. The taxonomy which involves the similarities and dissimilarities among the immune system of different taxa is termed as:
   a) Serotaxonomy
   b) Chemotaxonomy
   c) Numerical taxonomy
   d) Molecular systematics
2. The common bottle cork is a product of :
   a) Xylem b) Phellem
   c) Vascular cambium **d) Phellogen**
3. Select the Day neutral plants from the following:
   a) Tobacco, Soyabean, Rice
   b) Pea, Barley, Oats
   c) Oats, Cocklebur, Rhododendron
   d) Potato, Tomato, Cotton
4. Stomata of a plant open due to:
   a) influx of Cl^- **b) Influx of K^+**
   c) Influx of OH^- d) Efflux of K^+
5. Centromere is required for _____
   a) Cytoplasmic cleavage
   b) Transcription
   c) Movement of chromosomes towards pole
   d) Crossing over
6. Identify the correctly matched pair:
   a) Bacteria - Crown gall
   b) Actinomycetes - Late blight
   c) Fungi - Sandal spike
   d) Mycoplasma - Lumpy jaw
7. Bryophyllum and Dioscorea are examples for:
   a) Cauline bud, apical bud
   b) Foliar bud, apical bud
   c) Cauline bud, foliar bud
   d) Foliar bud, cauline bud
8. In which of the following wavelength the rate of photosynthesis is high?
   a) 400 to 700 nm b) 200 to 400 nm
   c) 500 to 800 nm d) 300 to 500 nm

SECTION - 2

Answer any four questions: **4 x 2 = 8**

9. What is plectostele? Give an example. **CHAPTER - 2**
10. Differentiate between aggregate fruit and multiple fruit. **CHAPTER - 4**
11. Bring out the significance of Transmission Electron Microscope. **CHAPTER - 6**
12. Write any two Enzymes and their sources and uses. **CHAPTER - 8**
13. What are the differences between Porous wood and Non-porous wood? **CHAPTER - 10**
14. The nitrogen is present in the atmosphere in huge amount but higher plants fail to utilize it. Why? **CHAPTER - 12**

SECTION - 3

Answer any three questions. Question No.19 is compulsory **3x3=9**

15. Add a note on merits and demerits of Five Kingdom classification. **CHAPTER - 1**
16. Write short notes on Nepenthes. **CHAPTER - 12**
17. Draw a neat labelled diagram of stomata. **CHAPTER - 9**
18. Give a brief account on Programmed Cell Death (PCD). **CHAPTER - 15**
19. Describe lamp-brush chromosomes with a neat diagram. **CHAPTER - 6**

SECTION - 4

Answer all the questions. **2 x 5 = 10**

20. a) Describe the floral characters of Clitoria ternatea. **CHAPTER - 5**

    (OR)

    b) Write the economic importance of Fungi. **CHAPTER - 1**
21. a) Write the differences between Anatomy of Dicot root and Monocot root. **CHAPTER - 9**

    (OR)

    b) Describe the structure of Ganong's potometer with a neat diagram. **CHAPTER - 11**

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GOVT. QUESTION PAPER - MARCH 2023

BOTANY

Time Allowed : 3.00 Hours Maximum Marks : 70

PART - I

Note : i) Answer All the questions.
ii) Choosethemostappropriateanswerfrom the given four alternatives and write the option code and the corresponding answer. 20 x 1 = 20

1. Pick out the correct Pair:
   (a) Phyllode - Acacia
   (b) Storage leaves - Launea
   (c) Bladder - Calophyllum
   (d) Pitcher - Utricularia

2. Which of the following reaction is not involved in Kreb's cycle?
   a) Splitting of Fructose 1, 6 bisphosphate into two molecules of 3C compounds
   b) Dephosphorylation from the substrates
   c) Shifting of phosphate from 3C to 2C
   d) All of the above

3. Which of the following plant has Geocarpic type of fruits?
   a) Arachis hypogea b) Desmodium
   c) Lab Lab purpureus d) Clitoria

4. Vexillary aestivation is characteristic of the family _____.
   a) Solanaceae **b) Fabaceae**
   c) Brassicaceae d) Asteraceae

5. Who proposed Chemiosomosis theory?
   a) R. Hill **b) P. Mitchell**
   c) Melvin Calvin d) Emerson

6. The double helix model of DNA was proposed by:
   a) Fred Sanger
   b) Linnaeus
   c) Robert Corey
   d) Watson and Crick

7. If a plant is provided with all mineral nutrients but Mn concentration is increased, what will be the deficiency?
   a) Only increase the uptake of Ca
   b) Prevent the uptake of Fe, Mg but not Ca
   c) Prevent the uptake of Fe, Mg and Ca
   d) Increase the uptake of Fe, Mg and Ca

8. The pairing of homologous chromosomes in meiosis is known as:
   a) Synergids b) Bivalent
   c) Synapsis d) Disjunction

9. _____ is called 'Agent Orange'.
   a) ABA
   b) Auxin
   c) NAA
   d) 2, 4 - D and 2, 4, 5 - T

10. Identify the Archaebacterium from the following:
    a) Treponema b) Acetobacter
    c) Methanobacterium d) Erwinia

11. Grafting is successful in dicot plants but not in monocot plants because the dicot plants have:
    a) Cambium for secondary growth
    b) Vascular bundles arranged in a ring
    c) Vessels with elements arranged end to end
    d) Cork Cambium

12. Match the following:
    (1) Godlewski - (i) Pulsation theory
    (2) Stephen Hales - (ii) Relay - pump theory
    (3) J.C. Bose - (iii) Cohesion and Transpiration Pull theory
    (4) Dixon & Jolly - (iv) Root pressure
    a) (1)-(ii), (2)-(iv), (3)-(i), (4)-(iii)
    b) (1)-(i), (2)-(iii), (3)-(iv), (4)-(ii)
    c) (1)-(ii), (2)-(iv), (3)-(iii), (4)-(i)
    d) (1)-(iii), (2)-(iv), (3)-(i), (4)-(ii)

13. Electron Microscope was first introduced by _____.
    a) Z. Jansen **b) Ernest Ruska**
    c) H. Roher d) Robert Hooke

14. In many dicot plants, the lumen of the xylem vessels is blocked by many balloon like in-growths from the neighbouring parenchymatous cells. These balloon like structures are called _____.
    a) Alburnum b) Duramen
    c) Tylosoids **d) Tyloses**

15. Which of the following Gymnosperm plant produces amber?
    a) Pinites succinifera b) Adiantum
    c) Gnetum d) Osmunda

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PART - II

Answer any six questions. Question No. 24 is Compulsory. **6 x 2 = 12**

16. What is Capnophilic bacterium? **CHAPTER - 1**
17. Draw and label the parts of regions of root. **CHAPTER - 3**
18. What is plectostele? Give one example. **CHAPTER - 2**
19. Write any two importance of meiotic cell division. **CHAPTER - 7**
20. Why the cells of sclerenchyma and tracheids become dead? **CHAPTER - 9**
21. Differentiate the wood formed in Pinus from that of Morus. **CHAPTER - 10**
22. Respiratory quotient is zero in succulent plants. Why? **CHAPTER - 14**
23. Give the technical terms for the following:
    a) A sterile stamen **CHAPTER - 4**
    b) Stamens are attached to the petals
24. Name the two bacteria that are involved in the nitrification process of Nitrogen Cycle. **CHAPTER - 12**

PART - III

Answer any six questions. Question No. 33 is Compulsory. **6x3=18**

25. Do you agree with the statement 'Byrophytes need water for fertilization'? Justify your answer. **CHAPTER - 2**
26. Write the physiological effects of auxin. **CHAPTER - 15**
27. Why is that in certain plants deficiency symptoms appear first in younger leaves while in others they do so in mature organs? **CHAPTER - 12**
28. Draw and label the parts of ultra-structure of plant cell. **CHAPTER - 6**
29. Where will you place the plants which contain two cotyledons with cup shaped thalamus? **CHAPTER - 5**
30. Compare Sympodial branching with Monopodial branching. **CHAPTER - 3**
31. Tabulate the differences between DNA and RNA. **CHAPTER - 8**
32. Bring out the significance of Transmission Electron Microscope. **CHAPTER - 6**
33. If a cell in the cortex with DPD of 5 atm is surrounded by hypodermal cells with DPD of 2 atm, what will be the direction of movement of water? **CHAPTER - 11**

PART - IV

Answer all the questions. **5 x 5 = 25**

34. a) List out the differences between Gram positive and Gram negative bacteria. **CHAPTER - 1**

    (OR)

    b) Write the Botanical description of Datura metel. **CHAPTER - 5**
35. a) Explain the types of protostele with diagram. **CHAPTER - 2**

    (OR)

    b) Tabulate the differences between Plant cell and Animal cell. **CHAPTER - 6**
36. a) Explain the different types of aestivation. **CHAPTER - 4**

    (OR)

    b) Explain the stages of mitotic division in detail. **CHAPTER - 7**
37. a) Explain the steps involved in Dark reactions in a detailed manner. **CHAPTER - 13**

    (OR)

    b) What is the name of alternate way of glucose breakdown? Explain the process involved in it. **CHAPTER - 14**
38. a) Explain sclereids with their types. **CHAPTER - 9**

    (OR)

    b) How will you measure the growth of the plant using an Arc auxanometer? **CHAPTER - 15**

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11

(Short Version - Long Version)

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PREFACE

Dear Students

- XIth Bio-Zoology book has been made EC - bearing in mind the needs and grasping power of the students.
- The subject matter given is simple, lucid and self - explanatory.

SPECIAL FEATURES OF THE BOOK

- This guide has been framed based on the New 100 marks pattern
- Theory based pattern for 70 marks.

  Additional MCQS, VSA, SA, LA questions with answer are given in each unit.
- Every chapter has its technical terms, exhaustive one mark questions and simplified diagrams.
- Answers include `key points' to be taken into account during public exam paper valuation.
- Other than textual questions enough additional questions with the right answers are given.
- Zoology long version students can also use it.
- Included Govt. questions with Keys.

TIPS TO GET CENTUM IN BIO-ZOOLOGY

- Use memory techniques
- Read - study, recall and revise systematically so as to store it in the LTM (Long Term Memory) file.
- Above all learn thoroughly with involvement.

Enclosing prayers and wishes

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CHAPTER 1

UNIT - I

THE LIVING WORLD

GLOSSARY

S.No.	Glossary	Explanation
1.	Cladogram	A branching diagram showing the relationship between a number of species.
2.	Phylogency	Relationships among various biological species based upon similarities and differences in their physical or genetic characteristics.
3.	Phylogenetic tree	A phylogenetic tree or evolutionary tree is a branching diagram or "tree" showing the inferred evolutionary relationships upon similarities and differences in their physical or genetic characteristics.
4.	Shared character	A shared character is one that two lineages have in common
5.	Derived character	Derived character is one that evolved in the lineage leading up to a clade.
6.	Threatened species	Species which are vulnerable to endangerment in the near future.

Part I – Evaluation (Book Back Questions)

1. A living organism is differentiated from non - living structure based on

a. Reproduction b. Growth c. Metabolism d. All the above

Ans: d) All the above

2. A group of organisms having similar traits of a rank is

a. Species b. Taxon c. Genus d. Family

Ans: a) Species

3. Every unit of classification regardless of its rank is S.V.June-2019

a. Taxon b. Variety c. Species d. Strain

Ans: a) Taxon

4. Which of the following is not present in same rank? S.V.Mar-2019

a. Primata b. Orthoptera c. Diptera d. Insecta **Ans: a) Primata**

5. What taxonomicaid gives comprehensive information about a taxon? L.V.Mar-2020

a. Taxonomic Key b. Herbarium c. Flora d. Monograph

Ans: a) Taxonomic Key

6. Who coined the term biodiversity?

a. Walter Rosen b. AG Tansley c. Aristotle d. AP de Candole

Ans: a) Walter Rosen

7. Cladogram considers the following characters

a. Physiological and Biochemical b. Evolutionary and Phylogenetic

c. Taxonimic and systematic d. None of the above

Ans: b) Evolutionary and Phylogenetic

8. Molecular taxonomic tool consists of S.V.GMQ-2018

a. DNA and RNA b. Mitochondria and Endocplamic reticulum

c. Cell wall and Membrane proteins d. All the above **Ans: a) DNA and RNA**

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9. Differentiate between probiotics and pathogenic bacteria. S.V.QY-2018 L.V.GMQ-2018

S.No.	Probiotics	Pathogenic bacteria
1.	It converts the milk in to curd (Eg.) Lactobacillus	It causes diseases in plants and animals
2.	It decomposes debris.	**(i) Plant diseases** Tomato – bacterial species **(ii) Animal diseases** Anthrax, Tuberculosis Pnemonia, Tetanus,

10. Why mule is sterile in nature? L.V.Mar-2019

The male donkey is crossed with female horse the mule can be produced, As the donkey is not crossed with its same species the off springs are sterile.

11. List any five salient features of the family Felidae.

1) They have sharp claws to catch the prey and to eat.
2) They have cutting incisors and large sharp canines to cut the meat.
3) They are free living.
4) They come out at nights for searching prey.
5) They have strong built body.
6) They have sharp sensory organs. (Eg.) Hearing, Smell, Vision, Touch
7) It's weight may ranges from 2 kg to 300 kgs. (Eg.) Lion, Tigers

12. What is the role of Charles Darwin in relation to concept of species? S.V.May -2022

Charles Darwin has written the book "Origin of Species" in 1859. In this book he has explained the relationship between evolution and origin of species through natural selection.

13. Why elephants and other wild animals are entering into human living area?

1. Habitat of elephants due to deforestation Destroyed.
2. Food shortages due to deforestation occurs.
3. As Rain and Water sources dry up.
4. Because human go into the forest and disturb them.

14. What is the difference between a Zoo and Wildlife Sanctuary. L.V.Mar-2023

S.No.	Zoo	Wildlife Sanctuary
1.	They are formed artificially.	It's a place of nature.
2.	Animals are in houses within enclosure.	Animals roam freely in their natural surrounding.
3.	They are formed for the purpose of free time enjoyment of people.	They are not formed for the purpose of enjoyment.

15. Can we use recent molecular tools to identify and classify organisms? S.V.QY-2019 QY-2018

1. The short genetic marker in a organism's DNA is used to identify the organism belonging to a particular species – For this molecular technique DNA bar-coding is used.
2. By DNA hybridization the degree of genetic similarity between pools of DNA sequences is measured.
3. To identify an individual from a sample of DNA by looking at unique patterns in their DNA DNA finger printing is used.
4. Difference in homologous DNA sequences that can be detected by the presence of fragments of different lengths after digestion of DNA samples is called Restriction Fragment Length Polymorphisms analysis (RFLP)
5. To amplify a specific gene on portion of gene by using polymerase chain reaction are used as taxonomical tools.

16. Explain the role of Latin and Greek names in Biology.

1. Before modern period of early modern period, learning is done in Greek and Latin.

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2. Educated people (scientists) knew Greek and Latin. Other's simply borrowed the coined words and terms of educated people or scientists.
3. Greek and Latin were the primary language taught everywhere uniquely it is the common language of Western Europe that too it is used and approved as the language of science.
4. Greek is more of language of science than Latin.
5. Plants and Animals had local popular names in many other languages. So a system is needed to be devised so that they were to be recognised everywhere universally.
6. When Carlous Linnaeus (1707 – 1778) formulated his binomial system of naming plants he did it in Greek and Latin continued this practise and made it universally acceptable as binomial nomenclature.
7. ICBN and ICZN – Indian Code of Botanical and Zoological nomenclature specify that not only name and its description should be translated in Latin.

Part-II – GMQ & GOVT. EXAM QUESTION AND ANSWERS

I. Choose the best options (1 Mark)

1. The mind map Cladogram was introduced by L.V.QY-2018

a) Aristotle b) R.H. Wittaker
c) Ernst Haeckal d) Carlous

Ans: c) Ernst Haeckal

2. The beneficial bacterias are knows as

a) pathogens b) probiotic S.V.HY-2018
c) Cyanobacteria d) plasmid

Ans: b) probiotic

3. The cross between male lion and female results in the production of S.V.QY-2019

a) Hinny b) Mule
c) Tigon d) Liger Ans: d) Liger

4. Nephridia of earthworms are performing the same functions as. S.V.HY-2018

a) Gills of prawns
b) Flame cells of Planaria
c) Trachea of insects
d) Nematoblasts of hydra

Ans: b) Flame cells of Planaria

5. Three domain classification was proposed by S.V.Mar-2019

a) Cavalier Smith b) R.H. Wittaker
c) Carolus Linnaeus d) Carl Woese

Ans: d) Carl Woese

6. The zoological name of National Bird is: S.V.June-2019

a) Pavo Cristatus b) Zoothera Salimalii
c) Ciolumba livia d) Chalcophaps indica

Ans: a) Pavo Cristatus

7. The prokaryotes capable of growing in salty environments L.V.June-2019

a) extremophiles b) halophiles
c) methanogens d) pathogens

Ans: b) halophiles

8. Which of the following is an incorrect taxonomical tool? S.V.Mar-2020

a. DNA- FingerPrinting -To identify an individual from a sample of DNA by looking at unique Patterns in their DNA.
b. Taxonomical keys are used to identify plants and animals based on similarities and dissimilarities.
c. A Museum has a collection of preserved plants and animals of extinct and living organisms, which can be studied.
d. Zoological parks - Wild animals are kept in natural environment without human care.

Ans: d. Zoological parks - Wild animals are kept in natural environment without human care.

9. The book written by Aristotle is L.V. Aug-2022

a) History of Animals b) Species plantaram
c) Species Animalium d) Origin of species

Ans: a) History of animals

10. An example for Tautonymy: S.V. Mar-2023

a) Felis Silvestris b) Naja naja
c) Ailurus fulgens d) Felis domestica

Ans: b) Naja naja

11. The DNA polymerase enzyme used in PCR technique was first isolated from _____ bacteria L.V. Mar-2023

a) Insulin b) ADH
c) Thyroxine d) Melatonin

Ans: d) Melatonin

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II. Short Answers (2,3 Marks)

1. Expand the abbreviations DAISY, ALIS and ABIS S.V.GMQ-2018 L.V. Aug-2022

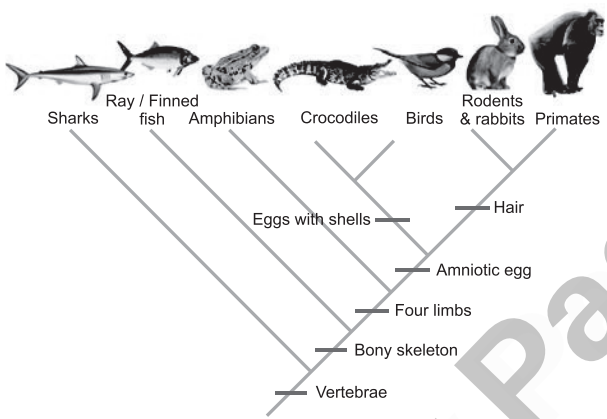
DAISY → Digital Automated Identification System.

ALIS → Automated Leafhopper Identification system.

ABIS → Automatic Bee Identification System

2. Construct a cladogram with the given examples. (Catfish, Frog, Crocodile, Crow, Rabbit and Monkey) S.V.GMQ-2018 **(or) What is cladogram? Draw a model cladogram.** S.V.QY-2019

Ernst Haeckal introduced the method of representing evolutionary relationships with the help of a tree diagram is called cladogram.



Example of a Cladogram

3. What are methanogens? S.V.HY-2018

The domain archaea includes single celled organisms, the prokaryotes which have the ability to grow extreme conditions like polar ice caps, volcano vents, etc,. Some of them produced methane is known as methanogens.

4. What is Trinomen classification? S.V.QY-2019

➢ This naming system was proposed by Huxley and Stricklandt, Trinomen means, three names. 1. generic name, 2. species name, 3. sub-species name.

➢ When members of any species which have large variations then trinomial system is used.

Eg: Corvus Splendens Splendens

5. What is the connection between taxonomy and publishing of book "Origin of Species"? S.V.HY-2019

Charles Darwin (1859) in his book Origin of species explains the evolutionary connection of species by the process of natural selection.

6. Differentiate monotypic genus from polytypic genus. L.V.June-2019

	Monotypic genus	Polytypic genus
1	In some genus there is only one species which is called as monotypic genus.	If there are more than one species in the genus it is known as polytipic genus.
2	**Eg.:** Red panda is the only species in the genus Ailurus : Ailurus julgens.	**Eg.:** 'Cats' come under the Genus felis, which has number of closely related species, Felis domestica (domestic cat), Felis margarita (jungle cat). Felis silvestris (wild cat)

7. Why do we call Carolus Linnaeus as the Father of modern taxonomy? S.V.Mar-2020

➢ Carolus Linnaeus is the Father of modern taxonomy which is the system of classifying and naming organisms.

➢ One of his contributions was the development of a hierarchical system of classification of nature.

➢ Today, this system includes eight taxa: domain kingdom, phylum, class, order, family, genus and species.

8. Naja Naja is an example for a particular types of nomenclature. Justify and define the nomenclature type. L.V.Mar-2020

➢ Giving three names to the species is meant as trinomial nomenclature.

➢ When members of any species which have large variations then trinomial system is used.

➢ The species is classified into subspecies and this is an extension of binominal nomenclature system which has an addition of subspecies.

➢ Followed by Genus name species subspecies name is also added.

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The practice of naming the animals in which the generic name and species name are the same is called tautonymy.

Eg. Naja Naga (The Indian cobra)

9. Find out p, q, r, s from the given tabulation L.V.Sep-2020

Male organism	Female organism	Hybrid
Horse	Donkey	p
Donkey	Horse	q
r	Tiger	Ligen
Tiger	Lion	s

Ans: **p - Hinny r - Lion**
q - Mule s - Tigon

10. What is special about the Domain Archaea? (or) Define extremophiles L.V.May-2022 S.V.Mar-2023

1) This domain includes single celled organisms the prokaryotes.
2) They have the ability to grow in extreme conditions like volcano vents hot springs and polar ice caps hence are called extremophiles.
3) They are capable of synthesizing their food without sunlight and oxygen by utilizing hydrogen sulphide and other chemicals from the volcanic vents.
4) Some of them produced methane.
5) Few live in salty environments and called as Halophiles.
6) Some thrive in acidic environments and are called as thermoacidophiles.

III. Long Answers (5 Marks)

1. i) Who proposed the three domain classification?

ii) On which basis three domain classification was classified?

iii) How does domain Archae differ from the domain Eukarya.

iv) What type of ribosome is seen in domain bacteria and domain Eukarya?

v) How are the animals in domain Eukarya classified. L.V.GMQ-2018

Ans:

i) Carl Woese 1977 and his Coworkers.

ii) Based on the difference in 16s rRNA genes

iii)

Archaea	Eukarya
They are Prokaryotes	They are Eukaryotes

iv) Bacteria : 70s type ribosomes
Eukarya: Ribosomes of 80s type in the cytosol and 70s type in the chloroplast and mitochondria

v) Eukarya classified under kingdoms namely Protista, Fungi, Plantae and Animalia

2. A research scholar identified a new animal in his locality. How can he identify and classify the animal? Explain? S.V.HY-2019

Tools and taxonomical aids may be different for the study of plants and animals. Herbarium and Botanical garden may be used as tools for the study of plant taxonomy. In the case of animal studies, the classical tools are museum, Taxonomical keys and zoological and marine parks.

The important components of the taxonomical tools are field visits, survey, identification, classification, preservation and documentation.

1. The classical taxonomical tools.
   a) Taxonomical keys
   b) Museum
   c) zoological parks
   d) marine parks
   e) printed taxonomical tools
2. Molecular taxonomical tools
3. Automated species identification tools
   a) Neo taxonomical tools.
   b) Ethology of taxonomical tools.
4. e–taxonomic resources.

3. Write down the rules of Nomenclature. S.V.QY-2018 L.V.Mar-2019 L.V.Mar-2023

1) The scientific name should be italicized in printed form and if hand written it should be underlined separately.
2) The generic name's first alphabet should be in uppercase.
3) The specific name should be in lower case.
4) The scientific names of any two organisms are not similar.

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5) The name of the scientist who first publishes the scientific name may be written after the species name along with the year of publication.
(Eg.) Lion – Felis Leo Linn . 1758 (or)
Felis Leo L. 1758

4. Explain the Taxonomic hierarchy L.V.Mar-2019

Species : It is a group of animals having similiar morphological features and is reproductively isolated to produce fertile offspring.

Genus : The organism formed from the closely related species. which have evolved from a common ancestor.

Family : It is a taxonomic catagory which includes a group of related genera with less similarity as compared to genus and species.

Order: Order is an assemblage of one or more related families which show few common features.

Eg. Family canidae and Felidae are placed in the order carnivora.

Class: Class includes one or more related orders with some common characters.

Phylum: The group of classes with similar distinctive characteristics constitute a phylum.

Animal Kingdom: All living animals belonging to various phyla are included in the kingdom.

5. Describe the automated species identification tools. L.V.Sep-2020

It consists of Cyber tools. For example: ALIS, DAISY, ABIS, SPIDA, Draw wing, etc.,

(i) **DAISY:** Digital Automated Identification System.

(ii) **ALIS:** Automated Leafhopper Identification System.

(iii) **ABIS:** Automatic Bee Identification System.

(iv) **SPIDA:** Species Identified Automatically (spiders, wasp and bee wing characters).

(v) **Draw wing:** Honey bee wing identification.

(1) **Neo taxonomical tools:** This based on Electron Microscopy images to study the molecular structures of cell organelles.

(2) **Ethology of taxonomical tools:** Based on the behaviour of the organisms it can be classified. For example sound of birds, bioluminescence, etc.

(3) **e-Taxonomic resources:** INOTAXA is an electronic resource for digital images and description about the species which was developed by Natural History Museum, London. **INOTAXA** means **In**tegrated **O**pen **TAX**onomic **A**ccess.

6. What are the various classical taxonomical tools? Explain. S.V.Mar-2023

The classical taxonomical tools:

1. Taxonomical keys.
2. Museum
3. Zoological parks.
4. Marine parks
5. Printed taxonomical tools

1. Taxonomical keys:

➢ Keys are based on comparative analysis of the similarities and dissimilarities of organisms.

➢ There are separate keys for different taxonomic categories.

2. Museum:

➢ Biological museums have collection of preserved plants and animals for study and ready reference.

➢ Specimens of both extinct and living organisms can be studied.

3. Zoological parks:

➢ These are places where wild animals are kept in protected environments under human care.

➢ It enables us to study their food habits and behaviour.

4. Marine parks:

➢ Marine organisms are maintained in protected environments.

5. Printed taxonomical tools consist of identification cards, description, field guides and manuals.

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PART-III – ADDITIONAL QUESTIONS

I. Match the following

1.

PART-I			PART-II	
A	Augustin Pyramus de Candole	–	I	Father of Botany
B	Aristotle	–	II	Father of Modern Taxonomy
C	Carolous Linnaeus	–	III	Father of Taxonomy
D	Theophrastus	–	IV	Introduces Taxonomy

a) A – IV, B – I, C – II, D – III b) A – IV, B – II, C – I, D – III
c) A – I, B – II, C – III, D – IV d) A – IV, B – III, C – II, D – I **Ans: d) A – IV, B – III, C – II, D – I**

2.

PART-I			PART-II	
1	John ray	–	a	Five kingdom concept
2	Linnaeus	–	b	Cladogram
3	Ernst Haeckal	–	c	Bionomial nomenclature
4	R.H. Whittaker	–	d.	Methodus plantarum

a) 1 – d, 2 – c, 3 – b, 4 – a
b) 1 – a, 2 – b, 3 – c, 4 – d
c) 1 – c, 2 – a, 3 – b, 4 – d
d) 1 – d, 2 – c, 3 – a, 4 – b

Ans: a) 1 – d, 2 – c, 3 – b, 4 – a

II. Choose the best options

1. Aristotle has classified organism based on the following category of locomotion.
a) Walking & bore dwellers
b) Flying & arboreal
c) Swimmers & aquatic
d) All the above **Ans: d) All the above**

2. Whose researchers confirm that species is a fundamental unit of classification.
a) John Ray b) R.H. Whittakar
c) Carl Woese d) Cavalier Smith
Ans: a) John Ray

3. Who has developed binomial nomenclature.
a) Carolous Linnaeus b) Augustin
c) Aristotle d) Ernst Haeckal
Ans: a) Carolus Linnaeus

4. The three domains classification is based on the difference in _____ gene.
a) 60s rRNA b) 70s rRNA
c) 16s rRNA d) mRNA
Ans: c) 16s rRNA

5. The prokaryotes that produces methane gas belongs to _____ kingdom.
a) Monera b) Eukarya
c) Bacteria d) Archaea
Ans: d) Archaea

6. Where is 80s and 70s ribosomes seen in Eukaryotic cells.
a. Cytoplasm – Chloroplast
b. Mitochondria – Golgi apparatus
c. Chloroplast – Endo plasmic reticulum
d. Nucleus – Lysosomes
Ans: a) Cytoplasm – Chloroplast

III. Choose the correct pair

1.
a. Domestic Cat – Felis silvestris
b. Wildcat – Felis margarita
c. Jungle cat – Felis domestica
d. Tiger – Panthera tigeris
Ans: d) Tiger - Panthera tigeris

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IV. Choose the incorrect pair

1. a. Peacock – Pavo cristatus
   b. Tiger – Panthera tigeris
   c. Man – Homosapiens
   d. Domestic crow – Salcopops indica

   Ans: d) Domestic crow – Salcopops indica

2. a. Carl Woese – Trinominal hypothesis
   b. Cavalier Smith – Seven kingdom system
   c. Male Lion and female Tiger results in – Hinny
   d. Male Tiger and female Lion results in – Tigon

   Ans: c) Male Lion and female Tiger results in – Hinny

V. Very Short Questions (2 marks)

1. **What is eco system?**
   Eco system is community of living organisms like plants and animals, non - living environment like minerals, climate soil water sunlight and their relationships.

2. **What are the unique characteristic features of living organisms?**
   1. Cellular organisation
   2. Nutrition
   3. Respiration
   4. Metabolism
   5. Movement
   6. Reproduction
   7. Excretion
   8. Homeostasis

3. **What is taxa (or) taxon?**
   Classification is a process by which things are grouped in convenient categories based on easily observable characters.
   The scientific term used for these categories is taxa.

4. **What are the scientific stages of taxonomy?**
   1. Characterisation
   2. Identification
   3. Nomenclature
   4. Classification

5. **What is taxonomy?**
   Taxonomy is a theoretical study of classification with well defined principles rules and procedures.

6. **What is phylogenetic or cladistics classification?**
   It is a classification based on evolution and genetic relationship.

7. **What is phylogenetic tree?**
   It's a method of representing evolutionary relationships with the help of a tree diagram known as cladogram.

8. **What is cladogram?**
   Arranging organisms on the basis of their similar or derived characters produced a phylogenetic tree or cladogram.

9. **What is the three domains of life indicates?**
   1) This system emphasizes the separation of prokaryotes into two domain.
   2) Bacteria and Archea and all the eukaryotes are placed into the domain Eukarya.

10. **How Archaea differs from bacteria?**
    If differs in cell wall composition and in membrane composition and rRNA type.

11. **What is the seven taxonomic hierarchy?**
    1. Kingdom
    2. Phyla
    3. Class
    4. Order
    5. Family
    6. Genus
    7. Species

12. **Define animal kingdom.**
    All living animals belonging to various phyla are included in the kingdom.

13. **What are the features that we have to keep in mind in naming them scientifically?**
    1. Morphology
    2. Habitat
    3. Feeding pattern
    4. Adaptations
    5. Genetic information
    6. Evolutions

14. **Define phylogeny.**
    Relationships among various biological species based upon similarities and differences in their physical or genetic characteristics.

15. **What are shared character?**
    A shared character is one that two lineages have in common.

16. **What are derived character?**
    Derived character is one that evolved in the lineage leading up to a clade.

VI. Short Questions (3 marks)

1. **What are the significances of taxonomy ?**
   1) It helps in identifying and differentiate closely related species.

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2) It helps in knowing the variation among the species.
3) It helps in understand the evolution of the species.
4) It helps in create a phylogenetic tree among the different groups.
5) It helps in conveniently study living organisms.

2. On which criteria the systematic classification is done?

1) Evolutionary history.
2) Environmental adaptations.
3) Environmental relationship.
4) Inter relationship between species.

3. Give an account of Aristotle's classification ?

1) In his book 'History of Animals' he classify plants and animals into two categories.
2) Based on locomotion walking, flying, swimming.
3) He classifies the organisms on the basis of blood. The animals into two as 'Enaima' with blood and those without blood as 'Anaima'

4. Who has developed five kingdom classification?

1) R.H. Whittakar proposed the five kingdom classification.
2) It is based on cell structure .
3) Mode of nutrition.
4) Mode of reproduction.
5) Phylogenetic relationships.

The kingdoms are

1) Monera 2) Protista
3) Fungi 4) Plantae 5) Animalia

5. What are the special features of frog that is identified in Western Gauts?

1) This frog has shiny purple skin.
2) There is a light blue ring around the eyes.
3) It has a pointy pig nose.
4) It's Zoological name Nasikabatrachus bhupathy.

VII. Long Answer Questions (5 marks)

1. List the defects of Aristotle's classification.

1) Aristotle's classification system had limitations and many organisms were not fitting into his classification.
2) The tadpoles of frog are born in water and have gills but when they metamorphased into adult frogs they have lungs and can live both in water and on land. There is no answer for this question.
3) Based on locomotion birds bats and flying insects were grouped either just by observing one single characteristic feature the flying ability.
4) On the contrary to the above said example the ostrich emu and penguin are all birds but cannot fly. He did not classified them as birds.

2. What is special about the domain bacteria ?

1) Bacterias are prokaryotic.
2) They do not have definite nucleus and do not have histones.
3) They have circular DNA.
4) They do not possess membrane bound organelles except for 70s ribosomes.
5) Their cell wall contains peptidoglycans.
6) Many are decomposers. Some are photo-synthesizers and few cause diseases.
7) There are beneficial probiotic bacteria. (Eg.) Cyanobacteria produces oxygen.

3. What is special about Eukarya ?

1) Eukaryotes have true nucleus and membrane bound organelles.
2) DNA in the nucleus is arranged as a linear chromosome with histone proteins.
3) In mitochondria 70s ribosome and in the cytosol 80s ribosome is present.
4) Animals in this domain are classified under kingdom namely Protista, Fungi Plantae and Animalia.

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CHAPTER 2

UNIT - 1

KINGDOM ANIMALIA

GLOSSARY

S.No.	Glossary	Explanation
1.	Alternation of generation	Alternation of haploid sexual and diploid asexual generation in the life cycle of an animal.
2.	Autonomy	Breaking of a body part.
3.	Dioecious	Animals in which male and female reproductive organs occurs in separate individuals.
4.	Hermaphrodite	Animals with both male and female reproductive organs.
5.	Mesentery	A thin double walled epithelial membrane that support alimentary canal and other organs in the abdominal cavity.
6.	Regeneration	Act of growing a new body parts which has been injured or lost.

Part I – Evaluation (Book Back Questions)

1. The symmetry exhibited in cnidarians is
a. Radial b. Bilateral L.V.Aug-2022
c. Pentamerous radial d. Asymmetrical
Ans: a) Radial

2. Sea anemone belongs to phylum
a. Protozoa b. Porifera
c. Coelenterata d. Echinodermata
Ans: c) Coelenterata

3. The excretory cells that are found in platyhelminthes are
a. Protonephridia b. Flame cells
c. Solenocytes d. All of these
Ans: b) Flame cells

4. In which of the following organisms, self fertilization is seen.
a. Fish b. Round worm
c. Earthworm d. Liver fluke
Ans: d) Liver fluke

5. Nephridia of Earthworms are performing the same functions as S.V.HY-2019
a. Gills of prawn
b. Flame cells of Planaria
c. Trachea of insects
d. Nematoblasts of Hydra
Ans: b) Flame cells of Planaria

6. Which of the following animals has a true coelom ?
a. Ascaris b. Pheretima
c. Sycon d. Taenia solium
Ans: b) Pheretima

7. Metameric segmentation is the main feature of
a. Annelida b. Echinodermata
c. Arthropoda d. Coelenterata
Ans: a) Annelida

8. In Pheretima locomotion occurs with the help of
a. circular muscles
b. longitudinal muscles and setae
c. circular, longitudinal muscles and setae
d. parapodia
Ans: c) circular, longitudinal muscles and setae

9. Which of the following have the highest number of species in nature? S.V.May -2022
a. Insects b. Birds L.V.Aug-2022
c. Angiosperms d. Fungi
Ans: a) Insects

10. Which of the following is a crustacean?
a. Prawn b. Snail
c. Sea anemone d. Hydra
Ans: a) Prawn

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11. The respiratory pigment in cockroach is
a. Haemoglobin b. Haemocyanin
c. Heamoerythrin d. None of the above
Ans: d) None of the above

12. Exoskeleton of which phylum consists of chitinous cuticle?
a. Annelida b. porifera
c. Arthropoda d. Echinodermata
Ans: c) Arthropoda

13. Lateral line sense organs occur in L.V.GMQ-2018
a. Salamander b. Frog L.V.May-2022
c. Water snake d. Fish
Ans: d) Fish

14. The limbless amphibian is L.V.Mar-2019
a. Icthyophis b. Hyla S.V.Mar-2023
c. Rana d. Salamander
Ans: a) Icthyophis

15. Four chambered heart is present in
a. Lizard b. Snake
c. Scorpion d. Crocodile
Ans: d) Crocodile

16. Which of the following is not correctly paired?
a. Humans – Ureotelic
b. Birds – Uricotelic
c. Lizards – Uricotelic
d. Whale – Ammonotelic
Ans: d) Whale - Ammonotelic

17. Which of the following is an egg laying mammal?
a. Delphinus b. Macropus
c. Ornithorhynchus d. Equus
Ans: c) Ornithorhynchus

18. Pneumatic bones are seen in L.V.Mar-2020
a. Mammalia b. Aves
c. Reptilia d. Sponges
Ans: b) Aves

19. Match the following columns and select the correct option. L.V.GMQ-2018

Column – I	Column – II
(p) Pila	(i) Devil fish
(q) Dentalium	(ii) Chiton
(r) Chaetopleura	(iii) Apple snail
(s) Octopus	(iv) Tusk shell

a. p – (ii), q – (i), r – (iii), s – (iv)
b. p – (iii), q – (iv), r – (ii), s – (i)
c. p – (ii), q – (iv), r – (i), s – (iii)
d. p – (i), q – (ii), r – (iii), s – (iv)
Ans: b) p – (iii), q – (iv), r – (ii), s – (i)

20. In which of the following phyla, the adult shows radial symmetry but the larva shows bilateral symmetry?
a. Mollusca b. Echinodermata
c. Arthropoda d. Annelida
Ans: b) Echinodermata

21. Which of the following is correctly matched?
a. Physalia – Portugese man of war
b. Pennatula – Sea fan
c. Adamsia – Sea pen
d. Gorgonia – Sea anemone
Ans: a) Physalia - Portugese man of war

22. Why are spongin and spicules important to a sponge?
1) Choanocytes or collar cells are special flagellated cells lining the spongocoel and the canals.
2) The spicules are made up of **calcium** and **silica.**
3) The body is supported by a skeleton made of spicules or spongin or both.

23. What are the four characteristics common to most animals?
1) Cellular structure
2) The nature of coelom
3) Notochord
4) Segmentation or absence of segmentation

24. List the features that all vertebrates show at some point in their development. L.V.GMQ-2018
The chordates are characterized by the presence of notochord, ventral nerve cord and gill slits.

25. Compare closed and opened circulatory system S.V.Mar-2023

S.No.	Opened Circulation	Closed Circulation
1.	There is no blood vessels	Presence of blood vessels.
2.	Blood remains filled in the tissue spaces.	Blood is circulated through blood vessels
3.	**(Eg.)** Arthropods, Mollusca, Echinodermata	**(Eg.)** Earthworm, Cephalochordates, Chordates

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26. Compare Schizocoelom with enterocoelom. S.V.GMQ-2018 /QY-2018 S.V.Mar-2020 S.V. & L.V May -2022 L.V.Aug-2022

S.No.	Schizocoelomates	Enterocoelomates
1.	Body cavity is formed by splitting of mesoderm.	The body cavity is formed from the mesodermal pouches or **archenteron.**
2.	(Eg.) Annelids, Arthropods	(Eg.) Echinodermata, Chordates

27. Identify the structure that the archenteron becomes in a developing animal.
The truecoelom called enterocoel formed from the **archenteron.**

28. Observe the animal below and answer the following questions L.V.GMQ-2018

a. Identify the animal
b. What type of symmetry does this animal exhibit ?
c. Is this animal Cephalized?
d. How many germ layers does this animal have?
e. How many openings does this animal's digestive system have?
f. Does this animal have neurons?

Ans :

a) Sea anemone
b) Bilateral symmetry
c) It is not a cephalized animal
d) Diploblastic animal
e) One
f) Yes.

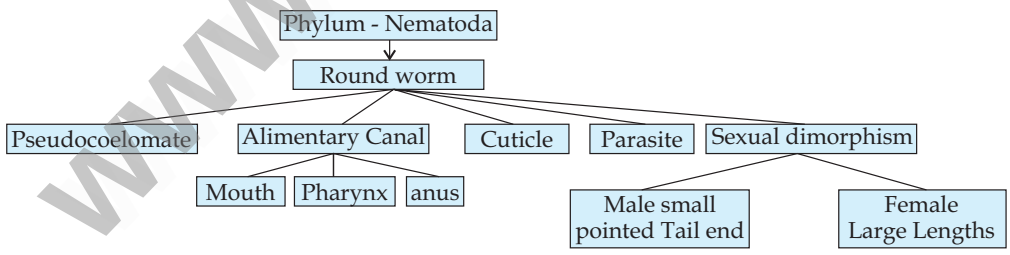
29. Choose the term that does not belong in the following group and explain why it does not belong?
Notochord, cephalisation, dorsal nerve cord and radial symmetry
'Radial symmetry' is the term that does not belong to the group.

Reason :
Chordates are bilaterally symmetrical, triploblastic, coelomates with organ system level of organisation.

30. Why flatworms are called acoelomates?
Animals which do not possess a body cavity are called **acoelomates**. Since there is no body cavity in these animals their body is solid without a perivisceral cavity, this restricts the free movement of internal organs. (e.g. Flatworms)

31. What are flame cells? S.V.Sep-2020 L.V.Mar-2023
Specialized excretory cells present in flatworms called flame cell helps in **Osmoregulation** and excretion.

32. Concept Mapping - Use the following terms to create a concept map that shows the major characteristic features of the phylum nematoda: Round worms, pseudocoelomates, digestive tract, cuticle, parasite, sexual dimorphism



33. In which phyla is the larva trochopore found?
Trochopore larva is seen in the Phylum – **Annelida.**

34. Which of the chordate characteristics do tunicates retain as adults? L.V.GMQ-2018
1) A single dorsal ganglion is present in the adults.
2) Respiration is through gill slits and cleft
3) Dorsal tubular nerve cord is present only in the larval stage
4) Notochord is present only in the tail region of the larval stage, hence named urochordata.
5) Alimentary canal is complete and circulatory system is of open type.
6) The heart is ventral and tubular

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35. List the characteristic features that distinguish cartilaginous fishes with living jawless fishes.

L.V.Mar-2019

S.No.	Cyclostomata	Chondrichthyes
1.	Some are ectoparasites on some fishes.	They are free living.
2.	Body is slender and eel like	Skin is tough and covered with placoid scales
3.	6 to 15 pairs of gillslits for respiration.	Respiration is by lamelliform gills.
4.	Mouth is circular without jaws and suctorial.	There are lower and upper jaws.
5.	Migrate to fresh water for spawning	There is no migration during breeding.
6.	After spawning they die	They don't die after spawning
7.	Oviparous (Eg : lamprey)	viviparous **Eg :** Trygon (stingray)

36. List three features that characterise bony fishes. L.V.Aug-2022

1) The body is spindle shaped skin is covered by ganoid **cycloid** or **Ctenoid** scales.
2) They have four pairs of filamentous gills with operculam on either side.
3) Air bladder helps in gaseous exchange and for maintaining buoyancy.
4) Sexes are separate.
5) They have lateral line sense organs. The kidney is **mesonephric.**

37. List the functions of air bladder in fishes. S.V.Aug-2022 L.V.Aug-2022

1) Air bladder may be connected to the gut or not.
2) They help in gaseous exchange.
3) In ray finned fishes they help in buoyancy.

38. Write the characteristics that contributes to the success of reptiles on land.

1) The body of reptile is covered by dry and cornified skin with epidermal scales or scutes.
2) All are **poikilotherms.**
3) Most reptiles lay cleidoic eggs.
4) Excretion is by metanephric kidneys and are uricotelic.
5) They are monoecious.
6) Internal fertilization is taking place

39. List the unique features of bird's endoskeleton.

1) The endoskeleton is fully ossified.
2) The long bones are hollow with air cavities. So that they can easily fly with lesser weight.

40. Could the number of eggs or young ones produced by an oviparous and viviparous female be equal? Why?

It is a not equal, because

- In oviparous animals, produced eggs to environmental conditions and are Face several problem for predators, unfertilize eggs and then able to survive and produce young ones.
- In viviparous animals the development of young ones take place in safe conditions inside the mother's body, and are less exposed to environmental conditions and predators.

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Part-II – GMQ & GOVT. EXAM QUESTION AND ANSWERS

I. Choose the best options (1 Mark)

1. Write the name of the animal in the given diagram. S.V.GMQ-2018

Ans: Squid

2. Read the given statement and choose the correct option. L.V.GMQ-2018

Statement 1: All triploblastic animals are eucoelomates.

Statement 2: They have a false coelom.

a) Statements 1 and 2 are in correct
b) Statement 1 is incorrect but statement 2 is correct.
c) Statements 1 and 2 are correct
d) Statement 1 is correct but statement 2 incorrect

Ans: a) Statements 1 and 2 are correct

3. Find out the incorrect pair. S.V.QY-2018

a) Ascaris - Round worm
b) Wuchereria - Filarial worm
c) Enterobius - Hook worm
d) Taenia - Tape worm

Ans: c) Enterobius - Hook worm

4. Match the following and choose the correct answer. S.V.QY-2019

A	Ctenophora	i	Trochophore larva
B	MollusCa	ii	Planula larva
C	Cnidaria	iii	Cydippid larva
D	Annelida	iv	Veliger Larva

a) A (iii), B (iv), C (ii), D (i)
b) A (iv), B (iii), C (i), D (ii)
c) A (i), B (iii), C (iv), D (ii)
d) A (ii), B (iv), C (iii), D (i)

Ans: a) A (iii), B (iv), C (ii), D (i)

5. Pick out the correct pair/pairs L.V.June-2019

i) Cnidaria - Planaria
ii) Ctenophora - Pleurobrachiae
iii) Meandrina - Sea pen
iv) Hirudinaria - Leech

a) (i), (ii) and (iv) only
b) (i) and (iv) only
c) (i), (ii), (iii) and (iv)
d) (ii) and (iv) only

Ans: d) (ii) and (iv) only

6. Which of the following group or larval stages are seen in phylum pltyhelminthes? L.V.June-2019

a) Miracidium, sporocysl, redia, cercaria
b) Planula, pleurobrachia, trochophore, tornaria
c) Cercaria, tornaria, miracidium, ammocoetes
e) Amphiblastula, pleurobrachia, planula, redia.

Ans: a) Miracidium, sporocysl, redia, cercaria

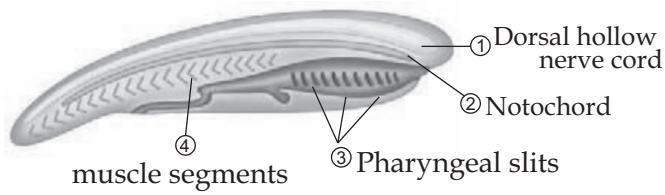
7. Find out the wrong pair from the following. S.V.Mar-2020

a. Flame cells - earthworms
b. Green glands - prawns
c. Solenocytes - Amphioxus
d. Malpighian tubules - insects

Ans: a) Flame cells - earthworms

8. Which of the following structure leads to the formation of vertebral column of adult vertebrates? S.V.Mar-2020

a. 2 b. 4 c. 3 d. 1



Ans: a) 2

9. Match L.V.Mar-2020

(1)	Lasso cells	(I)	Mollusca
(2)	Flame cells	(ii)	Annelida
(3)	Chlorocruorin	(iii)	Ctenophora
(4)	Haemocyanin	(iv)	Platyhelminthes

(a) (1)-(iii), (2)-(iv), (3)-(ii), (4)-(i)
(b) (1)-(iv), (2)-(ii), (3)-(i), (4)-(iii)
(c) (1)-(ii), (2)-(iii), (3)-(iv), (4)-(i)
(d) (1)-(iii), (2)-(iv), (3)-(i), (4)-(ii)

Ans: a) (1)-(iii), (2)-(iv), (3)-(ii), (4)-(i)

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10. Fill in the blanks with correct matching pair L.V.Mar-2020

i) Book gills – _____

ii) _____ – Scorpions

a) Fishes; vascularised lungs

b) Amphibians; Tracheal tubes

c) Limulus; Book lungs

d) Earthworms; simple diffusion

Ans: c) Limulus; Book lungs

11. Match the following: L.V.Mar-2023

1) Pila	- i) Devil fish
2) Sepia	- ii) Squid
3) Loligo	- iii) Apple snail
4) Octopus	- iv) Cuttle fish

a) (1)–(ii), (2)–(iv), (3)–(i), (4)–(iii)

b) (1)–(ii), (2)–(i), (3)–(iii), (4)–(iv)

c) (1)–(i), (2)–(ii), (3)–(iii), (4)–(iv)

d) (1)–(iii), (2)–(iv), (3)–(ii), (4)–(i)

Ans: d) (1)–(iii), (2)–(iv), (3)–(ii), (4)–(i)

II. Short Answers (2 , 3 Marks)

1. Write about the excretory organs in Arthopods. L.V.GMQ-2018

Excretory organs:

Malpighian tubles, green glands, Coxal glands.

2. Brief about metagenis in cnidarians? L.V.GMQ-2018

- Cnidaria which exist in both forms, also exhibit alternation of generations in their life cycle (Metagenesis).
- The polyp represents the asexual generation and medusa represents the sexual generation.
- Polyps produce medusa asexually and medusa forms polyps sexually.

3. Why did we call Ascaris as Pseudocoelomate? S.V.OY-2019

- In ascaris, the body cavity is not fully lined by the **mesodermal** epithelium, but the mesoderm is formed as scattered pouches between the ectoderm and endoderm.
- Such a body cavity is called a **pseudocoel** and is filled with **pseudocoelomic** fluid.

4. Classify the animals based on the body cavity. S.V.Mar-2019

- Acoelomate - Flatworms
- Pseudocoelomate - round worms
- Eucoelom. 1. Schizocoelomate - Annelids
  2. Enterocoelomate - Echinoderms

5. Hemichordates posses the characters of echinoderms and chordates. Write any 3 characters of echinoderms as well as chordates seen in hemichordates. S.V.June-2019

Echinodermata:

1. The adults are radially symmetrical but the larvae are bilaterally symmetrical.
2. They are exclusively marine with organ system level of organisation.
3. The circulatory system is open type without heart.
4. Sexual reproduction
5. External Fertilization.
6. Development is indirect with free swimming bilaterally symmetrical larval forms.

Chodata:

1. Bilaterally symmetrical
2. Triplo blastic organism
3. Myogenic heart
4. Coelomates with organ system level of organisation.

6. Assign the phylum for the following animals. L.V.June-2019

a) Leech	b) Filarial worm
c) Locust	d) Octopus
e) Pennatula	f) Sea horse

Ans:

a) Annelida	b) Aschelminthus
c) Arthopoda	d) Mollusca
e) Cnidaria	f) Osteichthyes

7. What is the advantage of the true coelom over a pseudocoelom? L.V.Sep-2020

- Eucoelom or true coelom is a fluid-filled cavity that develops within the **mesoderm.**
- Thus, the body cavity, along with the body fluid, acts as a water frame and is used for displacement.
- It is used to easily release nutrients into the bloodstream and to remove waste products. **E.g.** Segmented worms, earthworms.

8. Identify the phylum for the following. L.V.Mar-2020

i) Apple snail - Mollusca

ii) Saccoglossus - Hemichordata

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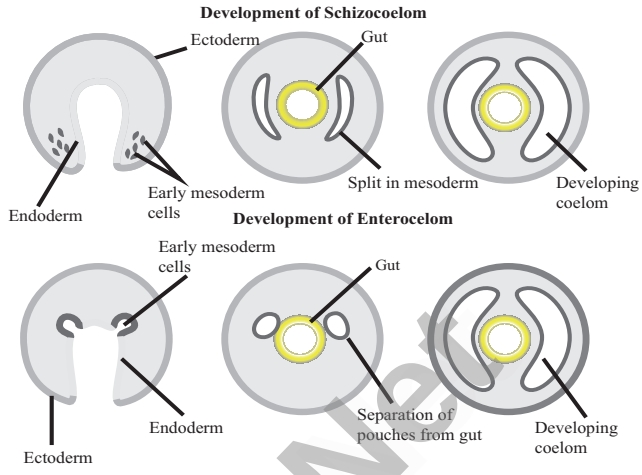
iii) Star fish - Echinodermata
iv) Ascaris - Aschelminthes (Roundworms)

9. Describe the characteristic features of bi-radially symmetrical animal with example. S.V.May-2022

Animals which possess two pairs of symmetrical sides are said to be biradially symmetrical. Biradial symmetry is a combination of radial and bilateral symmetry as seen in ctenophores. There are only two planes of symmetry, one through the longitudinal and sagittal axis and the other through the longitudinal and transverse axis. (e.g. Comb jellyfish – Pleurobrachia)

10. Draw a neat labelled diagram of their Development in Schizocelom with Enterocelom. L.V.Aug-2022



11. Compare the chordates with non-chordates? L.V.Mar-2023

S.No.	Chordates	Non-chordates
1	Notochord is present	Absence of notochord.
2.	Dorsal hollow and single nerve cord	Double ventral solid nerve cord.
3.	Pharynx perforated by gill slits.	Gill slits absent.
4.	Heart is ventrally placed.	Heart indoors or laterally placed or absent.
5.	A post anal tail is present	Post anal tail is absent
6.	Alimentary canal placed ventral to the nerve cord	Alimentary canal is placed dorsal to the nerve cord

III. Long Answers (5 Marks)

1. List any two characteristics of Hemichordata S.V.GMQ-2018

1) They possess the characters of invertebrates and chordates.
2) This phylum consists of soft worm like organisms.
3) They are triploblastic coelomate animals.
4) They are bilaterally symmetrical.
5) Their circulatory system is simple and open type.
6) They are ciliary feeders.
7) Respiration is through paired gill silts opening into the pharynx.
8) Excretion is through glomerulus.
9) Nervous system is primitive sexes are separate.
10) In its development there is a free swimming tornaria larva.

2. a) i) Find out the Phylum which shows bioluminescence

ii) Describe the Phylum with suitable examples. S.V.GMQ-2018 L.V.Sep-2020

Ctenophora is known as the bioluminescence phylum.

Ctenophora characteristics :

➢ Ctenophora are exclusively marine, biradially symmetrical, diploblastic animals with tissue level of organisation. Through they are diploblastic, their mesoglea is different from that of **cnidaria.**

It contains amoebocytes and smooth muscle cells.

➢ The have eight external rows of ciliated comb plates (comb jellies) which help in locomotion, hence commonly called **comb jellies** or **sea**

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walnuts. Bioluminescence (the ability of a living organism to emit light) is well marked in ctenophores.

- ➢ They lack nematocysts but possess special cells called **lasso cells** or **colloblasts** which help in food capture. Digestion is both extracellular and intracellular.
- ➢ They reproduce only by sexual means.
- ➢ Fertilization is external and development is indirect and includes a larval stage called **cydippid larva.**

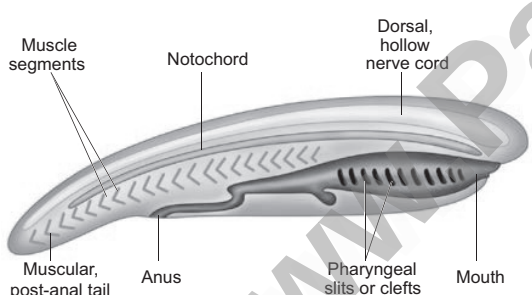
Examples: Pleurobrachia and Ctenoplana.

3. Explain the district features of Phylum Chordata. S.V.QY/HY-2018 L.V.QY-2018 S.V.May-2022

- ➢ Chordata is the largest phylum with most familiar group of animals, such as fishes, amphibians, reptiles, birds and mammals and less known forms such as lancelets (Amphioxus) and tunicates (Ascidian). All chordates possess three fundamental distinct features at some stage of their life cycle.

Notochord:

- ➢ Presence of elongated rod like notochord below the nerve cord and above the alimentary canal. It serves as a primitive internal skeleton.



A Typical Chordate

- ➢ It may persist throughout life in lancelets and lampreys. In adult vertebrates, it may be partially or completely replaced by backbone or vertebral column.

Nerve Cord above the notochord:

- ➢ A dorsal hollow or tubular fluid filled nerve cord lies above the notochord and below the dorsal body wall. It serves to integrate and co-ordinate the body functions.
- ➢ In higher chordates, the anterior end of the nerve cord gets enlarged to form the brain and the posterior part becomes the spinal cord, protected inside the vertebral column.

Pharyngeal gill slits:

- ➢ Presence of **pharyngeal** gill slits or clefs in all chordates at some stage of their lifecycle.
- ➢ It is a series of gill slits or clefs that perforates the walls of pharynx and appears during the development of every chordate.
- ➢ In aquatic forms, pharyngeal gill slits are vascular, lamellar and form the gills for respiration.
- ➢ In terrestrial chordates, traces of non-functional gill clefs appear during embryonic developmental stages and disappear later.

4. While a biology student goes to the beach, he happens to see crabs and starfishes on the sea shore S.V.QY-2019

Crab:

- ➢ Crab belong to phylum arthropoda.
- ➢ (G. arthors - jointed; podes - feet).
- ➢ This is the largest phylum of the Kingdom Animalia and includes the largest class called **insecta** (total species ranges from 2-10 million).
- ➢ They are bilaterally symmetrical triploblastic animal and Schizocoelomata animals with organ system grade of body organisation.
- ➢ They have jointed appendages which are used for **locomotion,** feeding and sensory function.
- ➢ Body is covered by chitinous exo-skeleton for protection and to prevent water loss.
- ➢ It is shed OFF periodically by a process called moulting or ecolysis.
- ➢ The body consists of a head, thorax and abdomen with a body cavity called haemocoel. Respiratory organs are gills, book gills, book lungs and trachea.
- ➢ Circulatory system is of open type.

Starfishes:

- ➢ Star fish belong to phylum Echinodermata. (G. Echinos - spiny; dermos - skin).
- ➢ All Echinoderms are marine animals.
- ➢ The adults are **radially symmetrical** but the larvae are **bilaterally symmetrical.**
- ➢ These animals have a mesodermal endoskeleton of calcareous ossicles.
- ➢ They are exclusively marine with organ system level of organisation.
- ➢ The most distinctive feature of echinoderms is the presence of the **water vascular system** or **ambulacral system with tube feet** or **podia**.
- ➢ In which helps in locomotion, capture and transport of food and respiration.

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- The digestive system is complete with mouth on ventral side and anus on the dorsal side.
- Excretory organs are absent.
- The nervous system and sensory organs are poorly developed.
- The circulatory system is open type without heart and blood vessels.
- Reproduction is sexual and fertilization is external.
- Development is indirect with free swimming bilaterally symmetrical larval forms.
- Some echinoderms exhibit autotomy with remarkable powers of regeneration.
  eg: Star Fish

5. Compare the anatomical features between Phylum Annelida and Arthopoda. S.V.Mar-2019

S.No.	Phylum Annelida	Arthopoda
1.	They are triploblastic, bilaterally	They are also triploblastic, bilaterally
2.	Schizocoelomates and exhibit organ system level of body organisation.	Schizocoelomate animals with Organ system grade of body organisation.
3.	The coelom with coelomic Fluid creates a hydrostatic skeleton and aids in locomotion.	They have jointed appendages which are used for locomotion feeding and are sensory in funciton.
4.	Closed type of circulatory system.	Open type of circulatory system.
5.	Earthworms are monoecious Neries and leach are dioecious	They are mostly dioecious
6.	They reproduce sexually development is direct or indirect.	They also development may be direct or indirect and its oviparous.
7.	They are trocophore larva stage.	Life history includes many larval stages followed by metamorphosis.

6. The so called animal 'Portuguese mand of war' belongs to which phylum? List out the general characters of the that phylium. S.V.June-2019 S.V.Aug-2022

The Phylum of Portuguese of war is Cnidarians.

- Cnidarians (were previously called Coelenterata), are aquatic, sessile or free swimming, solitary or colonial forms with radial symmetry The name Cnidaria is derived from **cnidocytes** or **cnidoblasts** with **stinging cells** or **nematocyst** on tentacles. Cnidoblasts are used for anchorage, defense, and to capture the prey.
- Cnidarians are the first group of animals to exhibit tissue level organisation and are diploblastic.
- They have a **central vascular cavity** or **coelenteron** (serves both digestion and circulatory function) with a single opening called mouth or hypostome, which serves the process of ingestion and egestion. Digestion is both extracellular and intracellular.
- The nervous system is primitive and is formed of diffused nerve net.
- Cnidarians like corals have a skeleton made up of calcium carbonate. Cnidarians exhibit two basic body forms, polyp and medusa.
- The polyp forms are sessile and cylindrical (e.g. Hydra, Adamsia), whereas the medusa are umbrella shaped and free swimming.
- Cnidarians which exist in both forms, also exhibit alternation of generations in their life cycle **(Metagenesis).**
- The polyp represents the asexual generation and medusa represents the sexual generation. Polyps produce medusa asexually and medusa forms polyps sexually. Development is indirect and includes a free swimming ciliated **planula larva.**
- **Examples:** Physalia (Portugese man of war), Adamsia (Sea anemone), Pennatula (Sea pen), Meandrina (Brain coral).

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7. What is coelom ? Describe it's types ? S.V.Mar-2019

Coelom : Body cavity lined with mesoderm is meant as coelom. This lie between body wall and alimentary canal.

1) Pseudo coelom :

The body cavity is not lined by the mesodermal epithelium and the mesoderm is formed as scattered pouches between the ectoderm and endoderm. **(Eg.) Round worm**

2) Eucoelom : L.V.Mar-2020

Coelom is a fluid filled cavity that develops within the mesoderm and is lined by mesodermal epithelium called **peritoneum.**

a) Schizocoelomates :

In these animals the body cavity is formed by splitting of mesoderm. **(Eg.) Annelids.**

b) Entero coelomate :

The body cavity is formed from the mesodermal pouches of archenteron.

(Eg.) Echinodermata

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8. Write the kingdom, phylum and class for pigeon. Write the characteristics of birds that are suitable for flying. S.V.Mar-2019

(i) kingdom - Animalia

(ii) phylum - chordata

(iii) class - Aves

Characteristictics:

1) The forelimbs are modified into wings. (Eg.) Ostrich, Kiwi, penguin
2) The hind limbs are adapted for **walking, running, swimming** and **perching.**
3) Tail have preen gland at it's base.
4) The long bones are hollow with air cavities. (pneumatic bones)
5) They have pectoralis major and minor muscles for flying.
6) Respiration is by spongy lungs that are continuous with air sacs.
7) The heart is four chambered.
8) In males the testes are paired but in females only one ovary is present.
9) All birds are oviparous. Eggs are **megalecithal.**
10) Migration and parental care is well marked.

9. List the general characteristics of the largest phylum of kingdom animalia. L.V.Mar-2020 L.V.Mar-2023

1) Arthropoda is the largest phylum of the kingdom.
2) They are bilaterally symmetrical, segemented, triploblastic.
3) They have jointed appendages which are used for locomtion, feeding and are sensory in function.
4) Body is covered by chitinous exo skeleton.
5) It is shed off periodically by a process called moulting or ecolysis.
6) The Body cavity called haemocoel.
7) Respiratory organs are gills, book gills, book lungs and trachea.
8) Circulatory system is of open type.
9) Sensory organs like antennae, eyes compound and simple.
10) Excretion takes place through malpighian tubules, green glands, coxal glands.
11) Life history includes many larval stages followed by metamorphosis.

eg: lepisma (silver fish)

Apis (Honey bee)

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10. What are the four common characteristics found in most animals & Explain. L.V.May-2022

1) On the basis of germ layers all animals will be diploblastic (ectoderm and endoderm) or triploblastic (outer ectoderm, middle mesoderm and inner endoderm).
2) Animals show symmetry. They may be radially symmetrical or bilaterally symmetrical. Few animals like sponges lack symmetry.
3) Most animals posses a body cavity between the body wall and alimentary canal and is lined with mesoderm. This is called coelom. Some animals lack coelom (acoelomate) or have false coelom (Pseudocoelomate).
4) Reproduction is a character seen in all animals. (asexual/sexual or both).

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PART-III – ADDITIONAL QUESTIONS

I. Match the following

1.

PART-I			PART-II	
A	Sponges	–	I	Mesoglea
B	Open circulation	–	II	Asymmetrical
C	Diploblastic animal	–	III	Echinodermata
D	Snails	–	IV	Choanocytes

a. A – IV, B – I, C – II, D – III
b. A – I, B – II, C – III, D – IV
c. A – IV, B – III, C – I, D – II
d. A – IV, B – II, C – III, D – I

Ans: c. A – IV, B – III, C – I, D – II

II. Choose the best options

1. _____ is the first group of animals to exhibit tissue level organisation.
a. Cnidaria b. Porifera
c. Mollusca d. Echinodermata
Ans: a) Cnidaria

2. Name the organs formed from ectoderm.
a. Heart b. Hair
c. Muscle d. Intestine
Ans: b) Hair

3. The mesoglea seen in between the ectoderm and endoderm is present in _____ phylum.
a. Platyhelminthes b. Arthropoda
c. Annelida d. Coelenterates
Ans: d) Coelenterates

4. Inporiferans through _____ pores water enters into the body and goes out through.
a. Osculum Ostia b. Ostia Osculum
c. Mouth Ostia d. Mouth Osculum
Ans: b) Ostia, Osculum

5. What is the excretory organ of round worm.
a. Flame cells b. Rennet glands
c. Green glands d. Malphigeal tubules
Ans: b) Rennet glands

6. The coelom of phylum arthropoda is
a. Pseudo coelom b. Eucoelom
c. Schizo coelom d. Entero coelom
Ans: c) Schizo coelom

7. Name the respiratory organ of Mollusca.
a. Ctenidia b. Gills
c. Book lungs d. Trachea
Ans: a) Ctenidia

8. Name the excretory organ of Cephalo Chordata.
a. Mesonephridia b. Metanephridia
c. Protonephridia d. Flame cells
Ans: c. Protonephridia

9. Name the organism which have both features of chordate and non chordates ?
a. Balanoglossus b. Ascidia
c. Amphioxces d. Salpa
Ans: a) Balanoglossus

10. _____ are called astunicates
a. Urochordates b. Cephalo chordates
c. Vertebrata d. Hemi chordata
Ans: a) Urochordates

11. The organism that shows the regeneration character
a. Planeria b. Liver fluke
c. Tape worm d. Leech
Ans: a) Planeria

12. The eggs of birds are _____
a. Megalecithal b. Mesolecithal
c. Telolocithal d. Alecithal
Ans: a) Megalecithal

III. The given statement whether true or False

1. **The name cnidaria is derived from cnidocytes with stinging cells or nematocyst on tentacles.**
2. **Annelids were the first segmented animals to evolve.**
3. **Round worms are bilaterally symmetrical and diploblastic.**
4. **Phylum Arthropoda extraction take place in Flame cells.**

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A) I-False, II-False, III-True, IV-True
B) I-True, II-False, III-False, IV-True
C) I-True, II-True, III-False, IV-False
D) I-False, II-True, III-True, IV-False

Ans: C) I-True, II-True, III-False, IV-False

IV. Choose the correct pair

1.
a. Planula – Planeria
b. Regeneration – Annelida
c. Trochopore larva – Cnidaria
d. Veliger larva – Mollusca

Ans: d) Veliger larva - Mollusca

2.
a. Segmentation – Annelida
b. Archenteron – Heart formation
c. Ostia – Sea anemone
d. Polyp medusa – Phylum ctenophora

Ans: a) Segmentation - Annelida

V. Very Short Questions (2 marks)

1. What are pinococytes ?
In sponges the outer surface is formed of plate like cell that maintain the size and structure of the sponges are called pinococytes.

2. What are chonaocytes?
The inner layer of sponges is formed of flagellated collar cells called coanocytes. They maintain water flow through the sponges thus facilitating respiratory and digestive functions.

3. Define tissue.
Cells that perform similar functions are aggregated to form tissues.

4. Define organ? Which was the first animal to have organ system ?
- ➢ Different kinds of tissues aggregate to form an organ to perform a specific function.
- ➢ In phylum Platyhelminthes organ level of organisation is first formed.

5. What are diploblastic animals.
- ➢ Animals in which the cells are arranged in two embryonic layers the ectoderm and endoderm are diploblastic animals.
- ➢ The ectoderm gives rise to epidermis.
- ➢ The endoderm gives rise to tissue lining the gut.

6. What is segmentation ?
In some animals the body is externally and internally divided into a series of repeated units called segments with a serial repetition of some organs. (Eg.) Annelida.

7. What is protostomia ?
In Eumetazoans the embryonic blastopore develops into mouth are known as protostomia.

8. What are deutrostomia ?
Eumetazoans in which anus is formed from ornear the blastopore and the mouth is formed away from the blastopore are deutrostomia.

9. List the excretory organs of phylum arthropoda?
1. Malphigean tubules
2. Green glands
3. Coxal glands

10. What is water vascular or ambulacral system ? What is it's function?
Tube feet or podia are present in Echinodermata. Through this structure the water enters and comes out. This system is known as water vascular system or ambulacral system.
Uses : Locomotion capture and transport of food and respiration.

11. What is cleidoic egg?
If the female organisms lay cleidoic eggs or shelled egg then it is known as cleidoic eggs.

12. What are the extra embryonic membranes present in reptiles?
1. Amnion 2. Allantois
3. Chorion 4. Yolksac

13. Differentiate between complete digestive system from a incomplete digestive system.

	Incomplete Digestive System	Complete Digestive System
1.	There is a single opening in a digestive system which serves as both mouth and anus. (Eg.) Platyhelminthes	There is separate openings for mouth and anus. (Eg.) Aschelminthes

14. Differentiate the respiratory pigment haemoglobin from haemocyanin.

	Haemoglobin	Haemocyanin
1.	It's iron containing respiratory pigment.	It's a copper containing respiratory pigment.
2.	This is present in annelida and chordata	This is present in molluscan blood.

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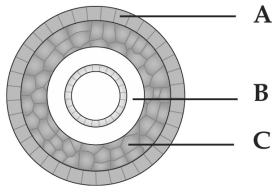
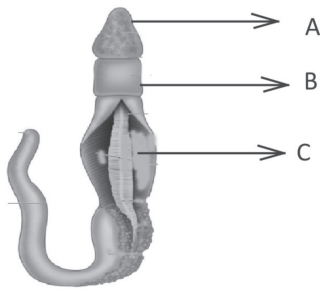
VI. Short Questions (3 marks)

1. Name the parts A, B and C in the diagram?



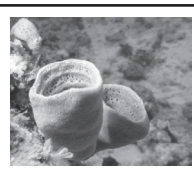
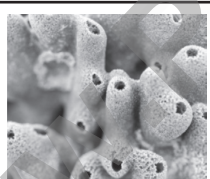
A) Ectoderm B) Pseudo coelom
C) Mesodorm

2. In the given diagram Balanoglossus mark A, B, and C.



A) Probosis
B) Collarette
C) Genital wings

3. Match

1. Cycon	 *Euplectella*
2. Chalina	 *Euplectella*
3. Euplectella	 *Hyalonema*
4. Hyalonema	 *Chalina*

a) I – b, II – d, III – c, IV – a,
b) I – a, II – b, III – d, IV – c,
c) I – b, II – a, III – d, IV – c
d) I – a, II – c, III – b, IV – d

Ans : a) I – b, II – d, III – c, IV – a

4. Write a general characters of Phylum Ctenophora.

1) Ctenophora are exclusively marine.
2) Biradially symmetrical, diploblastic.
3) It is mesoglea and its contains amoebocytes and smooth muscle cells.
4) It is a bioluminescence its ability of a living organism to emit light.
5) The special cells called lasso cells or colloblasts which help in food capture.
6) They reproduce only by sexual means.

5. Give any five characteristic features of urochordata?

1) They are exclusively marine.
2) They are mostly sessile some pelagic or free swimming.
3) Body is covered by a tunic .
4) Coelom is absent.
5) Notochard is present only in the tail region of the larval stage.
6) Circulatory system is open type.

6. Differentiate parazoa from eumetazoa?

	Parazoa	Eumetazoa
1	Multi cellular	Multicellular
2	Cells are loosely arranged	Well developed tissues and organ system are present

7. Look at the picture given below and answer for the questions

a) What is the name of this fish?
b) What is the name of the larva of this fish?
c) What is the shape of the mouth?

Ans : a) Lamprey
b) Ammocete
c) Circular

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VII. Long Answer Questions (5 marks)

1. What is symmetry ? Describe it's type with examples.

Symmetry is the body arrangement in which parts that lie on opposite side of an axis are identifical

1) A Symmetrical : If any plane passing through the centre of the body does not divide them into two equal halves. **(Eg.) Sponges.**

2) Radial Symmetry : When any plane passing through the central axis of the body divides an organism into two identical parts it is called radial symmetry. **(Eg.) Sea anemone**

3) Bilateral Symmetry : Animals which have two similar halves on either side of the central plane show bilateral symmetry. **(Eg.) Man**

4) Biradial Symmetry : It is a combination of radial and bilateral symmetry. **(Eg.) Comb jelly fish**

2. Compare Platyhelminthes with Aschelminthes?

S.No.	Platyhelminthes	Aschelminthes
1	The body is flattened one	They are round in shape.
2.	They are bilateral and triploblastic animal.	They are bilateral and triploblastic animal.
3.	Acoelomate	Pseudo coelom is present.
4.	They have pseudo segmentation	The body is unsegmented
5.	Excretion is through flame cells.	Excretion is through rennet glands.
6.	Sexes are not separate. They are monoecious.	Sexes are separate and exhibit sexual dimorphism.
7.	Some show regeneration capacity.	No regeneration capacity.
8.	Larva is present.	No larva
9.	(Eg.) Tape worm	(Eg.) Ascaris

3. What are the general characters of phylum vertebrata?

1) They possess notochord during embryonic stage only.
2) The notochord is replaced by a cartilaginous or bony vertebral column in the adult.
3) Skin is covered by skeleton consists of scales, feathers, hairs, claws, nails.
4) They possess paired appendages such as fins or limbs.
5) Respiration is through gills skin bucco pharyngeal cavity and lungs.
6) Heart is with two or three or four chambers.
7) Kidneys are for excretion and osmoregulation.
8) The heart is four chambered and posses a left systematic arch.
9) Mammals have a large brain when compared to other animals.
10) Their kidneys are metanephric and are ureotelic.
11) All are homeothermic.

4. What are the general characters of mammals?

1) Body is covered by hairs.
2) They are found in a variety of habitats.
3) Presence of mammary gland is the most unique feature of mammals.
4) They have two pairs of limbs.
5) Skin consists of sweat glands and sebaceous glands.
6) Exo skeleton includes horns spines, scales claws etc.
7) Teeth are thecodont heterodont and diphyodont.

5. Explain the general characters of Aves.

1) The fore limbs are modified in to wings (except Ostrich, Kiwi, Penguin)
2) Hind limbs are adapted for walking, running, swimming and perching.
3) The oil gland or pleen gland at the present base of the tail.
4) The long bones are hollow with air cavities.
5) The pectoral muscles of Flight (Pectoralis major and pectoralis minor)
6) Respiration is by compact spongy lungs that are continuous air sacs.
7) The heart is four chambered.
8) In males the testes are paired but in females, only the left ovary.
9) All birds are oviparous its contain megalacithal and cleidoic.
10) Migration and parental care is well marked.

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6. What are the characteristic features of amphibia?

1) Amphibians live both in aquatic as well as terrestrial habitats.
2) They are pokilothermic.
3) They have two pairs of limbs.
4) They may have tail or may not be present.
5) Their skin is smooth or rough.
6) Heart is three chambered.
7) They excrete urea as a excretory product.
8) The kidneys are mesonephric.
9) They are oviparous and development is indirect.

7. Give three distinct features of all chordates that is seen at some stage of their life cycle? What is the fate of two characters out of three in the matured adults ?

1) Presence of notochord below the nerve chord and above the alimentary canal.
2) Presence of nerve cord lies above the notochord and below the dorsal body wall.
3) Presence of pharyngeal gill slits in all chordats at some stage of their life cycle.

Features seen in the matured adult animals

Larva	Adult
Notochord	It may be partially or completely replaced by backbone.
Nerve cord	They enlarged to form the brain and spinal cord.

8. Phylum: Compare the common characteristics of Porifera, Cnidaria, Platyhel minthes, Aschelminthes

S. No.	Characters	Phylum			
		Phylum Porifera	Phylum Cnidaria	Phylum Platyhel minthes	Phylum Aschelminthes
1.	Habitat	Marine / Fresh water	Aquatic	Parastite	Terrestrial / terrestrial parasite
2.	Germinal Layers	Diploblastic	Diploblastic	Triploblastic	Triploblastic
3.	Symmetry	Asymmeterical	Radial symmetry	Bilateral symmetry	Bilateral symmetry
4.	Coelom	Absent	Absent	Absent	Pseudocoelom
5.	Segmentation	Absent	Absent	Pseudo segmentation	Absent
6.	Sextual Nature	Bisexual	Bisexual	Bisexual	Unisexual
7.	Excretion	Diffusion	Absent	Flame cell	Rennet glardn
8.	Respiration	Diffusion	Absent	Absent	Absent
9.	Circulation	Canal system	Absent	Absent	Absent
10.	Reproduction	Sexual asexual	Sexual asexual	Sexual	Sexual
11.	Embryonic Development	Indirect Development	Indirect Development	Indirect Development	Indirect Embryonic Development
12.	Larval stage	Parenchymula	Planula	Miracidium	Development absent

******* ********** *******

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GOVT. QUESTION PAPER - MARCH 2023

BIO-ZOOLOGY

Time Allowed : 3.00 Hours **PART - II** Maximum Marks : 35

SECTION - 1

Note : i) Answer All the questions.

ii) Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer. **8 x 1 = 8**

1. Rod cells are predominant in the _____.
   a) Optic nerve b) Blind spot **c) Extra fovea region** d) Iris
2. The limbless amphibian is:
   a) Rana b) Salamander **c) Icthyophis** d) Hyla
3. Synovial fluid is found in _____
   a) Immovable joints b) Ventricles of the brain
   c) Freely movable joints d) Spinal cord
4. The myocardium of the ventricle is thrown into irregular muscular ridges called:
   a) Chordae tendinae b) Bundle of His **c) Anastomoses** d) Purkinje fibres
5. Sexually, earthworms are:
   a) Hermaphroditic and self-fertilizing b) Sexes are separate
   c) Parthenogenic **d) Hermaphroditic but not self-fertilizing**
6. Hypersecretion of Growth hormone in children leads to:
   a) Grave's disease b) Cretinism c) Tetany **d) Gigantism**
7. The Tidal Volume of a normal person is _____.
   a) 500 mL b) 800 mL c) 1100 - 1200 mL d) 1200 mL
8. An example for Tautonymy:
   a) Felis silvestris **b) Naja naja** c) Ailurus fulgens d) Felis domestica

SECTION - 2

Answer any four questions: **4 x 2 = 8**

9. Define extremophiles. **CHAPTER - 1**
10. What are earthworm casts? **CHAPTER - 4**
11. Name the respiratory organs of Flatworm, Cockroach, Fish and Cat. **CHAPTER - 6**
12. Compare closed and opened circulatory system. **CHAPTER - 2**
13. Tabulate the functions of brain lobes. **CHAPTER - 10**
14. Write the different types of salivary glands. **CHAPTER - 5**

SECTION - 3

Answer any three questions. Question No. 19 is Compulsory. **3x3=9**

15. Name the disorder caused due to the hyposecretion of parathyroid hormone and write its symptoms. **CHAPTER - 11**

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16. Draw and label the structure of a Nephron. CHAPTER - 8
17. Some epithelial cells are pseudostratified. What does this mean? CHAPTER - 3
18. Give the economic importance of lac insect. CHAPTER - 12
19. Aqueous humour maintains the intra-ocular pressure - Justify. CHAPTER - 10

SECTION - 4

Answer all the questions. **2 x 5 = 10**

20. a) Explain the origin and conduction of Heart Beat. CHAPTER - 7

(OR)

b) What are the various classical taxonomical tools? Explain. CHAPTER - 1

21. a) List out the various functions of skeletal system. CHAPTER - 9

(OR)

b) Fishes provide a good staple food to tide over the nutritional needs of man. Discuss the various fish by-products. CHAPTER - 11

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GOVT. QUESTION PAPER - MARCH 2023

ZOOLOGY

Time Allowed : 3.00 Hours Maximum Marks : 70

PART - I

Note : i) Answer All the questions. **15 x 1 = 15**

ii) Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer.

1. The ciliated epithelium lines the:
   a) Gall bladder b) Skin c) Trachea **d) Digestive tract**
2. The DNA polymerase enzyme used in PCR technique was first isolated from _____ bacteria.
   a) Salmonella **b) Thermus aquaticus**
   c) Mycobacterium d) E. coli
3. The hormone which regulates sleep and wake cycle is:
   a) Insulin b) ADH
   c) Thyroxine **d) Melatonin**
4. First step in digestion of fat is:
   a) Absorption by lacteals b) Emulsification
   c) Storage in adipose tissue d) Enzyme action
5. Normal Glucose values in blood:
   a) 70 - 110 mg / dL **b) 70 - 100 mg / dL**
   c) 110 - 140 mg / dL d) 80 - 120 mg / dL
6. Match the following:
   (1) Pila - (i) Devil fish
   (2) Sepia - (ii) Squid
   (3) Loligo - (iii) Apple snail
   (4) Octopus - (iv) Cuttle fish
   a) (1)-(ii), (2)-(iv), (3)-(i), (4)-(iii)
   b) (1)-(ii), (2)-(i), (3)-(iii), (4)-(iv)
   c) (1)-(i), (2)-(ii), (3)-(iii), (4)-(iv)
   d) (1)-(iii), (2)-(iv), (3)-(ii), (4)-(i)
7. Concentration of urine depends upon _____ part of the nephron.
   a) P.C.T (Proximal Convoluted Tubule)
   b) Bowman's Capsule
   c) Network of blood capillaries arising from glomerulus
   d) Long of Henle's loop
8. Kidney of frog is:
   a) Mesonephros b) Archinephros c) Metanephros d) Pronephros
9. Rearing of honey bee is called:
   a) Vermiculture b) Sericulture **c) Apiculture** d) Lac culture

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10. The respiratory organs of insects are:
    a) Green glands **b) Tracheal tubes** c) Lungs d) Skin
11. The functional unit of a muscle fibre is:
    a) Myosin **b) Sarcomere** c) Actin d) Sarcoplasm
12. Which of the following is not involved in blood clotting?
    a) Platelets b) Fibrin **c) Bilirubin** d) Calcium
13. The excretory organ of Nematodes:
    a) Rennette cells b) Kidney c) Flame cells d) Malphighian tubules
14. Iodised salt is essential to prevent:
    a) Goitre b) Rickets c) Acromegaly d) Scurvy
15. The respiratory centre is present in the:
    a) Cerebellum **b) Medulla Oblongata**
    c) Thalamus d) Hypothalamus

PART - II

Answer any six questions. Question No. 24 is Compulsory. **6 x 2 = 12**

16. What are the differences between a zoo and a wild-life sanctuary? CHAPTER - 1
17. What are flame cells? CHAPTER - 2
18. What does a pacemaker do? CHAPTER - 12
19. What are earthworm casts? CHAPTER - 4
20. What is Methaemoglobin? CHAPTER - 6
21. Name the contractile proteins present in the skeletal muscle. CHAPTER - 9
22. What is called blind spot? Why is it called so? CHAPTER - 10
23. Write the symptoms of cretinism. CHAPTER - 11
24. Differentiate Biopsy and Autopsy. CHAPTER - 3

PART - III

Answer any six questions. Question No. 33 is Compulsory. **6x3=18**

25. Write the rules of Nomenclature. CHAPTER - 1
26. Differentiate Chordates and Non - Chordates. CHAPTER - 2
27. Write the types of respiration seen in frog. CHAPTER - 4
28. Mention the functions of human liver. CHAPTER - 5
29. Why is pneumonia considered a dangerous disease? CHAPTER - 6
30. What is lymph? Write its functions. CHAPTER - 7
31. Draw a neat labelled diagram of L.S. of the human eye. CHAPTER - 10
32. What are the different types of rib bones that form the rib cage? CHAPTER - 9
33. Compare - Ammonoteles, Uricoteles and Ureoteles. CHAPTER - 8

PART - IV

Answer all questions. **5 x 5 = 25**

34. a) List out the general characteristics of the Phylum Arthropoda. CHAPTER - 2

(OR)

b) Explain the male reproductive system of frog. CHAPTER - 4

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35. a) Describe in detail, the process of digestion in the small intestine. CHAPTER - 5

(OR)

b) How does the blood transport O_2 from the lungs to the tissue cells? CHAPTER - 6

36. a) Explain A B O blood groups in man. CHAPTER - 7

(OR)

b) Explain the sliding filament theory of muscle - contraction. CHAPTER - 9

37. a) Explain the structure of neuron with a labelled diagram. CHAPTER - 10

(OR)

b) Explain the structure of pancreas. Write about the hormones secreted by the pancreas and their functions. CHAPTER - 11

38. a) What is called CT scanning? Mention its clinical significance. CHAPTER - 12

(OR)

b) What is called artificial insemination? What are the advantages of artificial insemination? CHAPTER - 12

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