

INDEX**A) SYLLABUS 2020-2021:**

- Month-wise syllabus
- Unit wise weightage

B) ASSIGNMENTS**TERM I**

- **Chapter 1:** THE LIVING WORLD
- **Chapter 2:** BIOLOGICAL CLASSIFICATION
- **Chapter 3:** PLANT KINGDOM
- **Chapter 4:** ANIMAL KINGDOM
- **Chapter 5:** MORPHOLOGY OF FLOWERING PLANTS
- **Chapter 6:** ANATOMY OF FLOWERING PLANTS
- **Chapter 7:** STRUCTURAL ORGANISATION IN ANIMALS
- **Chapter 8:** CELL: THE UNIT OF LIFE
- **Chapter 10:** CELL CYCLE AND CELL DIVISION
- Term I MCQ's and Case based questions.
- Revision Assignment- Term I
- **Chapter 9:** BIOMOLECULES
- **Chapter 11:** TRANSPORT IN PLANTS
- **Chapter 12:** MINERAL NUTRITION
- **Chapter 13:** PHOTOSYNTHESIS IN HIGHER PLANTS
- **Chapter 14:** RESPIRATION IN PLANTS
- **Chapter 15:** PLANT GROWTH AND DEVELOPMENT
- **Chapter 16:** DIGESTION AND ABSORPTION
- **Chapter 17:** BREATHING AND EXCHANGE OF GASES
- **Chapter 18:** BODY FLUIDS AND CIRCULATION
- **Chapter 19:** EXCRETORY PRODUCTS AND THEIR ELIMINATION
- **Chapter 20:** LOCOMOTION AND MOVEMENT
- **Chapter 21:** NEURAL CONTROL AND COORDINATION
- **Chapter 22:** CHEMICAL COORDINATION AND INTEGRATION
- Term II MCQ's and Case based questions.
- Revision Assignment- Term II

C) PROJECT**D) PRACTICE PAPER I and II**

SYLLABUS 2020-2021**MONTH-WISE SYLLABUS****First Semester (April -August 2020)**

APRIL 2020

Chapter 8: CELL: THE UNIT OF LIFE**Chapter 10:** CELL CYCLE AND CELL DIVISION

MAY 2020

Chapter 1: THE LIVING WORLD**Chapter 2:** BIOLOGICAL CLASSIFICATION**Chapter 3:** PLANT KINGDOM

JULY 2020

Chapter 4: ANIMAL KINGDOM**Chapter 5:** MORPHOLOGY OF FLOWERING PLANTS**Chapter 6:** ANATOMY OF FLOWERING PLANTS

AUGUST 2020

Chapter 7: STRUCTURAL ORGANISATION IN ANIMALS**Second Semester (September 2020 - February 2021)**

SEPTEMBER 2020

Chapter 9: BIOMOLECULES

OCTOBER 2020

Chapter 11: TRANSPORT IN PLANTS**Chapter 12:** MINERAL NUTRITION**Chapter 14:** RESPIRATION IN PLANTS

NOVEMBER 2020

Chapter 13: PHOTOSYNTHESIS IN HIGHER PLANTS**Chapter 15:** PLANT GROWTH AND DEVELOPMENT**Chapter 16:** DIGESTION AND ABSORPTION

DECEMBER 2020

Chapter 17: BREATHING AND EXCHANGE OF GASES**Chapter 18:** BODY FLUIDS AND CIRCULATION**Chapter 19:** EXCRETORY PRODUCTS AND THEIR ELIMINATION

JANUARY 2021

Chapter 20: LOCOMOTION AND MOVEMENT**Chapter 21:** NEURAL CONTROL AND COORDINATION**Chapter 22:** CHEMICAL COORDINATION AND INTEGRATION

February 2021 REVISION

SYLLABUS 2020-2021

UNIT - WISE WEIGHTAGE

THEORY

TIME: 3 HOURS

MARKS: 70

UNIT	NAME	MARKS
I	DIVERSITY IN THE LIVING WORLD	12
II	STRUCTURAL ORGANISATION IN ANIMALS AND PLANTS	12
III	CELL : STRUCTURE AND FUNCTION	12
IV	PLANT PHYSIOLOGY	17
V	HUMAN PHYSIOLOGY	17
	TOTAL	70

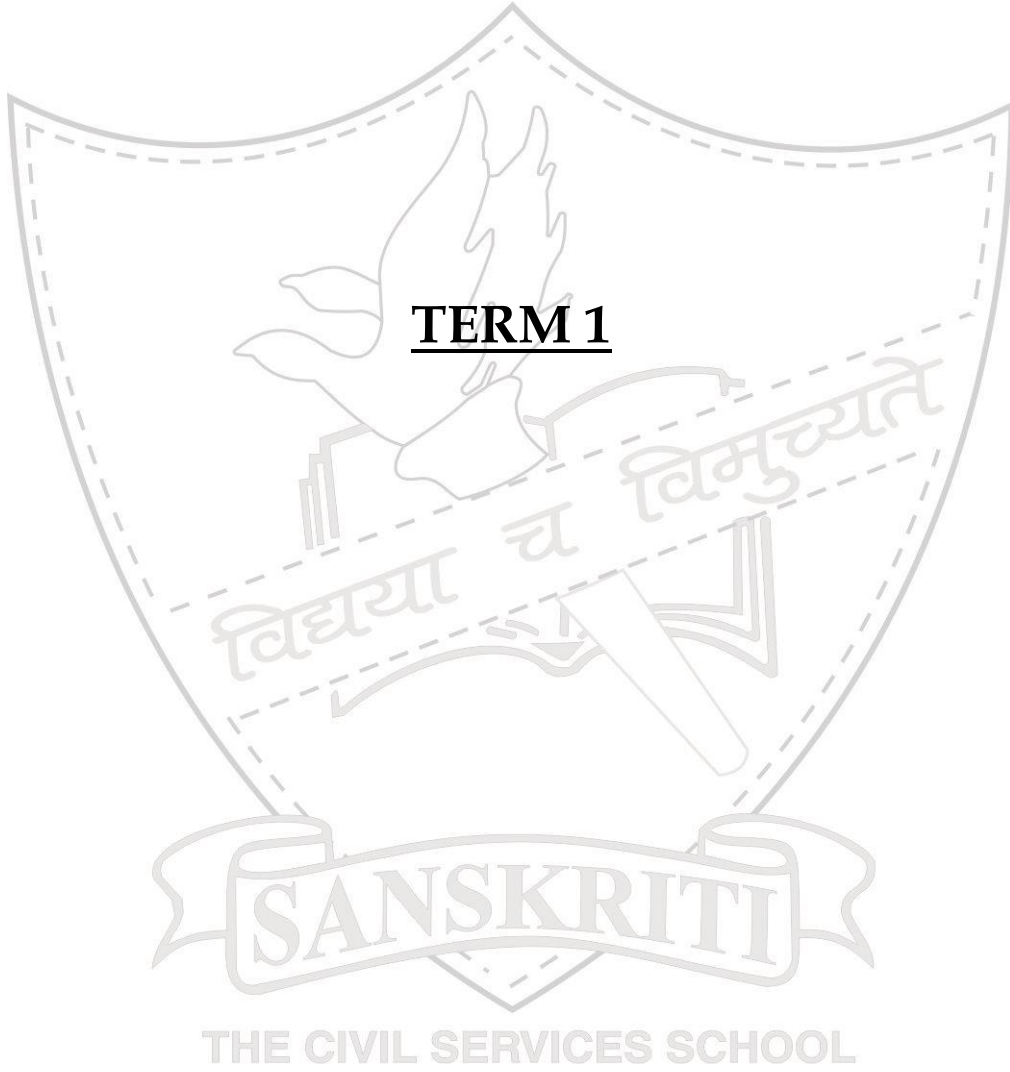
PRACTICALS

TIME: 3 HOURS

MARKS: 30

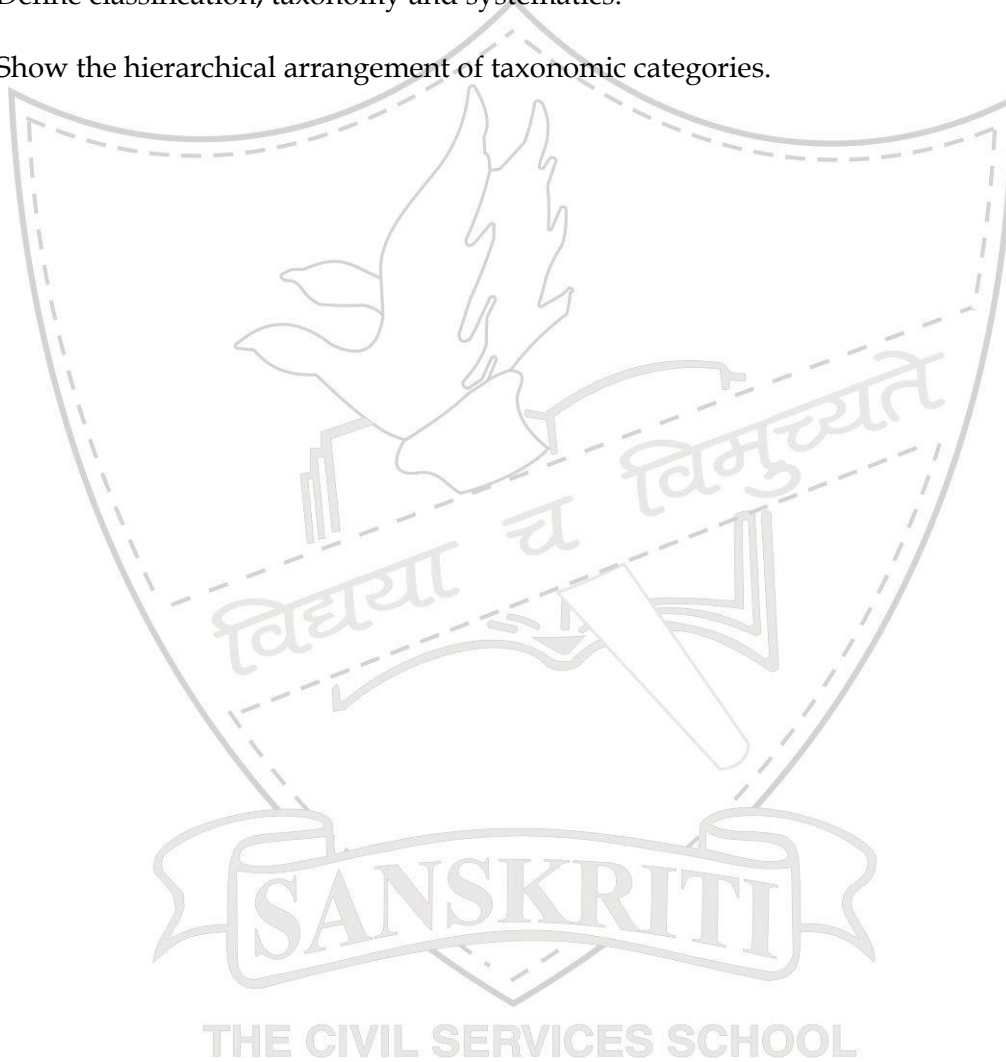
CONTENTS

- 1 EXPERIMENTS AND SPOTTING
- 2 RECORD OF ONE INVESTIGATORY PROJECT AND VIVA BASED ON THE PROJECT
- 3 PRACTICAL FILE RECORD AND VIVA BASED ON EXPERIMENTS



Chapter No. 1
THE LIVING WORLD

1. A crystal increases in size and so does a baby. What is the difference?
2. Differentiate between catabolism and anabolism with examples.
3. Enlist the rules for writing scientific names. Give an example.
4. Define classification, taxonomy and systematics.
5. Show the hierarchical arrangement of taxonomic categories.



Chapter No. 2

BIOLOGICAL CLASSIFICATION

1 mark each

1. Fill in the blanks:

- i) Two or more species occupying the same or overlapping area are _____.
- ii) The microscopic unicellular organisms found in aquatic bodies are _____.
- iii) In Monera the DNA is _____ and _____ histones.
- iv) Most common method of reproduction in prokaryotes is _____.
- v) Phylogeny refers to _____.
- vi) In the 5 kingdom classification, unicellular eukaryotes, primarily aquatic and both autotrophic and heterotrophic are included under _____.
- vii) Slime moulds resemble _____ but are put under kingdom _____.
- viii) The body of fungi is called _____ and is made of _____.
- ix) Binomial nomenclature was first described by _____ and consists of 2 words _____ and _____.
- x) In artificial system of classification organisms are classified on the basis of _____.
- xi) Dinoflagellates belong to kingdom _____. Their mode of reproduction is _____.
- xii) Asexual spores produced at the tip of hyphae exogenously are called _____.
- xiii) Fungi where sexual reproduction is not known is _____.

2) What kind of nutrition do (i) Monera, (ii) Protista, (iii) Fungi show?

3) What is the basis of classification of protozoa?

4) What are Mycorrhiza?

5) What is red tide?

6) What kind of food is stored in Fungi?

7) Give the technical name for the fruiting body of a mushroom.

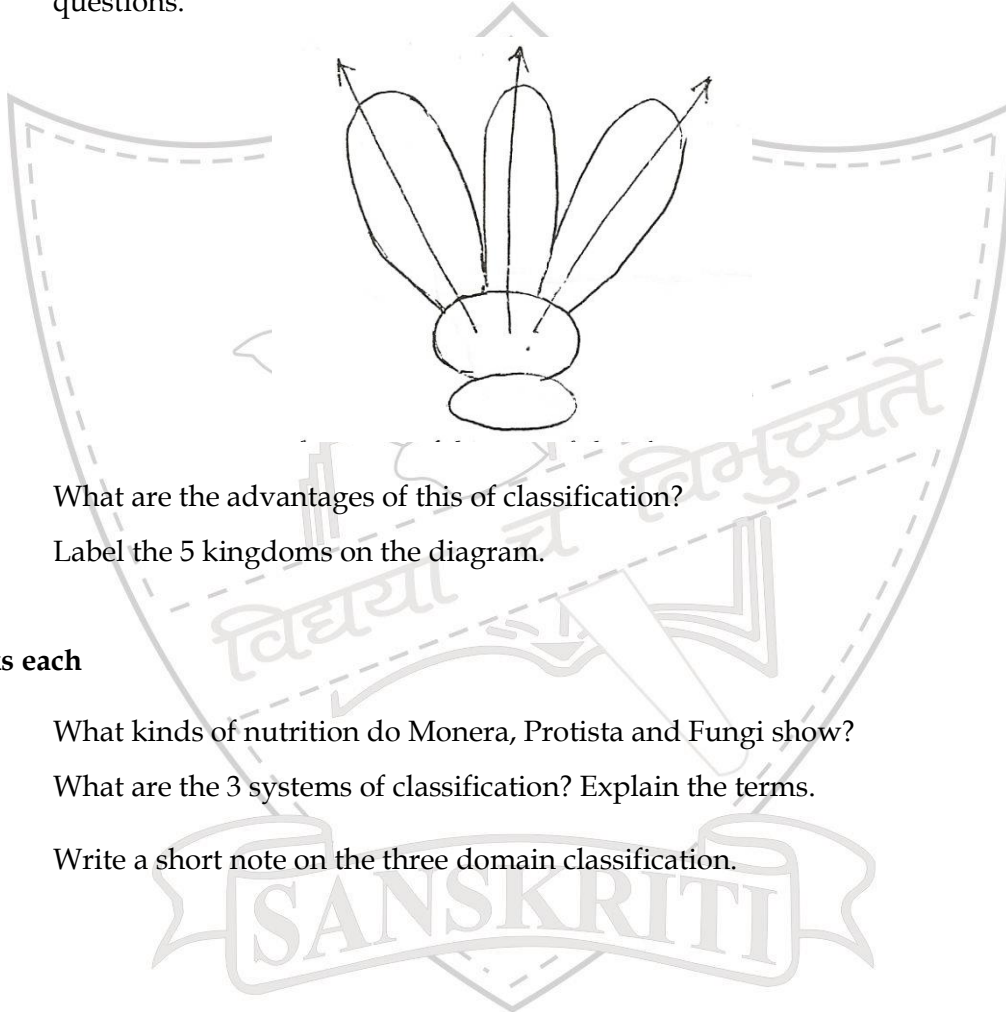
8) In which cells of *Nostoc*, does nitrogen fixation take place?

9) Why are blue green algae included under Monera?

10) In the scientific name *Ficus bengalensis* L, what does 'L' stand for?

2 marks each

- 1) Describe the phylogenetic system of classification How is it different from the artificial system?
- 2) State the importance of mycorrhiza.
- 3) The figure below shows the 5 kingdom classification. Answer the following questions.



- 4) What are the advantages of this of classification?
- 5) Label the 5 kingdoms on the diagram.

3 marks each

- 1) What kinds of nutrition do Monera, Protista and Fungi show?
- 2) What are the 3 systems of classification? Explain the terms.
- 3) Write a short note on the three domain classification.

THE CIVIL SERVICES SCHOOL

Chapter No. 3
PLANT KINGDOM

1 mark each

1) Fill in the blanks:

- i) Dominant generation in Bryophytes is _____ and gametes are produced by _____. meiosis occurs in_____.
- ii) Spore of a fern belongs to _____ generation.
- iii) Gametophytic phase of *Pinus* is restricted to _____ and _____.
- iv) Agar is obtained from_____.

2) Name the amphibians of the plant kingdom. Why are they called so? Which group do kelps belong to? Give one reason why bryophytes cannot grow taller than a few inches?

2 marks each

- i. What does the prothallus look like? What is its significance?
- ii. What kind of photosynthetic pigment is found in red algae and brown algae?
- iii. Distinguish between the gametophyte of a moss and a fern.
- iv. Where does meiosis occur in bryophytes and pteridophytes?
- v. An organism is aquatic, mainly marine with a filamentous form. Their cell wall is covered with algin. Identify the organism. State any 1 economic use of such organisms.
- vi. Where will you find the following:
 - Fucoxanthin,
 - siliceous wall
 - uncovered seeds
 - sori
 - Rhizoids.

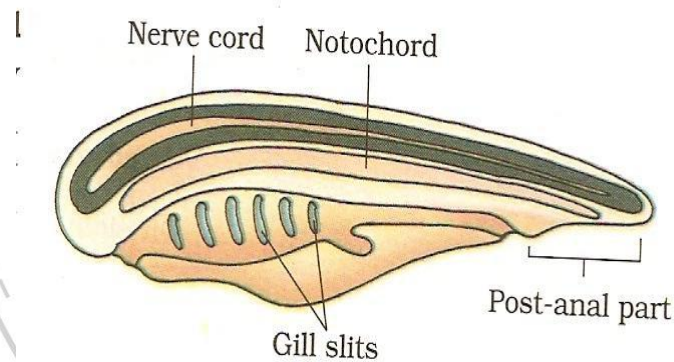
Chapter No. 4
ANIMAL KINGDOM

1 mark each

- 1) Why do Platyhelminths need a flat body?
- 2) Why is octopus included under Mollusca?
- 3) Name the phylum where you will find (i) tube feet, (ii) calcareous shell

2 marks each

- 1) What kind of polymorphism do cnidarians show?
- 2) How have reptiles coped with the dry terrestrial habitat?
- 3) Platypus is an oviparous animal. Justify its classification under Mammalia
- 4)



- a) Classify the above organism according to the labeling given.
- b) Name the organism.
- c) Why are they called protochordates?

3 marks each

1. Define the term 'coelom.' Enlist 3 features that enable the avian organisms to fly giving 2 examples of the group.

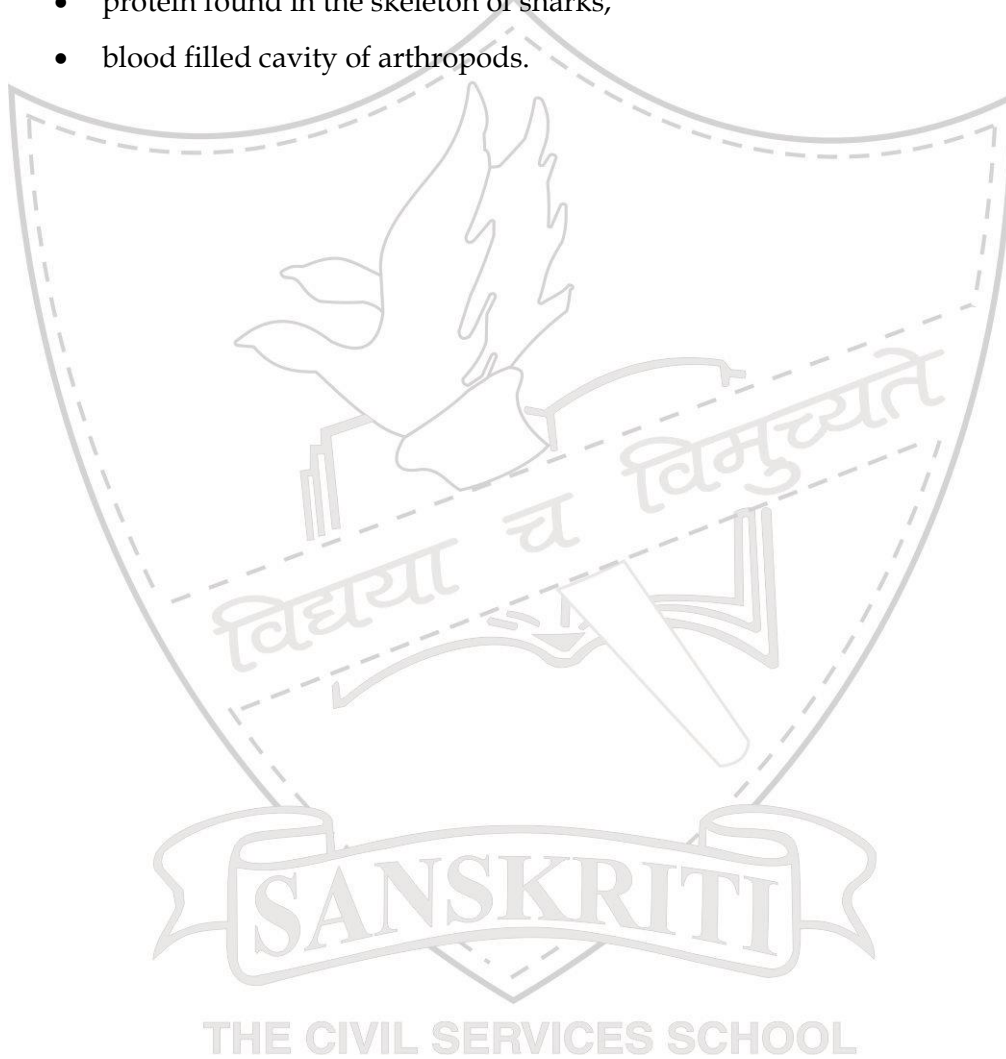
Write an explanatory note on

- (a) tube within a tube plan,
 - (b) cell aggregate plan,
 - (c) blind sac plan.
2. Differentiate between Chondrichthyes and Osteichthyes.
 3. With which animal/ phylum would you associate the following?

Carapace, malpighian tubules, medusa, mantle, flame cells, ossein, hinged calcareous shell.

4. Give scientific terms for the following

- excretory organs of annelids,
- stinging organs of jelly fish,
- free floating forms of cnidaria,
- collection of nerve bodies,
- protein found in the skeleton of sharks,
- blood filled cavity of arthropods.



Chapter 5

MORPHOLOGY OF FLOWERING PLANTS

1 marks each

1. Name 2 plants that produce rhizomes.
Give 2 examples where root system is poorly developed.
2. What are haustoria? Name a plant which has them.
3. What is the difference between tendrils of pumpkin and pea?

2 marks each

1. Differentiate between hypogynous and epigynous flowers
2. Explain : superior ovary, aestivation, diadelphous stamens, axile placentation.
3. Give 2 reasons to justify that onion is a modified stem.
4. Castor is a dicot albuminous seed. Explain.
5. Why apple is called a false fruit but the banana a true fruit?
6. What is the role of the micropyle of a seed?
7. Where do the different parts of a fruit arise from?



Chapter 6

ANATOMY OF FLOWERING PLANTS

1 mark each

- 1) Where is the quiescent center located? Why is it named so?
- 2) What is endarch arrangement? Where will you find it?
- 3) If xylem is called wood, what is phloem called?

2 marks each

- 1) If you get a 4 cm piece of flowering plant, how will you identify anatomically if it is a stem or a root ?
- 2) Why annual rings are better developed in hilly areas than in coastal areas?
- 3) Mention 2 differences between stems of sunflower and maize.
- 4) With reference to a dicot root, answer the following questions:
 - a) Where is the pericycle located?
 - b) How are the xylem vessels arranged?
 - c) What types of cells constitute the cortex?
 - d) What does the pith look like?
- 5) What is another name given to cork cambium? What kind of cells does it give rise to?
- 6) Name the dead elements of the xylem and the phloem.

3 marks each

- 1) Why is the xylem called a complex tissue? Explain the peculiarities of the tissue.
- 2) Describe extra stellar secondary growth in a dicot root.
- 3) Describe stellar secondary growth in a dicot stem.

THE CIVIL SERVICES SCHOOL

Chapter 7

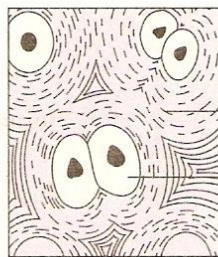
STRUCTURAL ORGANISATION IN ANIMALS

1 mark each

- 1) What do fibroblasts synthesize?
- 2) What are chondriocytes?
- 3) Name the protein found in bone and cartilage.
- 4) Name the most common ion found in blood.
- 5) Where will you find chondrin? Describe the tissue where these proteins are found.
- 6) How is a ligament different from a tendon?
- 7) How do epithelial tissue get their supply of nutrients?
- 8) Where are blood cells produced?

2 marks each

- 1) Enlist the basic characteristics of epithelium and connective tissues.
- 2) Where will you find ciliated epithelium and why?
- 3) State the difference between keratinized and nonkeratinised epithelium, Where are each of them found?
- 4) Name the kind of cells found in connective tissue. State the function of each.
 - (a) Identify the diagram
 - (b) Label the diagram
 - (c) Where will you find this structure in the body?



(a)

3 marks each

- 1) Name the tissue that lines urinary bladder, intestinal mucosa, fallopian tubes. State the importance of the presence of these tissues in these locations.
- 2) Where will you find the following in the body:
Ciliated epithelium, myosin, lacunae, lamellae, ossein, axons

Chapter 8

CELL : THE UNIT OF LIFE

1 mark each

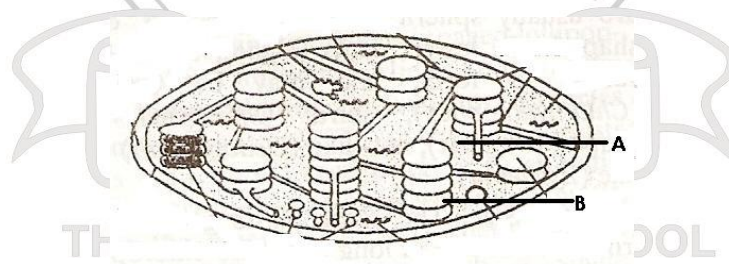
- 1) Name the substance that stabilizes the cell membrane of a eukaryotic cell.
- 2) What kind of ribosomes are found in a prokaryotic cell?
- 3) Name the substance that stabilizes the cell membrane of a prokaryotic cell.

2 marks each

- 1) Why are lysosomes called suicidal vacuoles? What kind of enzymes do they have?
- 2) Describe the genetic organization of a bacterial cell.
- 3) How is a Eukaryotic cell wall different from a prokaryotic cell wall?
- 4) Describe the function of any membrane bound cell organelle.

3 marks each

- 1) How does the fluid mosaic model of a cell membrane explain the following:
 - i. facilitated transport
 - ii. Tissue recognition
 - iii. endocytosis
 - iv. antigenic properties of a tissue
 - v. active transport
- 2) What is euchromatin? Explain the structure of a eukaryotic nucleus
- 3) Observe the given diagram and answer the questions that follow:



- a) Identify the picture shown above.
- b) Label A and B
- c) Give the function of each

5 marks each

- 1) Describe along with labeled illustrations, the Singer Nicholson Model of the cell membrane.

Chapter 10

CELL CYCLE AND CELL DIVISION

1 mark each

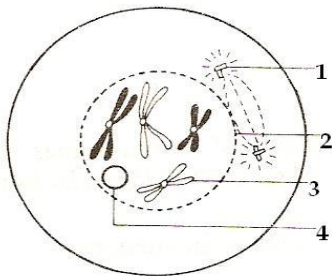
1. In which phase does DNA replication take place?
2. In which phase of cell division are the chromosomes present in the cytoplasm?
3. At which phase do you see sister chromatids during mitosis and meiosis?

2 marks each

1. Enumerate the events that occur during diakinesis. What is the significance of crossing over?
2. What are the events that occur during (a) G₂ phase, (b) S phase.
3. Does interphase take place after meiosis I? Justify.
4. Differentiate between mitotic and meiotic anaphase .

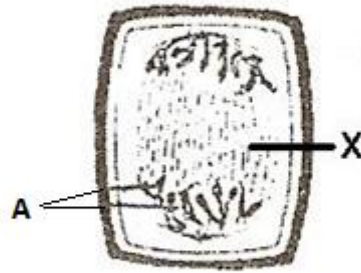
3 marks each

1. Why the interphase is called a period of great activity? State the significance of meiosis.
2. Examine the figure and answer the questions:



- i) Identify the stage.
- ii) Label the diagram.
- iii) What is the importance of '1'?
- iv) What will happen after this phase?

3. Observe the given diagram and answer the questions that follow.



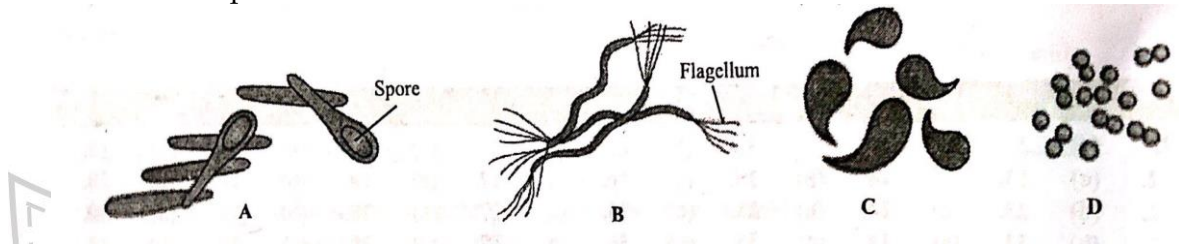
- i) Identify the stage shown in the diagram above.
- ii) How will (X) form in this kind of a cell?
- iii) How will this stage be different from a similar stage in Meiosis I?
- iv) What is the chemical composition of (A)?
- v) Describe briefly, the stage immediately preceding this stage.



TERM 1**MCQ's AND CASE BASED QUESTIONS****I. Choose the correct options of the given MCQ's:**

1.

Bacteria are grouped under four categories according to their shapes. Study the given figures and select the correct option.



- | | A | B | C | D |
|----|----------|----------|----------|----------|
| a) | Cocci | Bacilli | Spirilla | Vibrio |
| b) | Spirilla | Bacilli | Vibrio | Cocci |
| c) | Bacilli | Spirilla | Vibrio | Cocci |
| d) | Bacilli | Spirilla | Cocci | Vibrio |

2. Read the following statements and select the correct option.

Statement A: Viruses are inert crystalline structures outside a living cell.

Statement B: Virioids possess a distinct protein coat.

- Both the statements A and B are correct and A is the reason for B.
- Both the statements A and B are correct and A is not the reason for B.
- Statement A is correct and B is wrong.
- Both Statement A and B are incorrect.

3. Which of the following pigments are found in brown algae?

- Chl a, Chl c
- Chl a, Chl d
- Chl a, Chl c and fucoxanthin
- Chl a and phycoerythrin

4. Protonema is

- Haploid and is found in mosses.
- Diploid and is found in liverworts.
- Diploid and is found in Pteridophytes.
- Haploid and is found in Pteridophytes.

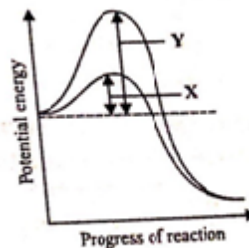
5. In (i) type of inflorescence, main axis terminates in a flower, hence is limited in growth and flowers are borne in (ii) succession.

- | | (i) | (ii) |
|----|----------|-----------|
| a) | Racemose | acropetal |
| b) | Racemose | basipetal |
| c) | Cymose | acropetal |
| d) | Cymose | basipetal |

6. Read the given statements:
- Gynoecium occupies the highest position while the other floral parts are situated below it.
 - Ovary is superior.

Which condition of flowers is being described by the above statements?

- Hypogyny
 - Perigyny
 - Epigyny
 - Both b and c
7. Both apical and intercalary meristems are _____ meristems.
- Primary
 - Secondary
 - Lateral
 - Both b and c
8. Read the following statements and select the correct option.
Statement A: Cardiac muscle of the heart is striated and has intercalated discs between its cells.
Statement B: It provides quick, powerful and rhythmic contractions to the heart.
- Both the statements A and B are correct and B is the reason for A.
 - Both the statements A and B are correct and B is not the reason for A.
 - Statement A is correct and B is wrong.
 - Both Statement A and B are incorrect.
9. What is denoted by X and Y in the given graph?



- | | |
|---|--|
| X | Y |
| a) Activation energy without enzyme | Activation energy with enzyme |
| b) Activation energy with enzyme | Activation energy without enzyme |
| c) Substrate concentration with enzyme | Substrate concentration without enzyme |
| d) Substrate concentration without enzyme | Substrate concentration with enzyme |

- 10 Holoenzyme is the complete enzyme consisting of an apoenzyme and a cofactor. Select the option that correctly identifies the nature of apoenzyme and cofactor.

	Apoenzyme	Cofactor
a)	Protein	Non-Protein
b)	Non-Protein	Protein
c)	Protein	Protein
d)	Non-Protein	Non-Protein

II. CASE BASED QUESTION:

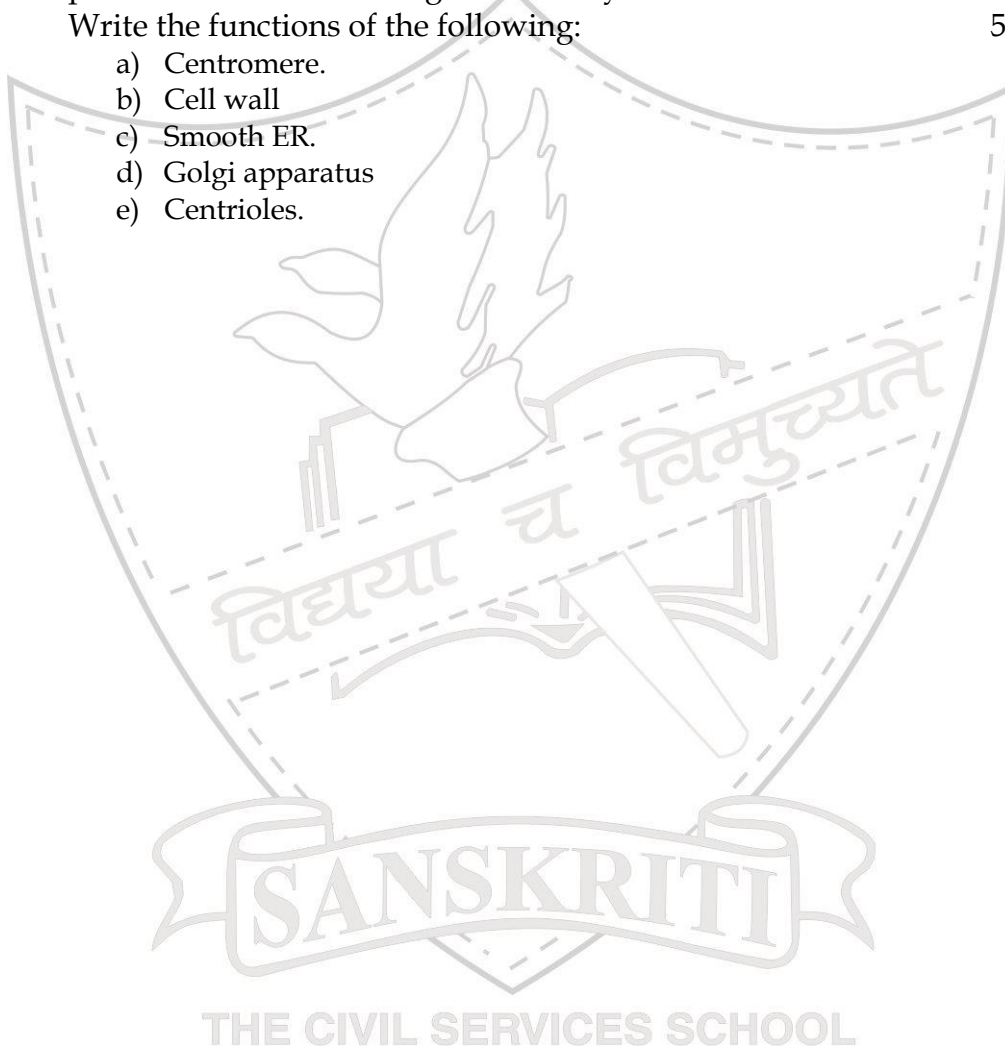
1. A mule is the offspring of a horse and a donkey. A donkey sperm contains 31 chromosomes and a horse egg cell contains 32 chromosomes, so the zygote contains a total of 63 chromosomes. The zygote develops normally. The combined set of chromosomes is not a problem in mitosis, and the mule combines some of the best characteristics of horses and donkeys. However, a mule is sterile; meiosis cannot occur normally in its testes or ovaries.
Explain why mitosis is normal in cells containing both horse and donkey chromosomes but the mixed set of chromosomes interfere with meiosis.
2. Choose from the following cells for the questions that follow:
 - a) Pancreatic cell that secretes digestive enzymes.
 - b) Ovarian cell that produces estrogen (a steroid hormone).
 - c) Muscle cell in the thigh of a long-distance runner.
 - d) White blood cell that engulfs bacteria.
 - i. In which cell would you find the most lysosomes?
 - ii. In which cell would you find the most smooth ER?
 - iii. In which cell would you find the most rough ER?
 - iv. In which cell would you find the most mitochondria?



REVISION ASSIGNMENTTERM 1

- Q1 Name a plant disease caused by a virioids. 1
- Q2 What is meant by:
a) Anthridiophore
b) Archegoniophore 1
- Q3 Write a brief note on the three domain system of classification. 1
- Q4 Give the technical term for the class of fungi commonly called gill-fungi. 1
- Q5 Name one unicellular and one colonial form among green algae. 1
- Q6 What is the significance of vacuole in a plant cell? 1
- Q7 Why 'mitochondria' are called semiautonomous organelles? 1
- Q8 Give one difference between acrocentric and telocentric chromosomes. 1
- Q9 Draw a labelled diagram of cardiac muscle fibres. 2
- Q10 Answer the following with reference to the anatomy of dicot root:
a) Where is pericycle located?
b) How are xylem vessels arranged?
c) What do you call such an arrangement?
d) Which type of cells constitutes the cortex? 2
- Q11 *Brassica campestris* linn. 2
a) Give the common name of the plant.
b) What do the first two parts of the name denote?
c) Why are they written in italics?
d) What is the meaning of linn written at the end of the name?
- Q12 a) Sand dollars, sea cucumbers and sea lilies are representatives of which phylum? What kind of symmetry the adult representatives of this phylum have? 3
b) Name the organs of locomotion in these organisms.
- Q13 Mention two modifications in reptiles required for terrestrial mode of life. 3
- Q14 What is periderm? How does periderm formation take place in dicot stems? 3

- Q15 What is a perianth? What term is given to its constituent members? Give an example. 3
- Q16 a) Draw a well labeled diagram of a cnidoblast. Mention its two functions. 5
b) Write two differences between chlorophyceae and phaeophyceae.
- Q17 What are taxonomical aids? Give the importance of herbaria and museums. How are botanical gardens and zoological parks useful in conserving biodiversity? 5
- Q18 Write the functions of the following: 5
a) Centromere.
b) Cell wall
c) Smooth ER.
d) Golgi apparatus
e) Centrioles.





Chapter 9
BIOMOLECULES

1 mark each

- 1) Name the homopolysaccharide found in an animal cell.
- 2) What are nucleosides?
- 3) Name 2 essential fatty acids.
- 4) What do you mean by anti parallel nature of DNA?
- 5) What kinds of bonds are found in a starch molecule?

2 marks each

- 1) Why does oedema occur in persons suffering from deficiency of protein?
- 2) Name 2 coenzymes derived from vitamins?
- 3) Name 2 non-iron products of the breakdown of hemoglobin.
- 4) Differentiate between coenzyme and cofactor. Describe any 3 factors that affect enzyme activity
- 5) With the help of illustrations describe the secondary structure of proteins.
- 6) What is K_m ? What is its significance?

3 marks each

- 1) Illustrate a glycosidic, a peptide, and a phosphodiester bond.
- 2) With the help of illustrations explain the concept of feedback inhibition of enzymes.
- 3) Enlist 3 factors that affect enzyme activity. Describe how they change enzyme function.
- 4) Why are phospholipids called amphipathic? State the significance of such molecules with respect to biomembranes. State any 1 role of the proteins found in association with biomembranes.
- 5) How are enzymes classified? How do they act as biocatalysts?

5 marks each

- 1) What is a polysaccharide? Describe the levels of organization of protein structure. What is a glycosidic bond? Draw a diagram to show the formation of this bond.

Chapter 11

TRANSPORT IN PLANTS

1 mark each

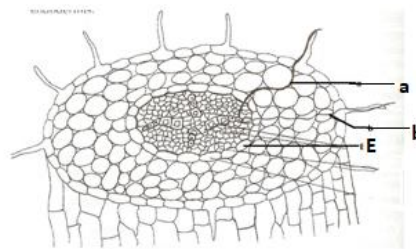
- i) What happens to the plant cell if it is placed in higher water potential?
- ii) A plant cell when kept in a certain solution got plasmolysed. What was the nature of the solution?
- iii) What does capillarity in the xylem depend on?
- iv) What do you understand by the chemical potential of a solute?
- v) What does the water potential of a solution depend on?
- vi) What are the conditions necessary for imbibition to take place?
- vii) What is the peculiarity of the endodermis that it prevents apoplastic pathway of water?

2 marks each

- i) How does the casparian strip affect water movement?
- ii) Under what conditions will water enter a cell?
- iii) What is reverse osmosis? What is its application?
- iv) Name a hormone that acts as an anti transpirant. How does it function?
- v) Why does an increase in internal CO₂ concentration close stomata?
- vi) How does humidity and temperature affect transpiration?
- vii) How is water transported to leaves in trees that are more than 100 m tall?

3 marks each

- i) Explain the role of K⁺ in the opening and closing of stomata.
- ii) Label the pathway (a) and (b), shown in the given diagram?
What happens to (a) pathway when it reaches E? Why does this happen?



Chapter 12
MINERAL NUTRITION

1 mark each

- i) A healthy potted *Nepenthes* when kept in a green house with favorable condition of light, temperature, and soil water, showed poor growth. Though there was no infection. State the possible cause of this problem.
- ii) How will you determine the essentiality of a mineral?
- iii) Some of its leaves in insectivorous plants are modified to _____ for the purpose of _____.
- iv) Why is Mn and Mo required by plants?

2 marks each

- i) How will you make out that a plant is suffering from a deficiency disease? How will you find a cause of this disease?
- ii) How do K^+ ions help in opening of the stomata?
- iii) In root nodules of leguminous plants what is the role of nitrogenase and leghaemoglobin?
- iv) A section of root nodules of a leguminous plant appears pinkish. What is the colour due to? What is the role of this substance?
- v) Give any 1 example of an insectivorous plant. What kind of soil do these plants grow in? How do these plants utilize the insect?

3 mark each.

- 1) Draw the nitrogen cycle and name all the organisms involved at each step.
- 2) Give an account of Biological Nitrogen fixation.
- 3) Describe how ammonia that is formed by nitrogen fixation is used by plants to synthesize amino acids

Chapter 13

PHOTOSYNTHESIS IN HIGHER PLANTS

1 mark each

1. A potted plant kept in sunlight is shifted to monochromatic red light. How will this affect the rate of photosynthesis?
2. What is the difference between chlorophyll a and chlorophyll b?
3. How many molecules of ATP are required for the synthesis of glucose in the C₃, C₄ cycle?
4. Fill in the blanks:
 - a. Enzyme that accepts O₂ during photorespiration _____
 - b. Chlorophyll of mesophyll cells of C₄ plants have a high concentration of _____ enzyme.
 - c. Calvin cycle takes place in _____.
 - d. Noncyclic photophosphorylation needs a constant supply of _____.
 - e. First electron donor in cyclic photophosphorylation is _____.
 - f. First acceptor of CO₂ in C₃ cycle is _____.
 - g. First acceptor of CO₂ in C₄ cycle is _____.
 - h. First product formed in C₄ cycle is _____.
 - i. First product formed in C₃ cycle is _____.
 - j. Pigments of PSI occur in the _____ part of the chloroplasts.
5. Define chemosynthesis. Name a bacteria that is chemosynthetic
6. What is PAR? Give its importance.
7. Mention the conditions under which PSI of the light reaction works.

2 mark each.

1. The photosynthetic lamellae are taken out from a chloroplast and suspended in nutrient medium in presence of light and CO₂. Will they synthesize glucose? Justify.
2. 2 green potted plants were kept inside bell jars. One was kept in sunlight while the other kept in the dark. Which will survive longer? Explain.
3. Why do plants need to reduce photorespiration?
4. Expand PGA, PSI, P700, Rubisco.
5. State the advantages of having more than 1 pigment molecule in the photocentre.

6. Why is photorespiration considered to be a wasteful process as well as a threat?
7. Give any 1 example of an insectivorous plant. What kind of soil do these plants grow in? How do these plants utilize the insect?
8. Mention any 2 functions of carotenoids.

3 marks each

1. What is the significance of photolysis of water in photophosphorylation? What happens to each product of this process?
2. Name the 3 cellular organelles involved in photorespiration. Mentioned the various steps of this pathway.
3. Name the enzyme that catalyzes carboxylation and oxygenation. In which cell organelle is this enzyme found?
4. Describe Kranz anatomy. State its importance.
5. Rubisco acts as a oxygenase as well as carboxylase. Explain both the reactions. Under what conditions does this shift from one role to the other occur?

5 marks each

1. What is photophosphorylation? Where does it take place? With the help of a flow chart only, describe the process occurring when the illumination is equal to 680nm. What are the products of this process?
2. What is photorespiration? Why does it happen? Why is it considered a wasteful process? How do plants overcome these losses?
3. Explain the Z scheme of photosynthesis.



Chapter 14

RESPIRATION IN PLANTS

1 mark each

1. What are the end products of anaerobic respiration in a plant cell and animal cell.
Name the connecting link between glycolysis and TCA cycle.
2. Where is O_2 used in the process of respiration?
3. Where does the ETS operate in the cell?
4. What is the role of the F₀-F₁ particles in respiration?
5. Which intermediate is oxidized during glycolysis to form NADH.H⁺?
6. What is the acceptor molecule in Kreb's cycle?
7. Which is the first product in TCA cycle?
8. ETC acceptors in the mitochondrial membrane are arranged along-----.

2 marks each

1. How is pyruvic acid converted to ethyl alcohol?
2. In mitochondria, name the specific regions responsible for the different steps of respiration.

3 marks each

1. Krebs's cycle is a common metabolic pathway for carbohydrates, fats and proteins.
Explain.
2. Respiration is considered to be an amphibolic pathway. Explain.
3. What is RQ? Derive the RQ value for carbohydrates, fats and proteins.

SANSKRITI
THE CIVIL SERVICES SCHOOL

Chapter 15

PLANT GROWTH AND DEVELOPMENT

1 mark each

1. Growth can be measured by an _____
2. Where are auxins synthesized? _____
3. Function of auxins are _____
4. Natural auxins are _____ and synthetic auxins are _____
5. A bioassay for auxin is _____
6. Define critical period.
7. Cut leaves remain green longer if sprayed with _____
8. Cytokinin was first isolated from _____
9. The pigment that helps in seed germination is _____
10. Hormone responsible for photoperiodism is _____
11. Enlist the conditions for vernalisation.
12. Statoliths are starch grains found in roots. Their movement causes _____
13. Why do the seeds not germinate immediately after they are released from the fruits?
14. How will you artificially ripen raw fruits?

2 marks each

1) Fill in the table:

S.No.	Hormone	Function/application
1	_____	Overcome seed dormancy
2	Ethylene	_____
3	_____	Hormone causing ageing
4	_____	Bolting
5	_____	Used as a weedicide
6	_____	Stress hormone

Chapter 16

DIGESTION AND ABSORPTION

1 mark each

1. State the function of enterokinase.
2. Why is the larynx raised while swallowing food?
3. What is chyme?
4. Name the kind of movement and the muscles involved in sending the food down the gut.
5. What are the three parts of the colon?
6. Name the protein digesting enzymes secreted by the gastric glands.

2 marks each

1. How does the liver serve as a digestive and excretory organ?
2. In what form are enzymes secreted in the gut? Why?
3. What is the site of fat and protein digestion in humans? Name the enzyme that digests fats and protein. Mention the end products of digestion of each.

3 marks each

1. What are chylomicrons? How are they different from micelles? What is their role in fat absorption in the human gut?
2. Give the secretions of stomach and function of each.
3. Give the functions of small intestine and liver.



Chapter 17

BREATHING AND EXCHANGE OF GASES

1 mark each

1. Why does vigorous exercise result in muscular pain?
2. Which is the respiratory center of the brain?
3. It is always advisable to breathe through the nose. Why?
4. How does the pH of blood affect respiration?
5. What prevents the collapse of alveoli and trachea?
6. What prevents the damage of the delicate alveoli from the particulate matter of the air?

2 marks each

1. The process of gas exchange never stops in the lungs. Comment.
2. Explain
 - (a) More O_2 is released from oxyhaemoglobin in a more active tissue than in a less active one.
 - (b) Oxygenation of blood promotes release of CO_2 in the lungs.
3. What are the muscles that are involved in breathing? How do they function?

3 marks each

1. What is the role of carbonic anhydrase? Show by a series of reactions, how carbonic anhydrase starts reaction leading to formation of haemoglobinic acid.
2. Define the terms:
Tidal volume, Respiratory quotient, Vital capacity.

5 marks each

1. How is CO_2 and O_2 carried by blood? What are the factors affecting the O_2 dissociation curve?

Chapter 18

BODY FLUIDS AND CIRCULATION

1 mark each

2. Why is blood group identification not required while transfusing blood?
3. Where does the cardiac impulse originate?
4. Name the membrane that covers the heart.
5. What is the role of the Purkinje fibres?

2 marks each

1. How is the foetus with Rh-positive blood affected if the mother is Rh- negative?
2. Human heart is myogenic. Explain. Name the nerve that can reduce heart rate.
3. What causes the heart sounds?
4. Name the different valves found in the heart. What is the function of these valves?
5. Discuss atherosclerosis and arteriosclerosis as heart circulatory disorders.

3 marks each

1. Name any 6 blood vessels associated with the heart.
2. Which part of the heart is called the pacemaker? Why? Name the disease that occurs due to its failure to function.
3. Plasma contains 3 classes of proteins. What are these? Give their functions.
4. Draw a standard ECG and explain the different segments in it.
5. Explain in detail the cardiac cycle.

SANSKRITI
THE CIVIL SERVICES SCHOOL

Chapter 19

EXCRETORY PRODUCTS AND THEIR ELIMINATION

1 mark each

Fill in the blanks:

1. Bowman's capsule is a part of _____.
2. The liquid collected in the Bowman's capsule is called _____.
3. Reabsorption of water in nephrons is regulated by _____.
4. pH of urine is normally _____.
5. _____ hormone controls the reabsorption of Na^+ in the nephrons.

2 marks each

- 1) What is the blood vessel that
 - (a) is present in the Bowman's capsule
 - (b) Enters and leaves the Bowman's capsule
 - (c) Surrounds the PCT, DCT
 - (d) enters and leaves the kidneys.
- 2) Enlist 3 ways by which animals excrete nitrogenous wastes. Which product requires minimum water for excretion?

3 marks each

- 1) How does the proximal convoluted tubule contribute to homeostasis?
- 2) Give examples of ureotelic, uricotelic and ammonotelic animals.
- 3) What kind of substance are reabsorbed in the ascending limb, descending limb, DCT of the nephron.
- 4) Describe the role of ADH on formation of hypertonic urine.
- 5) What are the factors that favor glomerular filtration?
- 6) Discuss the role of Renin Angiotensin mechanism in osmoregulation.

5 marks each

- 1) Explain the process of urine formation.

Chapter 20

LOCOMOTION AND MOVEMENT

1 mark each

1. What are antagonistic muscles? Give 1 example.
2. Name the tissue that connects muscle to bone and the one which connects muscle to muscle.
3. What are troponin and Tropomyosin?

2 marks each

1. List 4 functions of the skeletal system.
2. The hormones secreted by the posterior pituitary are neurosecretions. Justify.
3. Point out 2 common features in a hinge and ball and socket joint.
4. What is the function of Ca^{++} in muscle contraction?

3 marks each

1. How many pairs of ribs are found in humans? How would you categorize them on the basis of their attachment? Explain.
2. What are the components of Actin and Myosin filaments? Explain the role of each in muscle contraction.
3. Draw a diagram to show the peculiarities of actin and myosin.

5 Marks

1. Describe in detail the sliding filament theory of muscle contraction.



Chapter 21

NEURAL CONTROL AND COORDINATION

1 mark each

1. Name the fluid in which the membranous labyrinth floats.
2. Name the area of the retina that contains only cones and no rods.
3. State the function of the pineal gland.
4. What kind of pigment is found in the rods and the cones?

2 marks each

1. Give 4 examples of reflex actions.
2. Trace the path of the sympathetic nerve fibre as it leaves the ventral root of the spinal cord and reaches the effector organ.
3. Name the space and cavities through which the CSF circulates. List the functions of the CSF.
4. What do you understand by accommodation of the eye?
5. Give the technical terms for the ear ossicles. What is their function?
6. What are layers of the retina?
7. Describe the Organ of Corti.

3 marks each

1. Where are the following located and state their function: hypothalamus, cerebellum, corpus callosum
2. Draw a diagram of the T S of the spinal cord and label afferent nerve, motor nerve, gray matter.

5 marks each

1. What are the events that take place at the point of stimulation of an axon?
2. How does synaptic transmission take place?

Chapter 22

CHEMICAL COORDINATION AND INTEGRATION

1 mark each

1. Name the birth hormone.
2. What do you understand by target organs?
3. Why is Pituitary called the master gland?

2 marks each

1. What causes cretinism? Name any other hormone secreted by the same gland and state its function
2. Give technical terms for anterior and posterior pituitary.
3. Name a few hormones that work synergistically and some that work antagonistically.

3 marks each

1. What hormones are produced when the body's blood glucose level drops below normal? How do these hormones act to return the level to normal?
2. Distinguish between diabetes mellitus and diabetes insipidus. Mention any 1 common symptom of the diseases.
3. What are the 2 forms of thyroxine? Which is more active? Name the amino acid used to prepare thyroxine.
4. Explain how the pituitary and the hypothalamus function as an integrated system.

5 marks each

1. How do protein hormones affect changes in their target organs? Explain with the help of an example. How is it that a few molecules of hormones are able to produce widespread effect in the target organ?
2. Explain in detail the cellular effect of a steroid and non steroid hormone.

TERM2MCQ's AND CASE BASED QUESTIONS**I. Choose the correct options of the given MCQ's:**

1 Match the columns:

Column- I	Column - II
A. Peptic Cells	(i) Mucus
B. Oxyntic Cells	(ii) Alkaline fluid
C. Goblet cells	(iii) Pro-enzymes
	(iv) HCl

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

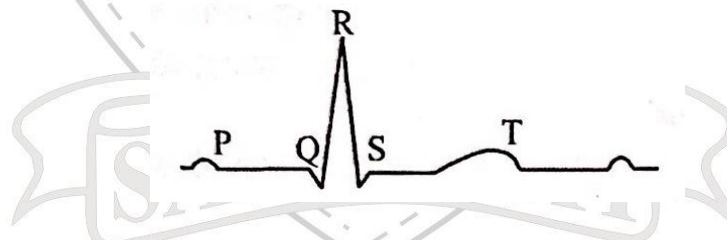
2. Which of the following pairs of food reaches the stomach totally undigested?

- a) Starch and fat
 b) Fat and cellulose
 c) Starch and cellulose
 d) Protein and starch

3. Vital capacity of the lungs is:

- a) IRV+ERV
 b) IRV+ERV+TV-RV
 c) IRV+ERV+TV+RV
 d) IRV+ERV+TV

4. Examine the diagrammatic representation of standard ECG. Select the option with correct matching

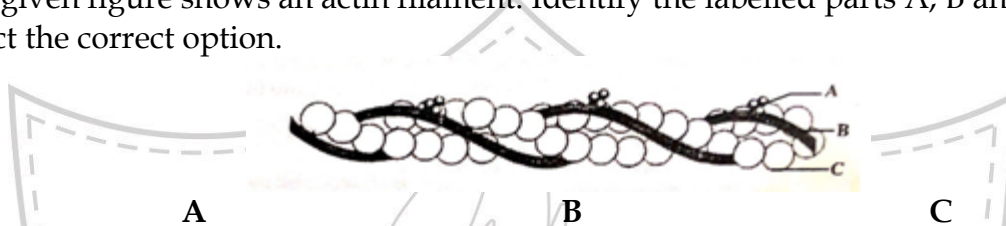
**P-Wave****QRS Complex****T-Wave**

- | | | | |
|----|----------------------------------|----------------------------------|----------------------------------|
| a) | Repolarisation of the atria | Repolarisation of the ventricles | Depolarisation of the atria |
| b) | Depolarisation of the atria | Depolarisation of the ventricles | Repolarisation of the ventricles |
| c) | Repolarisation of the ventricles | Repolarisation of the atria | Depolarisation of the ventricles |
| d) | Depolarisation of the ventricles | Depolarisation of the atria | Repolarisation of the atria |

5. Read the following statements and select the correct option.
 Statement A: the final reabsorption of water from the urine into the blood occurs through the collecting duct of the nephrons to produce hyperosmotic urine.
 Statement B: The loop of Henle creates a sodium gradient in the interstitial fluid.

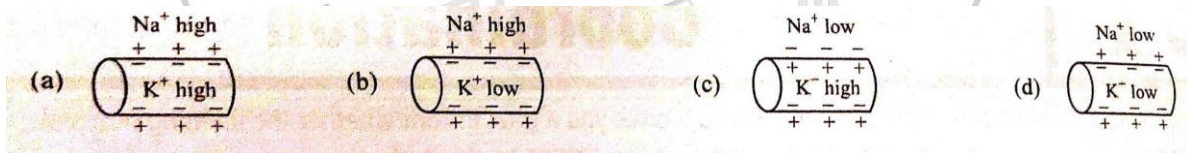
- a) Both the statements A and B are correct and A is the reason for B.
- b) Both the statements A and B are correct and A is not the reason for B.
- c) Statement A is correct and B is wrong.
- d) Both Statement A and B are incorrect.

6. The given figure shows an actin filament. Identify the labelled parts A, B and C and select the correct option.



- | | | | |
|----|-------------|-------------|-------------|
| | A | B | C |
| a) | Tropomyosin | Troponin | F-Actin |
| b) | Troponin | Myosin | Tropomyosin |
| c) | Troponin | Tropomyosin | Myosin |
| d) | Troponin | Tropomyosin | F-Actin |

7. Which of the following options illustrates the distribution of Na and K ions in a section of non-myelinated axon which is at resting potential?

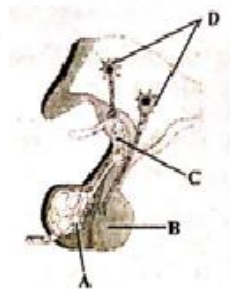


8. Adrenocorticotrophic hormones are secreted by

- a) Thyroid
- b) Adrenal
- c) Pancreas
- d) Anterior pituitary

9. Select the option that correctly identifies the labels A, B, C and D in the given diagram:

THE CIVIL SCHOOL



- | | | | | |
|----|---------------------|---------------------|---------------|----------|
| | A | B | C | D |
| a) | Anterior pituitary | Posterior pituitary | Blood vessels | Thalamus |
| b) | Posterior pituitary | Anterior pituitary | Hypothalamus | Thalamus |

- c) Anterior pituitary Posterior pituitary Portal circulation Hypothalamic neurons
- d) Hypothalamic neurons Posterior pituitary Anterior pituitary Portal circulation

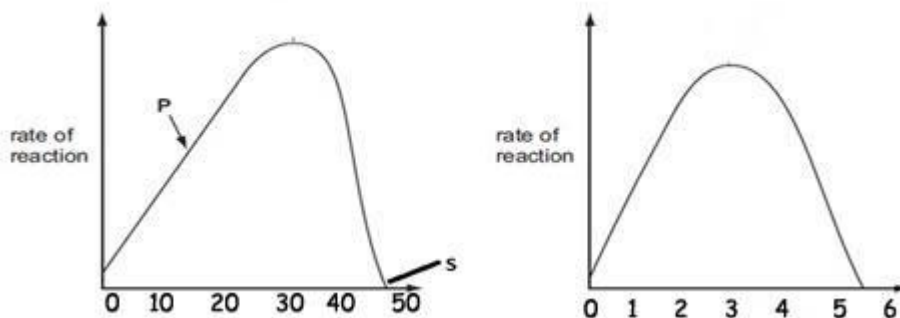
10 In the given figure the durations of the events of the cardiac cycle are given. Identify these events and select the correct option.

	A	B	C
a)	Auricular systole	Joint diastole	Ventricular systole
b)	Ventricular systole	Joint diastole	Auricular systole
c)	Ventricular systole	Auricular systole	Joint diastole
d)	Joint diastole	Auricular systole	Ventricular systole

II. CASE BASED QUESTIONS:

1. The graphs given below show the effect of temperature and pH on enzyme activity. Based on the graph answer the following:

- a) Name the point at which the rate of reaction of the enzyme is increasing steadily. Also mention the value of the temperature at that point.
- b) Name the point at which the enzyme is denatured. Also mention the value of the temperature at that point.
- c) What is the value of pH at which the enzyme shows optimum activity?



2 Fermentation is a metabolic process in which an organism converts a carbohydrate, such as starch or a sugar, into an alcohol or an acid. For example, yeast performs fermentation to obtain energy by converting sugar into alcohol. Bacteria perform fermentation, converting carbohydrates into lactic acid. The study of fermentation is called **zymology**.

Answer the following questions:

- Fermentation is considered as a wasteful process. Justify by giving two reasons.
- What would be the maximum concentration of alcohol in beverages that are naturally fermented? Give reason.
- Name the enzymes used in alcoholic fermentation.

- 3 Figure A shows a photograph of a blood clot taken using an electron microscope.

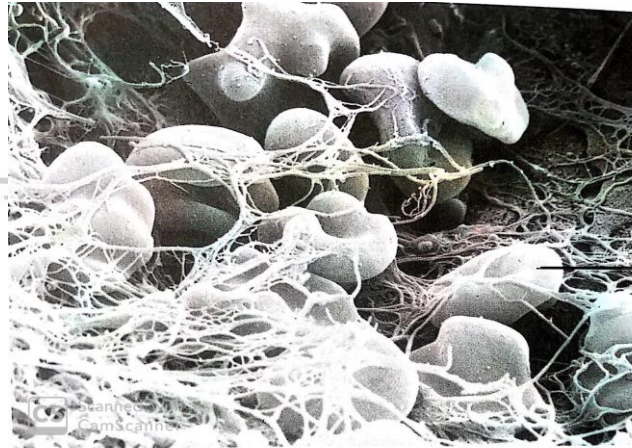


FIGURE A

Long, insoluble threads that are shown in Figure A are formed as the blood clots over a cut in the skin. Figure B shows how these insoluble threads are formed.

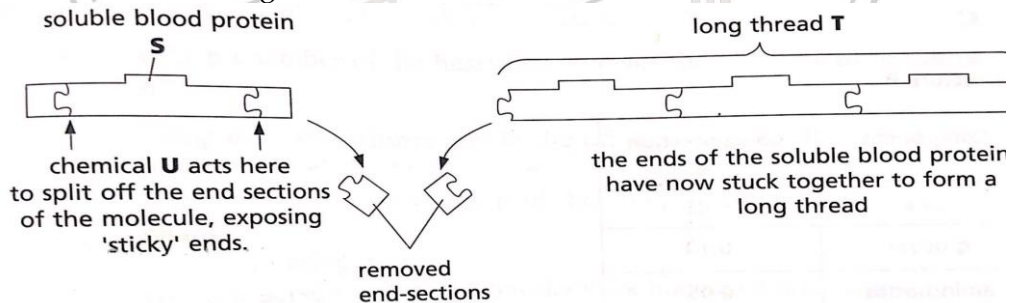


FIGURE B

On the basis of the above given pictures answer the following questions:

- Identify the structure X and give its function.
- Name the soluble protein S and the long insoluble thread T.
- Explain the formation of chemical U to bring about the above mechanism.

REVISION ASSIGNMENTTERM 2

- Q1 Differentiate between fibrous roots and adventitious roots. 1
- Q2 Define solute potential. 1
- Q3 What are histones? Give their function. 1
- Q4 A farmer adds *Azotobacter* culture to soil before sowing maize. Which mineral element is being replenished? 1
- Q5 Name the amino acid whose R- group is 1
 a) Hydrogen
 b) Hydroxy methyl
- Q6 Why are deuteromycetes commonly called imperfect fungi? 2
 Mention two characteristics of mycelium of such fungi.
- Q7 Answer the following with reference to the anatomy of dicot 2
 root:
 e) Where is pericycle located?
 f) How are xylem vessels arranged?
 g) What do you call such an arrangement?
 h) Which type of cells constitutes the cortex?
- Q8 Name the two types of fibres found in connective tissue. Write 2
 their functions.
- Q9 Differentiate between arithmetic and geometric growth rates. 2
- Q10 Mention the two steps in glycolysis where ATP is consumed. 2
- Q11 Explain the mechanisms which aid the opening of stomata. 2
- Q12 In which phase of meiosis are the following formed: 2
 a) Synaptonemal complex.
 b) Recombination nodules.
 c) Terminalisation of chiasmata
 d) Formation of dyad cells.
- Q13 Draw a standard ECG graph and explain it. 2
- Q14 Name the hormones involved in the calcium regulation in the 2
 human body and mention their respective source glands.

- Q15 Diagrammatically show the position of diaphragm and the rib cage during inhalation and exhalation. 2
- Q16 a) Why catecholamines are called emergency hormones? 2
b) What is the role of second messenger in the mechanism of protein hormone action?
- Q17 a) Define biocatalysts. 3
b) How does temperature and substrate concentration affect enzyme activity? Explain.
- Q18 Enumerate the factors which help to decide the essentiality of an element for a plant. 3
- Q19 Explain the regulation of kidney function. 3
- Q20 a) Name the bones of the pectoral girdle. 3
b) Give an example of fibrous joint.
c) What is the role of calcium ions in muscle contraction?
- Q21 a) Differentiate between cyclic and non cyclic photophosphorylation. 5
b) Describe the three phases of Calvin cycle.
- Q22 a) Define respiratory quotient. 5
b) Fermentation is considered to be a hazardous process. Why? Give two reasons.
c) Respiration is considered to be an amphibolic pathway. Support the statement with an example.
- Q23 a) Describe the mechanism of generation and conduction of nerve impulse through a neuron. 5
b) Why is blind spot devoid of vision?
c) Which part of the ear functions to maintain body balance?
- Q24 a) How fatty acids and glycerol are absorbed in spite of being insoluble in blood? 5
b) Draw a well labeled diagram of the T.S. of the human gut.

PROJECT (summer vacation work)

The Biology students are required to submit a research based project report on any one of the following topics. This is a tentative list and the students are free to choose any other topic of their interest.

Please note that the project work is a compulsory part of grade XII practical examination.

New Age diseases

Modern Vaccines

Global food crisis

Lifestyle diseases

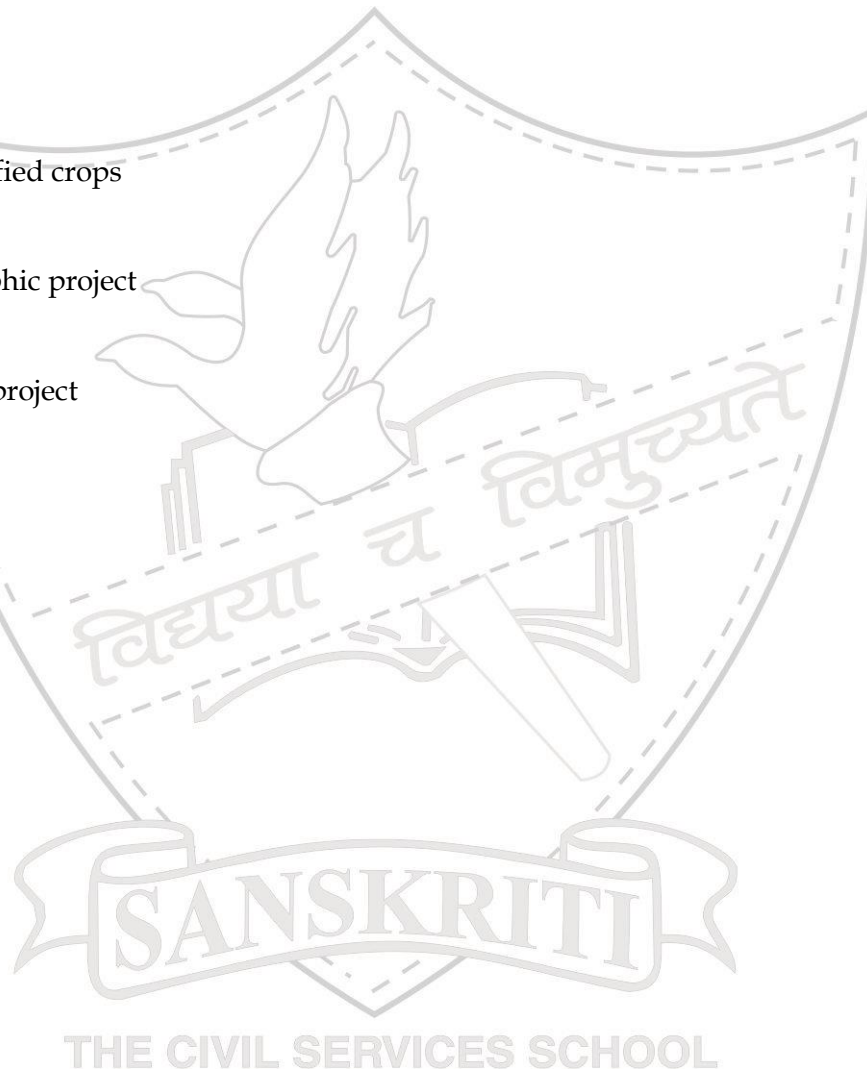
Genetically modified crops

Genetic diseases

Human genographic project

Stem cell therapy

Human genome project



Practice Paper I
Academic Session: 2019-20
First Term Examination
Subject – Biology
M/2/1

Time: 3hours

Max. Marks: 70

General Instructions:

- The Question Paper has 4 sections A, B, C and D.
- Section A has 5 questions of 1 mark each, Section B has 7 questions of 2 marks each, Section C has 12 questions of 3 marks each and Section D has 3 questions of 5 marks.
- The question paper has 3 printed sides and 27 questions.

Section A

- | | | |
|-----|--|---|
| Q1. | Write the full form of ICBN. | 1 |
| Q2. | Name the two components that constitute lichens. | 1 |
| Q3. | Name the phyllotaxy in <i>Calotropis</i> . | 1 |
| Q4. | Name the communication junctions present in cardiac muscles. | 1 |
| Q5. | What are satellite chromosomes? | 1 |

Section B

- | | | |
|------|--|---|
| Q6. | Amoeba multiplies by mitotic cell division. This phenomenon can be called as growth as well as reproduction? Explain. | 2 |
| Q7. | Explain metagenesis. Give one example of an animal which shows metagenesis. | 2 |
| Q8. | Mention the modified functions performed by the following: <ol style="list-style-type: none"> a. Underground stem of ginger. b. Axillary bud of <i>Bougainvillea</i>. | 2 |
| Q9. | Give two differences between spring wood and autumn wood. | 2 |
| Q10. | Answer the following with reference to the anatomy of dicot root: <ol style="list-style-type: none"> a. Where is pericycle located? b. How are xylem vessels arranged? c. What technical term can be given to the above arrangement? d. Which type of cells constitute the cortex? | 2 |
| Q11. | Name the specific tissue that lines the bronchioles. State any one advantage of this tissue being present there. | 2 |

- Q12. Which types of leucoplasts are found in potatoes and mustard seed respectively? What substance do they store in them? 2

Section C

- Q13. Differentiate between Phaeophyceae and Rhodophyceae on the basis of : 3
- Main pigment found.
 - Stored food material.
 - Cell wall composition
- Q14. a. Ascomycetes produce two kinds of spores, namely ascospores and conidia. Give two points each to explain how they are different from each other. 3
- b. Which class of kingdom Fungi is commonly called as 'imperfect fungi'? Give an appropriate reason for your answer.
- Q15. Write a short account on herbarium as a taxonomic aid. 3
- Q16. a. Name the following: 3
- Cells that line the spongocoel of Sponges.
 - Rasping organ found in the mouth of molluscs.
 - Phylum in which animals have a water vascular system.
 - Group in which animals have long ,hollow and pneumatic bones.
- b. Define metamerism.
- Q17. Differentiate between : 3
- Apocarpus and syncarpus ovary
 - Actinomorphic and Zygomorphic flower
 - Racemose and Cymose inflorescence.
- Q18. Explain the activity of cork cambium during secondary growth. 3
- Q19. a. Draw a diagram of a monocotyledonous seed and label the following parts: 3
- Scutellum
 - Endosperm
 - Plumule
 - Coleorhiza.
- b. Give an example of a monocot plant which contain non endospermic seeds.

- Q20. a) Give two differences between the muscles found in biceps and stomach. 3
b) Where are neuroglial cells found? What is their function?
- Q21. Why is mitosis called equational division? Differentiate metaphase of mitosis from metaphase I of meiosis. What is the significance of mitosis? 3
- Q22. a) How are the following components transported across the plasma membrane? 3
i. Neutral solutes.
ii. Polar molecules
b) What is meant by (9+2) organization of axonemal microtubules?
c) Name the protein which makes up the peripheral fibrils of centrosomes.
- Q23. a. Describe the two types of glycocalyx found in bacterial cells. 3
b. What are mesosomes in prokaryotic cells? Give any one function of mesosomes.
- Q24. a. What are plasmids? Describe their role in bacteria. 3
b. State the two postulates of cell theory.

Section D

- Q25. a. Draw a cyclic flowchart to show alteration of generations in Bryophytes. 5
b. Write any two economic importances of bryophytes.
- Q26. a) Draw a neat and a well labelled diagram of T.S. of a monocot leaf. 5
b) What are bulliform cells? How do they help to minimise water loss in plants.
- Q27. Describe the events taking place during prophase I of cell division. Support your answer with appropriate diagrams. 5

Practice Paper II

Academic Session: 2019-2020

Annual Examination

Subject - Biology

M/2/1

Time: 3 Hrs.

Max. Marks: 70

General Instructions:

- There are a total of 27 questions and five sections in the question paper. All questions are compulsory.
- Section A contains question numbers 1 to 5, multiple choice questions of one mark each.
Section B contains question numbers 6 to 12, short answer type I of two marks each.
Section C contains question numbers 13 to 21, short answer type II of three marks each.
Section D contains question numbers 22 to 24 case based short answer type questions of three marks each.
Section E contains question numbers 25 to 27, long answer type questions of five marks each.
- The question paper has 5 printed sides.

Section A

- Methanogens belong to
 - Eubacteria.
 - Archaeobacteria
 - Dinoflagellates
 - Slime moulds.
- Inner surfaces of bronchi and bronchioles are lined by:
 - Cuboidal epithelium
 - Squamous epithelium
 - Ciliated epithelium
 - Columnar epithelium
- Vernalisation promotes flowering by:
 - Low temperature
 - High temperature
 - Prolonged photoperiod
 - Short photoperiod
- Read the following statements and select the correct option.

Statement A: To counteract the increase in turgor pressure in plant cells, the cell wall produces an equal and opposite pressure, called wall pressure.

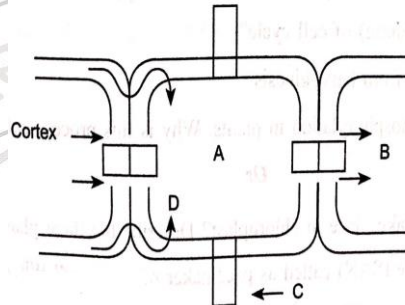
Statement B: When plant cells undergo endosmosis, they swell but do not burst.

- Both the statements A and B are correct and A is the reason for B.
- Statement A is correct and B is wrong.
- Statement A is wrong and B is correct.

- d) Both the statements A and B are correct and A is not the reason for B.
5. Duration of cardiac cycle is:
- 0.6 sec
 - 0.6 min
 - 0.8 sec
 - 0.8 min

Section B

6. Name the gametophytic stage of mosses and Pteridophytes. State one difference between the two mentioned stages.
7. Enlist any four fundamental characteristics possessed by the animals belonging to phylum Chordata.
8. Why are stamens of
- Brinjal called epipetalous,
 - Lily called epiphyllous ?
9. Mention two functions of pericycle in dicot root.
10. Where is the respiratory rhythm centre located in humans? What is its significance in breathing?
- 11.



Observe the diagram given above and answer the following questions:

- Identify C and name the substance it is made of.
 - Name and explain the pathway of water movement represented as D.
12. Diagrammatically explain the histology of alimentary canal.
- ### Section C
13. a) Write any two physiological changes that happen as a response to the secretion of emergency hormones in our body.
b) Diagrammatically explain the mechanism of protein hormone action.
14. Describe the three common steps in the sexual reproduction of fungi.

15. Differentiate between the following:
- Dense regular and dense irregular connective tissues
 - Tendon and ligament
 - Adhering junctions and gap junctions
16. a) Which region of the sarcomere shortens during contraction of a muscle?
b) List the steps involved in the sliding filament theory of muscle contraction.
17. a) Name the two types of nephrons found in the human kidney. Give one difference between them.
b) Urine becomes hypertonic as it flows through the descending limb of the loop of Henle. Justify.
18. Explain the various events which are responsible for developing a proton gradient across the membrane of thylakoid.
19. What is nitrification? Explain with the help of equations and also mention the micro-organisms involved.
20. a) What is plasticity in plants? Give an example to support your answer.
b) Plant growth regulators have innumerable practical applications. Name the PGR you should use to:
- Increase yield of sugarcane.
 - Promote lateral shoot growth.
 - Induce parthenocarpy in tomatoes.
 - Induce seed dormancy.
21. Draw a neat diagram of the fluid mosaic model of the plasma membrane and label the following:
- Component which provides stability to the structure.
 - Component which has a hydrophobic and a hydrophilic end.
 - Component which helps in the transport of molecules across it.
 - Component which helps in cell recognition.

Section D

22. Fermentation is a metabolic process in which an organism converts a carbohydrate, such as starch or a sugar, into an alcohol or an acid. For example, yeast performs fermentation to obtain energy by converting sugar into alcohol. Bacteria perform fermentation, converting carbohydrates into lactic acid. The study of fermentation is called **zymology**. Answer the following questions:
- Fermentation is considered as a wasteful process. Justify by giving two reasons.
 - What would be the maximum concentration of alcohol in beverages that are naturally fermented? Give reason.
 - Name the enzymes used in alcoholic fermentation.

23. Figure A shows a photograph of a blood clot taken using an electron microscope.

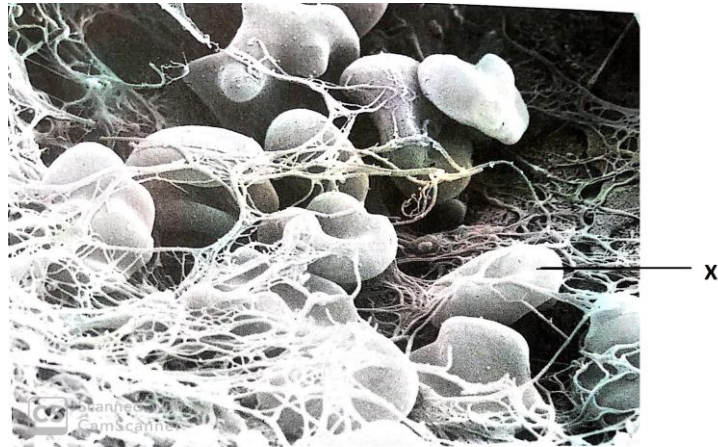


FIGURE A

Long, insoluble threads that are shown in Figure A are formed as the blood clots over a cut in the skin. Figure B shows how these insoluble threads are formed.

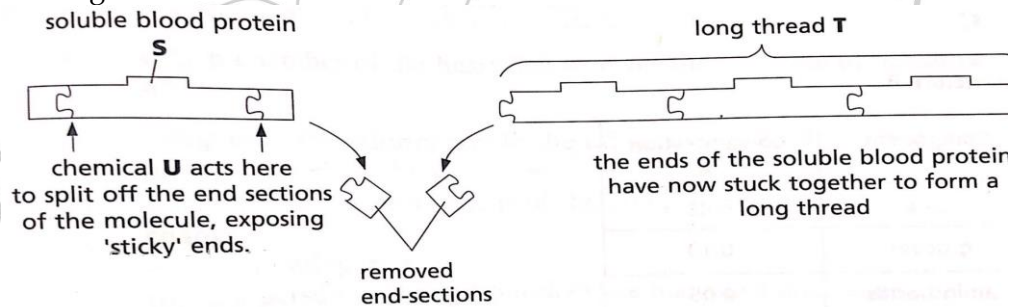


FIGURE B

On the basis of the above given pictures answer the following questions:

- d) Identify the structure X and give its function.
 - e) Name the soluble protein S and the long insoluble thread T.
 - f) Explain the formation of chemical U to bring about the above mechanism.
24. A biologist performed two series of experiments on lactase, the enzyme that hydrolyses lactose to glucose and galactose. First, she made up 10% lactose solutions containing different concentrations of enzyme and measured the rate at which galactose was produced (grams of galactose per minute). Results of these experiments are shown in table A below. In the second series of experiments (Table B) she prepared 2% enzyme solutions containing different concentrations of lactose and again measured the rate of galactose production.

Lactose concentration	10%	10%	10%	10%	10%
Enzyme concentration	0%	1%	2%	4%	8%
Reaction rate	0	25	50	100	200

Lactose concentration	0%	5%	10%	20%	30%
Enzyme concentration	2%	2%	2%	2%	2%
Reaction rate	0	25	50	65	65

Answer the following questions:

- Explain the relationship between the reaction rate and enzyme concentration.
- Explain the relationship between the reaction rate and substrate concentration. Draw a graph to support your explanation.

Section E

- An organism has two pairs of chromosomes (chromosome number = 4). Diagrammatically represent the chromosomal arrangement during different phases of meiosis II.
- Name the first stable compound formed in sugarcane plant during CO₂ fixation.
 - Diagrammatically represent the Hatch and Slack pathway.
- What is meant by reflex arc? Mention the correct sequence of events that happen during a reflex action like knee jerk reflex.
 - What is the composition of photopigments in human eye? How do they help in the mechanism of vision?

