GOVERNMENT CENTENNIAL MODEL SCHOOL BANNU

Chapter # 01 NUTRITION

Class: 9 SLO BASED QUESTIONS SET: 1

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Role of mineral elements in plant life

1. Differentiate between micronutrients and macronutrients
2. How the right food helps in recovery from disease?
3. What is chlorosis
4. In which form animals store their food in the body
5. Discuss the role of Magnesium in plant life

Importance of fertilizers

6. What are fertilizers? What are its main types?
7. What is importance of organic fertilizers
8. What are the environmental hazards of chemical fertilizers?
9. What is the difference between organic and inorganic fertilizers?

Components of human food

10. Name the elements of carbohydrates
11. Write the sources of starch containing food
12. How much kilocalories are present in one gram of carbohydrates?
13. Where is glycogen store in human body
14. What is the composition of amino acid?
15. Write the functions of proteins
16. What are the sources of proteins?
17. What is the composition of fats/lipids?
18. Write the functions of lipids in human body
19. Differentiate between fats and oil
20. What is meant by balance diet
21. Vitamins
22. What are vitamins
23. How many types of vitamins are there?
24. Differentiate between water soluble and fat soluble vitamins
25. What is the other name of vitamin A.?
26. Which disorder is caused by deficiency of vitamin A
27. What are the sources of vitamin A?
28. What is the other name of vitamin C?
29. What is the main function or importance of vitamin C in our body?
30. What are antioxidants. Which vitamin act as antioxidant
31. Which disorder occurs due to deficiency of vitamin C
32. Which vitamin is fat soluble vitamin
33. Which disorder occurs due to deficiency of vitamin D
34. What are the sources of vitamin D?
35. What is the importance of dietary fibers?
36. How much water is required for the body of an adult
37. What is the relation of energy with age?
38. What is the relation of energy with gender?

39. What is the relation of energy with activity?
40. Define malnutrition.
41. What are the good sources of proteins?
42. Define rickets
43. What are dietary fibers
44. Write the types of dietary fibers
45. Write the functions of dietary fibers
46. How dietary fibers controls cholesterol level

Protein energy malnutrition

47. What is Marasmus
48. What is Kwashiorkor
49. Differentiate between Marasmus and Kwashiorkor
50. How will you explain mineral deficiency disease?
51. What is osteoporosis
52. How will you define anemia?

Human digestive system

53. Name the largest organ of human digestive system
54. Differentiate between chemical and mechanical digestion
55. How chewing important for digestion
56. What is meant by assimilation
57. What is meant by egestion
58. Which enzymes are present in the saliva of humans
59. What is the composition of saliva?
60. Draw a neat and labeled diagram of buccal cavity
61. What is role of tongue is swallowing the food
62. Which type of enzymes are secreted by stomach
63. What is meant by heart burning
64. Why stomach is not affected by HCL produced in it
65. What is the role of pancreas in digestion?
66. Which enzymes are secreted by pancreas
67. Which enzymes are secreted by liver
68. What is the role of gall bladder?
69. Distinguish between carbohydrates and proteins
70. Write two function of stomach
71. What do you think that the cause of famine?
72. What role is played by liver
73. What would happen if pancreatic juice didn't reach duodenum?
74. Name the three parts of colon
75. What is the function of appendix?
76. Draw a neat and labeled diagram of human digestive system

Disorders of gut

77. Why routine use of laxative medicine is discouraged
78. Define constipation
79. What are the causes of constipation?

Ulcer

80. What is the cause of ulcer?
81. Write the treatment of ulcer

Diarrhea

82. Which pathogen causes the diarrhea
83. What is the causative agent of diarrhea?
84. Why you cannot breathe while you are swallowing

Chapter: 2 "Solving a Biological Problem"

Class: 9 **SET: 1**

Topic: Biological Method

1. What is biological method? Enlist the different steps of biological method in correct sequence.
2. Define observation and its types with suitable examples.
3. What is hypothesis?
4. Write at least four characteristics of good hypothesis.
5. What is control group? How is it important for scientific study?
6. At what stage of scientific method hypothesis is accepted or rejected?
7. Differentiate between inductive and deductive reasoning.
8. Farina wanted to investigate how the amount of sunlight affects the growth of a plant. She hypothesized "**that plants receiving more sunlight will grow taller than those receiving less sunlight".**
   To test her hypothesis, she set up an experiment with two groups of identical plants. **Group A** received 5 hours of sunlight each day, while **Group B** received only 2 hours of sunlight daily. The plants were watered and cared for equally. After two weeks, Farina measured the height of each plant. What are the independent and dependent variables in Sarah's experiment? Justify your answer in two lines.

a. Independent variable: The height of the plants; Dependent variable: The amount of sunlight
b. Independent variable: The amount of sunlight; Dependent variable: The height of the plants
c. Independent variable: The growth of the plants; Dependent variable: The amount of sunlight.
d. Independent variable: The amount of water; Dependent variable: The height of the plants

9. Discuss biological method of study and explain its application by the help of suitable example.
10. What is scientific method? Describe different steps involve in scientific method.
11. Write a detail note of the steps of scientific method also give example of each step.

Topic: Biological problem 1 what is the cause of Malaria

12. Define observation. Write any three observations of physicians of ancient time about the malaria.
13. "Plasmodium is the cause of malaria" write down the deduction of mentioned hypothesis.
14. Explain how scientists use biological method to solve the biological problem 1 (What is the cause of Malaria?

Topic: Biological problem 2. How plasmodium is transmitted to humans

15. Proved the hypothesis "Mosquitoes involve in spread of malaria" by Ronald Ross's experiment.
16. Describe the steps involved in biological method such as, Recognition of a Biological problem, Observation, building a hypothesis, drawing deduction, advising experiment by using malaria as an example.

Topic: Theory, Law and principles, data organization and data analysis, Mathematics as an integral part of scientific method.

17. What is law?
18. Define theory and principle.
19. How data organization and data analysis is important for scientific study?
20. Define ratio and proportion. How it is important for scientific study give example.
21. If a biologist wants to know how many sparrows would be infected with malaria if he allows Culex mosquito to bite 50 sparrows. Previous findings already explained that 6 out of 10 sparrows get malaria if bitten by Culex mosquito.
22. Explain how mathematics is considered to be the integral part of scientific method?
23. Describe the use of ratio and proportion in solving biological problems.
24. Explain the importance of data organization and data Analysis for confirming, modifying or rejecting the hypothesis.
25. Justify mathematics as an integral part of Scientific process

UNIT 3 BIODIVERSITY

Class: 9th **SET: 1**

BIOIVERSITY AND ITS IMPORTANCE

1.How many kinds of organisms inhabit the earth?

(a) 10 million (b) 15 million (c) 20 million (d) 25 million

2.The plants present in a particular region:

(b) Flora (b) Fauna
(c) Species (d) Population

3.The animals present in a particular region:

(c) Flora (b) Fauna
(c) Species (d) Both a and b

4.Biodiversity found on earth today is the result of how many years of evolution?

(d) 3 billion (b) 4 billion
(c) 5 billion (d) 6 billion

1. Define biodiversity and write derivation of word biodiversity
2. Write the biodiversity of Pakistan
3. How biodiversity is distributed in world.
4. What are the factors which effect the distribution of biodiversity?
5. Distinguish the term variety among the species and within species with suitable example
6. Which regions of world has richest and lowest biodiversity, why?
7. How biodiversity is important for human in food and health field.
8. Write few the industrial importance of biodiversity
9. Write the role of biodiversity in ecosystem

CLASSIFICATION AND HIERARCHY OF TAXANOMY

5.The branch of Biology which deals with classification and traces the evolutionary history of organisms:

(a) Taxonomy (b) Systematics
(c) Histology (d) Entomology

6.A class is a group of related:

(e) Phylum (b) Order
(c) Family (d) Genus

7.A related group of genera comprises:

(f) Phylum (b) Class
(c) Family (d) Order

8.A genus is a group of related:

(g) Class (b) Family
(c) Order (d) Species

9.A family is a group of related:

(h) Genera(b) Orders
(c) Species (d) Classes

10. A group of related species is:

(a) Kingdom (b) Phylum (c) Genus (d) Order

11. The order of pea plant:

(a) Pisum (b) Fables
(c) Magnoliophyte (d) Fabaceae

12. The family of human being:

Chordata Mammalia Primates Hominidae

13. The order of human according to classification is:

(a) Mammalia (b) Primates (c) Homonidae (d) Pisum

14. The basic unit of classification:
(a) Order (b) Family
(c) Genus (d) Species

10. Define the term classification
11. Write few basis of classification.
12. Modern classification based on which characteristic? list few characteristics
13. Write at least four aims of classification.
14. How understanding of classification is important for scientist?
15. Write few principles of classification.
16. How anatomical features and evolutionary history is helpful in classification?
17. What is taxon? How taxon is arranged.
18. Explain hierarchy of taxonomy.
19. Define species, taxon and genus with example
20. Distinguish the following term with example
    a. specie and genus
    b. family and genus
    c. class and family
21. Write principle, aims importance of classification system.

STATUS OF VIRUS

15. Viruses belong to kingdom:
(a) Monera (b) Protista
(c) Fungi (d) None of these
16. Which organisms are composed of only proteins?
(j) Prions (b) Viroid
(c) Fungi (d) Algae
17. Which of these is acellular particle?
(k) Human (b) Bacteria (c) Fungi (d) Virus
18. The organisms that are composed of circular RNA only?
(l) Prions (b) Viroid (c) Fungi (d) Algae

22. Can you distinguish between the following?
    A. Plant and fungi b. Bacteria and protist. C. Plant and animal.
23. Why viruses are regarded as acellular.
24. What are prions, viroid's, what type of organization they represent
25. Why the virus is regarded as the borderline between living and non-living organisms.
26. What is status of virus in five Kingdom system.
27. Write short note on virus structure.

BINOMIAL NOMENCLATURE

28. What is binomial nomenclature. Give its importance
29. Write the rules for writing binomial Nomenclature

30. Write scientific classification of human.
31. Write the scientific name of the following
cat , lion, tiger, dog, mustard plant

HISTORY OF CLASSIFICATION

19.Who introduced the system of classification of organisms for the first time?
(a) Ernst Hackle (b) Aristotle
(c) Carolus Linnaeus (d) Robert Whittaker
20.The smallest taxon of taxonomy is:
(b) Family (b) Order
(c) Species (d) Kingdom
21.The cross between a male donkey and a female horse produces:
(c) Mule (b) Pony
(c) Liger (d) Tiger
22.The animal unable to reproduce is:
(d) Monkey (b) Mule
(c) Horse (d) Donkey
23.Who proposed three kingdom classification system?
(e) E-Chatton (b) Robert Whittaker
(c) Ernst Hackle (d) Margulies
24. Which organism is included in kingdom monera?
(i) Cyanobacteria (b) Algae (c) Fungi (d) Virus
25.According to Biologists, the protists are the ancestors of:
(a) Plantae (b) Fungi
(c) Animalia (d) All of these
26.Kingdom Protista includes:
(a) Eukaryotic unicellular (b) Simple multicellular
(c) Eukaryotic multicellular (d) Both a and b
27. Nuclear envelope is absent in:
(a) Monera (b) Protista
(c) Fungi (d) Plantae

32. Write the characteristics of kingdom plantae and Animalia
33. Ex What are the limitations or draw Backs of two Kingdom system
34. Explain five Kingdom system and two Kingdom system
35. Distinguish between two and five Kingdom system of classification.
36. Write a note on two kingdom system of classification
37. Write the modification done by Margulies and Schwartz in five kingdom

Conservation of biodiversity

28.A species that no longer lives in an ecosystem is called:
(m) Endangered species (b) Global ecosystem
(c) Extinct species (d) Population
29.The greatest cause of species extinction is
(n) Hunting (b) Species introduction (c) Habitat destruction (d) None of these

30. The greatest threat to biodiversity on earth today:

a. Species introduction (b) Pollution
(c) Habitat Loss (d) Hunting
(d) Euglena

38. Why should we be concerned with preserving biodiversity?
39. Write note on conservation of biodiversity in Pakistan also mention the steps taken in Pakistan to conserve biodiversity.
40. How deforestation leads to desertification
41. Write any five endangered species of Pakistan.
42. How over hunting destroy biodiversity
43. How deforestation leads to desertification
44. What are the major issues in Pakistan in conservation of biodiversity?

Chapter: 4 Cells and Tissues

Class: 9 **SET: 2**

Topic: Microscopy

1. Define microscopy, magnification and resolution.
2. Differentiate between light microscope and electron microscope in terms of
   i Radiation Type ii. Lenses iii. Magnification iv. Image type.
3. Write distinguishing features of Transmission Electron Microscope and Scanning Electron Microscope.
4. Write the contribution of Zacharias Janssen and Anton van Leeuwenhoek in microscopy.

Topic: Emergence of Cell Theory

5. What are the contributions of Rudolf Virchow and Louis Pasteur in the emergence of cell theory?
6. What are the contributions of Schleiden and Schwann in emergence of cell theory?
7. What is cell theory? Write its main postulates.
8. What are acellular structures. What are virus, prions and viroid made up of?
9. Draw neat and labelled diagram of plant and animal cell.

Topic: Cell Wall

10. Differentiate between the chemical composition of cell wall of:
    i. Prokaryotes ii. Protista iii. Fungi and iv. Plantae.
11. What are the components of a cell wall? How does composition of cell wall vary in different organisms?

12. Distinguish between primary and secondary cell wall.
13. Write down the functions of cell wall in reference to i. Shape ii. Protection iii. Rigidity iv. Support.
14. Write a detailed note on cell wall with respect to its location, chemical composition, layers and functions.

Topics: Cell Membrane and Cytoplasm

15. Why is plasma membrane described as proteins in a sea of lipids?
16. Explain the structure of cell membrane with the help of a diagram.
17. What is the function of cholesterol in cell membrane?
18. What is meant by plasma membrane as semi-permeable membrane?
19. What are the functions of plasma membrane?
20. Draw a neat and labelled diagram of cell membrane.
21. What is the location of cell membrane in different types of cells?
22. What are glycolipids and glycoproteins?
23. Differentiate between cytosol and cytogel.
24. Explain the structure and Function of plasma membrane in detail.
25. Explain Fluid Mosaic Model with the help of a diagram.
26. Write a detailed note on cytoplasm.

Topic: Endoplasmic Reticulum

27. What is endoplasmic reticulum? What are its types?
28. Differentiate between smooth and rough endoplasmic reticulum?
29. Which organelle is involved in the synthesis of proteins, lipids and carbohydrates?
30. Which organelle consists of channels of membranes serving as transport system?
31. Draw a neat and labelled diagram of endoplasmic reticulum.
32. What are cisternae?
33. Write a detailed account on discovery, structure, types and functions of endoplasmic reticulum. Also draw its neat and labelled diagram.

Topic: Golgi Apparatus and Mitochondria

34. Why is mitochondria known as power house of the cell?
35. How is energy produced in prokaryotes?
36. What is the function of cristae in mitochondria?
37. Draw a neat and labelled diagram of mitochondria.
38. Which type of cells have more number of mitochondria?
39. Why do more active cells have more number of mitochondria as compared to less active cell?
40. What are dictiyosomes?
41. What are Golgi vesicles?
42. Draw a neat and labelled diagram of Golgi apparatus.
43. What is the function of Golgi apparatus?
44. Describe the structure and function of Golgi Apparatus in detail.
45. Give a detailed account of mitochondria in terms of

i. Discovery ii. Occurrence iii. Structure iv. Number and v. Function. Draw diagram also.

Topic: Ribosomes

46. Define ribosomes.
47. Why are ribosomes present in both prokaryotic and eukaryotic cell?
48. Where are ribosomes found?
49. What is the difference between prokaryotic and eukaryotic ribosomes?
50. What is the function of ribosomes?
51. Explain ribosomes in term of i. Definition ii. Occurrence iii. Structure iv. Location and v. Function

Topic: Plastids

52. How do certain plant structures contribute to the vibrant colors we observe in fruits and flowers?
53. What organelles play a crucial role in the process of photosynthesis and the conversion of sunlight into energy in plants?
54. Can you explain the role of specific cellular structures in storing and synthesizing various compounds within plant cells?
55. How do certain plant organelles contribute to the ripening process of fruits and the breakdown of starches into sugars?
56. Can you describe the functions of specialized cell structures involved in the synthesis and storage of lipids and oils in plants?
57. What cellular components are responsible for the storage of starches and carbohydrates in plant cells?
58. How do plants utilize specific organelles to convert absorbed light energy into chemical energy in the form of sugars and carbohydrates?
59. Which organelle is responsible for food storage in plants? Where are they found?
60. Which organelles are responsible for various colors of different parts of plants?
61. Which organelle is related to food synthesis in plants?
62. Draw a neat and labelled diagram of chloroplast.
63. What is chlorophyll? Where is it found?
64. How photosynthetic prokaryotes undergo photosynthesis?
65. Which structure in prokaryotes is responsible for photosynthesis?
66. Write the structure and function of chloroplast. Also draw its neat and labelled diagram.
67. Explain chloroplast in terms of occurrence, structure and functions.

Topic: Centriole and Cytoskeleton

Differentiate between microfilaments and microtubules.

68. What is cytoskeleton? Briefly explain its three types of filaments.
69. Which organelle is considered as the structural frame work of a cell?

70. Write down the functions of cytoskeleton in terms of:
    i. Mechanical Support ii. Shape maintenance iii. Cell motility iv. Aid in Cytokinesis
71. What is centrosome?
72. In unicellular organisms how microtubules help in locomotion?
73. Write a detailed note on centriole. Also draw the diagram.
74. Write a detailed note on cytoskeleton.

Topic: Nucleus

75. Distinguish between chromosomes and chromatin.
76. Why is nucleus called the control center of the cell?
77. What makes the prokaryotic cell different from eukaryotic cell?
78. Where does the heredity material of prokaryotes and eukaryotes lie?
79. What is the role of nucleolus?
80. Draw a neat and labelled diagram of the nucleus.
81. Write the structure of nucleus in reference to the following components:
    i. Nuclear envelop ii. Nucleoplasm iii. Nucleolus and iv. Chromosomes
82. What in nuclear envelop? Write its function.
83. Differentiate between prokaryotic and eukaryotic cell with respect to:
    i. Nucleus ii. Ribosomes iii. Cell Wall and iv. Examples
84. Give a detailed description of nucleus in terms of:
    i. Definition ii. Occurrence iii. Location iv. Structure and v. Function

Topic: Lysosomes

85. Which organelle is known as suicidal bags or garbage disposal of the cell?
86. Which organelle is involved in destroying the invading microorganisms?
87. Which organelle of animal cell involve in breakdown of material? and how does it works?
88. Which Organelle contain strong digestive enzymes?
89. Why are lysosomes found in animal cell only?
90. What are the functions of lysosomes?
91. Write down the i. Discovery ii. Presence iii. Structure and iv. Function of lysosomes. Also draw its diagram.

Topic: Vacuole and Turgor

92. Name the largest and single membrane bounded organelle of plant cell? How does it work?
93. What is tonoplast?
94. In plant cell which organelle is responsible for playing significant role in breakdown of material as lysosomes in animal cell?
95. Define vacuole. What are the types of vacuoles?

96. Which organelle is responsible for the turgidity of a plant cell?
97. What do you know about contractile vacuole?
98. Which cells in plant lack vacuole?
99. What is a vacuole chemically composed?

Discuss the following aspects of vacuole: i. Definition ii. Presence iii. iv. Chemical composition and function.

100. What is turgor? Write its importance.

Topic: Diffusion, Osmosis & Plasmolysis

101. What type of molecules can traverse cell membrane without expenditure of energy?
102. Which process is responsible for the passage of molecules assisted by certain proteins?
103. Explain diffusion as passive transport.
104. Define and explain osmosis.
105. What happens to plant cell when it is placed in hypertonic solution?
106. How is plant cell affected by placing in hypotonic, hypertonic and isotonic solution?
107. Why plant cell becomes flaccid when placed in isotonic solution?
108. What is meant by concentration gradient?
109. What is the role of cell wall in keeping plant cell turgid?
110. How does turgor pressure develop in a plant cell?
111. Differentiate between plasmolysis and deplasmolysis.

Topic: Active Transport; Exocytosis and Endocytosis + Cells and Their Specificity

112. Which process requires energy for the transport of molecules?
113. By which process glucose is transported from small intestine to blood?
114. How conduction of nerve impulse is an example of active transport?
115. Differentiate between exocytosis and endocytosis.
116. Give a diagrammatic representation of exocytosis and endocytosis.
117. What is the importance of exocytosis?
118. How is endocytosis important?
119. Define endocytosis. Write its types.
120. Why are root hair cells adapted to absorption of water?
121. Why are RBCs disc like and biconcave in shape?
122. Define filtration.
123. Root hairs are adapted to absorption and xylem to support. Relate their structure to their function.
124. Write the function of: i. Nerve cells ii. Mesophyll cells iii. Bone cells iv. Muscle cells v. Blood cells

Topic: Plant Tissue

125. Define meristem. What are their types?
126. Differentiate between primary and secondary growth.
127. What is cuticle?
128. How epidermis helps in gaseous exchange?
129. Write some distinguishing features of cells of epidermal tissue.
130. Write down the characteristics of parenchyma cells.
131. What is the function of parenchyma tissue?
132. Which tissue is responsible for mechanical support in plant? Briefly write its types.
133. Compare xylem tissue with phloem tissue.
134. What are vascular tissue? Write their types.
135. Which tissue is responsible for the transport of water in plant and what type of cells does it consist of?
136. What are characteristics of sieve tube cells?
137. How meristematic tissue differ from permanent tissue?
138. Discuss different types of tissue found in plants. Elaborate your answer with relevant diagrams.
139. Differentiate between simple and compound tissue.

Topic: Animal Tissue

140. Which tissue separates the body from outside world?
141. Briefly describe the given types of connective tissue: i. Loose connective tissue ii. Fibrous connective tissue iii. Adipose tissue iv. Blood
142. Distinguish between cartilage and bone.
143. Differentiate between skeletal and smooth muscles.
144. Give a brief account of cardiac muscles.
145. What is the function of nervous tissue?
146. Describe animal tissue in detail and also draw diagrams.

Chapter 05 Cells Cycle

Class: 9 **SET: 2**

Topic: Cell Cycle

1. Why is it called cell cycle?
2. Explain 4 stages of cell cycle?
3. What is cytokinesis and karyokinesis?
4. In which phase of cell cycle proteins, Enzyme and ribosomes synthesized.
5. Explain GO Phase in cell cycle.

Topic: Cell division

6. How Meiosis division is different from Mitosis. Explain any 4 points?
7. In which body cells having Mitosis and Meiosis division?
8. What is somatic and germs cells in our body?
9. Chromatin and chromatids is a unique structure in division phase define these two terms?
10. What is sister and non-sister chromatids?
11.
12. What is mitotic apparatus?
13. Define centrosome and centriole?

Topic: Mitosis + Meiosis

14. How cytokinesis is difference in plant cell as compared to animal's cell.
15. Write down the importance of mitosis and meiosis.
16. How crossing occur in meiosis and its importance.
17. What happen in telophase stage of mitosis?
18. Write down the events in metaphase of mitosis?
19. During which meiosis phase does crossing over occur?
20. How meiosis-I different from meiosis-II explain.
21. Define crossing over and its importance,
22. Explain flow chart of mitosis, meiosis. Division from parental to daughter cell with chromosome numbers.

Topic: Apoptosis and Necrosis

23. Difference between apoptosis and necrosis?
24. Write down the importance of apoptosis?
25. What types of factors involved in necrosis causing process?
26. What type of cell death inflammation is and how releasing of chemical from the cell occurs?

Topic: Cell cycle

27. Explain the cell cycle with the help of diagram.
28. What are 4 stages of cell cycle explained?

Topic: Mitosis

29. Describe the 4 stages of mitosis with the help of diagram?

Topic: Meiosis

30. Explain the difference between cytokinesis and karyokinesis with the help of diagram.
31. Write down the importance of Meiosis and explain the events of meiosis –I
32. How Meiosis-I different from meiosis-II with the help of diagram?

Topic: Cell death

33. Write down difference between apoptosis and necrosis with example.
34. Write down the importance of apoptosis?
35. How plant cell cytokinesis is different from animal's cell. Explain it with diagram?

Chapter 6 "ENZYMES"

Class: 9 SET: 3

Topic "Metabolism"

1. What is metabolism? Differentiate between (a) Anabolism and catabolism (b) photosynthesis and respiration
2. Define metabolism. How can you differentiate between Constructive reaction and destructive reactions? Explain your answer with example.
3. Why enzymes are called biological catalyst?
4. What is the difference between substrate and product?
5. Define
   (i) catalyst (ii) enzyme (iii) Substrate (iv) Product
6. Following is equation of Photosynthesis

$$6CO_2 + 12H_2O \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} C_6H_{12}O_6 + 6O_2 + 6H_2O$$

   (i) Identify the Reactants
   (ii) Identify the product
   (iii) What is the nature of reaction?
   (iv) Identify the energy source

7. Following is equation of Respiration

$$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + ATP$$

   (i) Identify the Reactants and Identify the product
   (ii) What is the nature of reaction?
   (iii) ATP stand for
   (iv) Define respiration

8. Define metabolism. Differentiate between anabolism and catabolism also give example with reference of plants
9. Explain metabolism with example.

Topic: Activation energy

10. What is activation energy?
11. In what way does enzymes lower the activation energy? Give at least three examples /ways.
12. In what way does enzyme change the rate of biochemical reaction?
13. What is the effect of enzyme on the rate of chemical reaction?
14. Why less energy is is needed to start the biochemical reaction in the presence of enzyme?

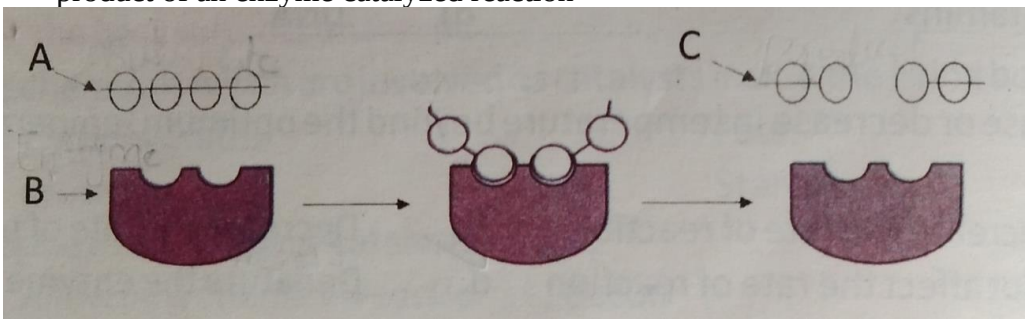
15. There is famous expression “without which none” how does this expression is true about role of enzyme. Explain it.

16. What is activation energy? Explain the ways through which enzymes lower the activation energy?
17. Define activation energy. How the presences of enzymes effect it? Explain your answer by the help of suite able example and graph.

Topic: Characteristics of enzymes

18. Who use the term enzyme for the first time and when?
19. Write any four characteristics of enzymes.
20. How can you categorize enzyme as intracellular and extracellular? Give at least one example.
21. Why enzymes are required in small amount?
22. What is active site and why it is important?
23. Why is enzyme specific for reaction and why can’t one enzyme speed up many different kind of reaction?
24. What are cofactors? Give at least 3 examples?
25. What are cofactors? Explain their types with examples.
26. Name the small portion to which Catalytic activity of an enzyme is restricted.
27.
28. What are enzyme inhibitors? Give examples.
29. Define the following with examples
    (i) Cofactor
    (ii) Coenzymes
    (iii) Prosthetic group
    (iv) Activators

30. Write a detail note on characteristics of enzymes.
31. Define enzyme and describe their properties/ characteristics.
32. Diagram below show the relationship between enzyme, substrate and a product of an enzyme catalyzed reaction



    a. What is represented by part A, B and C in diagram?
    b. Name the two properties of enzymes represented in this diagram

Topic Specificity of enzymes

33. What is enzyme specificity? Explain your answer with at least 3 examples
34. Enzymes are specific in their action justify the statement with examples.
35. Define biocatalyst. Write the name of suitable biocatalyst that can act upon following substrate.

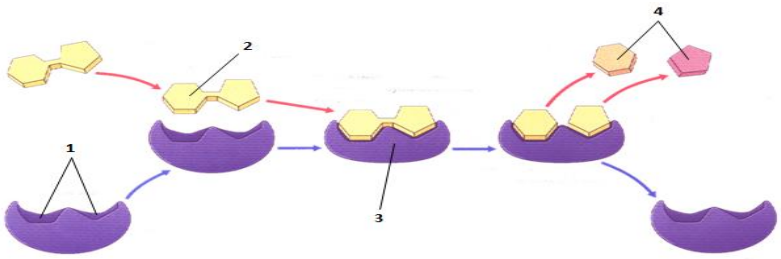
(i) Protein
(ii) Starch
(iii) Cellulose

36. Why enzymes are specific for substrate?
37. What is substrate? Write suitable substrate for following enzymes.
    (iv) Protease
    (v) Amylase
    (vi) Cellulose
    (vii) Hydrolase

38. Prove that enzymes are protein in nature and specific in function. Explain specificity of enzyme due to shape.

Mechanism of enzyme action

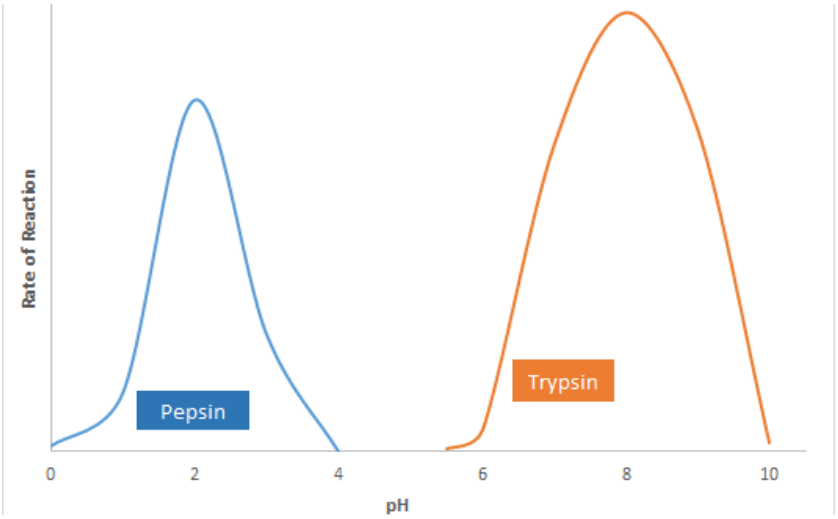
39. What are the main 4 steps of enzymes action?
40. Explain the mechanism of enzyme action by the help of induced fit model.
41. How does lock and key model explain the mechanism of enzyme action?
42. The diagram below shows mechanism of enzyme action. Describe and explains what is happening at each stage.



43. Name and discuss the two models that have been proposed to explain the mechanism of enzyme action.
44. Differentiate between lock and key model and induced fit model.

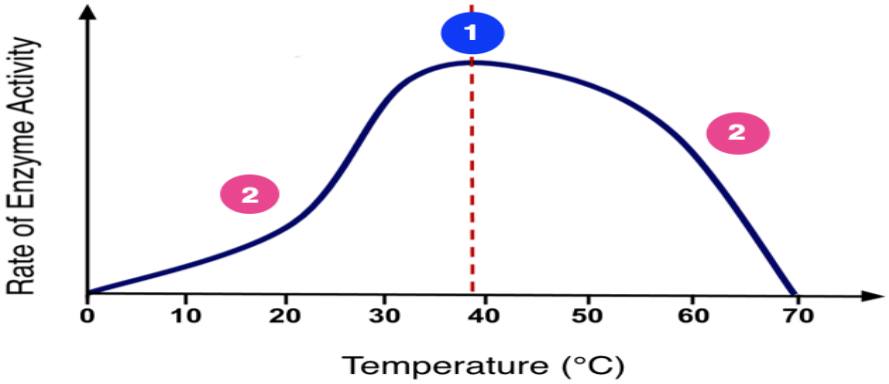
Factors that affect the rate of enzyme action

45. Name any three factors that affecting the enzyme activity?
46. What term is use to describe the temperature and pH at which enzymes can work more efficiently in a reaction?
47. What is meant by denaturation?
48. What happens to the rate of reaction when concentration of substrate is increases beyond the limit?
49. In what way does temperature affect the enzyme activity?
50. Graph below shows that the rate of an enzymatic action



(i) According to graph what is optimum pH for pepsin
(ii) According to graph what is optimum pH for Trypsin
(iii) As pH moves away from the optimum value , what happen to the enzyme activity?

51. Graph below shows that the rate of an enzymatic action



(i) According to graph at which temperature enzyme activity is highest?
(ii) When temperature is increase up to that point what happen to enzyme?

52. Describe the factors that affect the rate of enzyme activity.
53. How does temperature and pH affect the rate of reaction?
54. Explain the effect of temperature on rate of reaction with the help of graph and examples.
55. Explain the effect of pH on rate of enzyme reaction with the help of graph and examples.
56. What is meant by optimum pH and optimum temperature?

Chapter # 08 (NUTRITION)

Class: 9th **Round: 3**

Role of mineral elements in plant life

1. Differentiate between micronutrients and macronutrients
2. How the right food helps in recovery from disease?
3. What is chlorosis
4. In which form animals store their food in the body
5. Discuss the role of Magnesium in plant life

Importance of fertilizers

6. What are fertilizers? What are its main types?
7. What is importance of organic fertilizers
8. What are the environmental hazards of chemical fertilizers?
9. What is the difference between organic and inorganic fertilizers?

Components of human food

10. Name the elements of carbohydrates
11. Write the sources of starch containing food
12. How much kilocalories are present in one gram of carbohydrates?
13. Where is glycogen store in human body
14. What is the composition of amino acid?
15. Write the functions of proteins
16. What are the sources of proteins?
17. What is the composition of fats/lipids?
18. Write the functions of lipids in human body
19. Differentiate between fats and oil
20. What is meant by balance diet

Vitamins

21. What are vitamins
22. How many types of vitamins are there?
23. Differentiate between water soluble and fat soluble vitamins
24. What is the other name of vitamin A.?
25. Which disorder is caused by deficiency of vitamin A
26. What are the sources of vitamin A?
27. What is the other name of vitamin C?
28. What is the main function or importance of vitamin C in our body?
29. What are antioxidants. Which vitamin act as antioxidant
30. Which disorder occurs due to deficiency of vitamin C
31. Which vitamin is fat soluble vitamin
32. Which disorder occurs due to deficiency of vitamin D
33. What are the sources of vitamin D
34. What is the importance of dietary fibers?
35. How much water is required for the body of an adult
36. What is the relation of energy with age?

37. What is the relation of energy with gender?
38. What is the relation of energy with activity?
39. Define malnutrition.
40. What are the good sources of proteins?
41. Define rickets
42. What are dietary fibers
43. Write the types of dietary fibers
44. Write the functions of dietary fibers
45. How dietary fibers controls cholesterol level

Protein energy malnutrition

46. What is Marasmus
47. What is Kwashiorkor
48. Differentiate between Marasmus and Kwashiorkor
49. How will you explain mineral deficiency disease?
50. What is osteoporosis
51. How will you define anemia?

Human digestive system

52. Name the largest organ of human digestive system
53. Differentiate between chemical and mechanical digestion
54. How chewing important for digestion
55. What is meant by assimilation
56. What is meant by egestion
57. Which enzymes are present in the saliva of humans
58. What is the composition of saliva?
59. Draw a neat and labeled diagram of buccal cavity
60. What is role of tongue is swallowing the food
61. Which type of enzymes are secreted by stomach
62. What is meant by heart burning
63. Why stomach is not affected by HCL produced in it
64. What is the role of pancreas in digestion?
65. Which enzymes are secreted by pancreas
66. Which enzymes are secreted by liver
67. What is the role of gall bladder?
68. Distinguish between carbohydrates and proteins
69. Write two function of stomach
70. What do you think that the cause of famine?
71. What role is played by liver
72. What would happen if pancreatic juice didn't reach duodenum?
73. Name the three parts of colon
74. What is the function of appendix?
75. Draw a neat and labeled diagram of human digestive system

Disorders of gut

76. Why routine use of laxative medicine is discouraged
77. Define constipation

78. What are the causes of constipation?

Ulcer

79. What is the cause of ulcer?
80. Write the treatment of ulcer

Diarrhea

81. Which pathogen causes the diarrhea
82. What is the causative agent of diarrhea?
83. Why you cannot breathe while you are swallowing

Chapter 7 "Bioenergetics"

Class: 9 **SET: 4**

Topic "Bioenergetics and Importance of Oxidation Reduction Reaction"

1. What is bioenergetics?
2. How could you define bioenergetics as study of energy relationship and energy conversion in living organisms?
3. Differentiate between Photosynthesis and respiration.
4. Define a) oxidation b) reduction
5. Define oxidation -reduction reactions. How they are important for the living organisms?
6. Oxidation –reduction reactions important for the plants why?
7. Differentiate between oxidation and reduction with the help of suitable example.
8. Explain the importance of oxidation –reduction reaction for the flow of energy through the living system.
9. Discuss bioenergetics as energy relationship and energy conversion in living system.

Topic "ATP as energy currency of cell"

10. What does ATP stand for?
11. Why ATP is regarded as energy currency of cell?
12. Draw and label the structure of ATP.
13. What are the Structural components of ATP?
14. How many calories of energy are generated during ATP to ADP cycle?
15. Explain ATP to ADP cycle by the help of diagram.
16. Explain ADP to ATP cycle by the help of diagram.
17. Differentiate between ATP and ADP how are they formed?
18. Name the constituents of ATP.
19. When cell need energy what happens with ATP?
20. Explain the synthesis and breakdown of ATP through ATP-ADP cycle in detail.
21. Explain ATP as chief energy currency of all cells.

Topic **"Photosynthesis as life sustaining process"**

22. What is photosynthesis?
23. Why photosynthesis is regarded as life sustaining process?
24. Write the equation (in words +symbols) of photosynthesis.
25. Reason out that all living organisms are depend upon photosynthesis.
26. How does photosynthesis contribute to the production of food for both plants and animals?
27. Suggest what would happen to the living organisms if the process of photosynthesis stops?
28. What is photosynthesis? Why is it considered to be a life sustaining process?

Topic **"Role of chlorophyll, sunlight, Carbon Dioxide and water in Photosynthesis"**

29. Differentiate between chloroplast and chlorophyll.
30. Describe the importance of chlorophyll in photosynthesis.
31. Differentiate between
    a) thylakoid and granum
    b) Stroma and granum
32. Differentiate between photosynthetic pigments and accessory pigments.
33. Explain the role of sunlight in photosynthesis.
34. Why is chlorophyll important for photosynthesis?
35. What is the role of Carbon dioxide in the process of photosynthesis?
36. What are Photosystems?
37. What is the role of water in the process of photosynthesis?
38. What is the difference between NAD, NADH and NADP?
39. Describe that chlorophyll traps light energy and convert it into chemical energy.
40. Explain the role of CO_2 and H_2O in photosynthesis.

Topic **"Mechanism of Photosynthesis"**

41. Define photosynthesis. What are the raw materials of photosynthesis?
42. Differentiate between Light reaction and dark reaction of photosynthesis.
43. What is photosynthesis? Name the two main stages of Photosynthesis.
44. Define photosynthesis and write its equation (in words and symbols)
45. What is light reaction? Explain its mechanism.
46. What are the immediate products of light reaction of photosynthesis?
47. What are the reactants and product of light reaction?
48. What is dark reaction? Why it is called as dark reaction?
49. What are the reactants and product of dark reaction?
50. Where dark reaction does occur?
51. Explain the mechanism of Calvin cycle.
52. What is photosynthesis? Explain the mechanism of light reaction in detail.
53. What is photosynthesis? Explain the mechanism of dark reaction in detail.
54. Explain the mechanism of photosynthesis with the help of suitable diagram.

Topic **"the concept of limiting factors in Photosynthesis"**

55. What are the limiting factors of photosynthesis?
56. What are the three main limiting factors that can affect the rate of photosynthesis?
57. How does light intensity affect the rate of photosynthesis and what happens when light becomes low?
58. Explain the relationship between concentration of CO2 and photosynthesis? How does its availability affect the process of photosynthesis?
59. How does light intensity affect the rate of photosynthesis?
60. How does the concentration of CO2 affect the rate of photosynthesis?
61. What is the optimum temperature for photosynthesis?
62. How does temperature act as limiting factor for photosynthesis?
63. What are limiting factors? Explain temperature and Carbon dioxide as limiting factors of photosynthesis?
64. Explain light intensity and concentration of CO_2 as limiting factors of photosynthesis?

Topic **"Respiration and Anaerobic Respiration"**

65. Define term
    a) Cellular respiration
    b) External respiration or breathing
    c) Respiration
    d) Fermentation
66. What is respiration? What are its types?
67. What does term anaerobic means?
68. Define the aerobic respiration by means of words and symbols?
69. Explain anaerobic respiration with the help of suitable example.
70. Differentiate between Lactic acid fermentation and Alcoholic fermentation.
71. What is Glycolysis?
72. What are the products of Lactic acid fermentation?
73. How many ATP molecules are generated during Lactic acid fermentation?
74. Write the reaction of Lactic acid fermentation.
75. Write the reaction of Alcoholic fermentation.
76. Which type of respiration occurs in both microorganisms and muscles cells of human?
77. Explain the process of Yoghurt formation as an example of anaerobic respiration.
78. Explain alcoholic fermentation.
79. Explain lactic acid fermentation.
80. What is anaerobic respiration? Explain its types.
81. What are the advantages and significance of anaerobic respiration I your daily life?

Topic **"Aerobic Respiration"**

82. Define aerobic respiration. What are the main steps of aerobic respiration?
83. Give at least four differences between aerobic and anaerobic respiration.
84. What is Glycolysis and were does it occurs?
85. Define the aerobic respiration by means of words and symbols?

86. How many ATP molecules are generated during Glycolysis?
87. Explain Krebs cycle and where does it occurs in cell?
88. Write a short note on Electron Transport Chain.
89. What are the products of Aerobic respiration?
90. Define aerobic respiration and write its equation.
91. How many ATP molecules are generated during ATP?
92. During which step of Aerobic respiration maximum numbers of ATP molecules are produced?
93. Differentiate between aerobic and anaerobic respiration in following terms

	Aerobic respiration	**Anaerobic respiration**
Oxygen requirement		
Energy production		
Equation		
Main Steps		

94. Why aerobic respiration is considered to be more efficient than aerobic respiration?
95. Aerobic respiration generates more ATP molecules than anaerobic respiration. Which process of aerobic respiration is responsible for this higher generation of ATP molecule?
96. Explain the three phases of aerobic respiration.

Topic **"comparison between Photosynthesis and Respiration"**

97. Define photosynthesis and respiration also writes the reaction of both.
98. Give at least four differences between photosynthesis and respiration.
99. Differentiate between Photosynthesis and Respiration in following terms

	Photosynthesis	**Respiration**
Definition		
Reactant		
Product		
Energy		
Organelle involve		
Reaction		

Chapter 9 Transport

Class: 9th **SET: 4**

Introduction

1. Define transport. Why is it important for living organisms?
2. How does transport occur in unicellular and less complex organisms?
3. How does transport in unicellular organisms differ from that of multicellular organisms?

Topic: Transport in Plants

4. In plants which tissue are responsible for the transport of water and dissolved salts and food?
5. Write any FOUR differences between xylem and phloem.
6. What are vascular tissue? Write their TWO types.
7. Which process is responsible for the absorption of water through root hairs?
8. How do root hair help in maximum absorption of water and salt?
9. Draw a neat and labelled diagram of internal structure of root.
10. Briefly discuss the internal structure of root with respect to the following terms:

i. Epidermis ii. Cortex iii. Endodermis iv. Pericycle

11. Give a detailed account on absorption of water and salts in plants. Also draw its diagram.

Topic: Transpiration

12. Define transpiration. Write its types.
13. Define: i. Stomatal transpiration ii. Cuticular transpiration and iii. Lenticular transpiration.
14. Briefly explain transpiration.
15. Draw a neat and labelled diagram of internal structure of a leaf.
16. What modifications are adopted by desert plants to minimize the rate of transpiration?
17. Is the rate of transpiration higher on a sunny day or a rainy day? Why?
18. How do stomata control the rate of transpiration?
19. Why do stomata open during day time and close at evening?
20. How does the light affect the rate of transpiration?
21. Write the effects of following factors on the rate of transpiration:

i. Light ii. Temperature iii. Soil Moisture iv. Humidity

22. How is the rate of transpiration affected by the number and distribution of stomata?
23. What is wind? How does it affect the rate of transpiration in a positive way?
24. Write any TWO advantages and TWO disadvantages of transpiration.
25. Why is transpiration considered as a necessary evil?

26. Why do eucalyptus trees reduce water table, when grown in very large number?
27. What is the significance of transpiration in plants?
28. What is transpiration pull? Describe its importance in the life of a plant.
29. Define transpiration pull. Write THREE reasons behind its creation.
30. What would happen to transpiration stream if the air is injected in xylem vessels.
31. Discuss transpiration and its importance in plants.
32. Explain the stomatal control of transpiration in detail.
33. "Transpiration is considered as a necessary evil." Explain.
34. Describe the factors affecting the rate of transpiration.
35. Define and explain transpiration pull.

Topic: Translocation of Food in Plants

36. What is translocation of food in plants?
37. Define Pressure Flow Theory. Who proposed pressure flow theory?
38. Distinguish between "Source" and "Sink ".
39. By which process the food enters the sieve tubes of phloem?
40. Explain translocation of food in plants in detail.
41. Discuss the flow of food from source to sink in detail.
42. How does the pressure flow theory explain the movement of sugars through phloem vessels of a plant?

Topic: Transport in Human Beings

43. Name TWO mediums that work for the transport of material in humans.
44. What do you know about lymphatic system?
45. Define blood. What is it composed of?
46. What is plasma? Write down its composition.
47. Write any FOUR functions of plasma.
48. If we don't take water the whole day in the month of June, what would be the effect on volume of plasma in blood?
49. What is serum?
50. What is the pH of human blood?
51. Why does a RBC lack nucleus and other cellular organelles?
52. What is hemoglobin? What is it specified for?
53. What percentage of cytoplasm of RBCs consists of hemoglobin and other enzymes?
54. Why do RBCs appear red in color and are biconcave?
55. Write the following characteristics of erythrocytes:

i. Number ii. Life span iii. Site of formation iv. Site of destruction

56. What are white blood cells? Write the names of FOUR types of WBCs.
57. How do leucocytes defend your body against pathogens?
58. Explain leucocytes in the following terms:

i. Shape ii. Number iii. Life span iv. Function

59. What is the role of white blood cells in our immune system?
60. Write any FOUR differences between red blood cells and white blood cells.
61. Define platelets. How many platelets are present in each cubic millimeter of blood?
62. How do platelets help in blood clotting?
63. Write down the following functions of blood:

i. Oxygen and carbon dioxide carrier ii. Transport medium
iii. Defense against pathogens iv. Blood clotting

64. What are the causes of leukemia and thalassemia?
65. What do you know about the derivation of the term "Thalassemia"?
66. Bone marrow transplant is more effective in which blood disorder?
67. Describe the composition of blood and its importance.
68. Give a detailed account on structure and function of RBCs.
69. Describe white blood cells in detail.
70. Explain platelets in detail.
71. Describe the composition of human blood. What are the main functions of blood cells?
72. Write down the causes, symptoms and treatment of leukemia.
73. Write down the causes, symptoms and treatment of thalassemia.

Topic: Blood Group System

74. Define antigen and antibodies.
75. What is blood group system? What are the FOUR types of blood groups?
76. Can a person with blood type AB donate blood to a person with blood type A? Explain your answer.
77. What is blood transfusion? What will happen if a person with blood group A receives blood group B?
78. How can you differentiate between different types of blood groups?
79. What is Rh factor? What is the effect of its presence or absence on blood groups?
80. What will happen if a Rh -ve person receives Rh +ve blood?
81. How are different blood groups formed? What is their practical implication in blood transfusion?
82. Explain blood transfusion in ABO system in detail.
83. Explain blood transfusion in Rh blood group system.

Topic: Human Heart

84. What is pericardium? What is its function?
85. What is the function of pericardial fluid?
86. In how many chambers is human heart divided? Write any TWO differences between auricles and ventricles.
87. Define the following:

i. Tricuspid valve ii. Bicuspid valve iii. Semilunar valve

88. Differentiate between pulmonary circulation and systemic circulation.
89. Define cardiac cycle. What are its TWO phases?
90. Differentiate between systole and diastole.
91. What do you know about pulse?
92. Draw a neat and labelled diagram of human heart.
93. Draw and explain the structure of human heart.
94. Human heart work as a double pump. Explain.
95. Explain the circulation of blood in heart chambers in detail.
96. Define and explain cardiac cycle.

Topic: Blood Vessels + Cardiovascular Disorders

97. Define arteries. What are the THREE layers of arteries?
98. Why do arteries appear red?
99. What do you know about i. Arteries ii. Arterioles iii. Capillaries and iv. Venules with respect to their diameter?
100. What do you know about capillaries?
101. Define the following:
    i. Aorta ii. Pulmonary artery
    iii. Vena cava iv. Pulmonary vein
102. What is the main distinction between pulmonary artery and pulmonary vein?
103. Write any FOUR differences between arteries and veins.
104. Write down the names of the organs to which the following arteries carry the blood:
    i. Coronary artery ii. Renal artery
    iii. Hepatic artery iv. Iliac artery
105. Write the names of the veins that collect the deoxygenated blood from the following organs:
    i. Head and shoulders ii. Liver iii. Kidneys iv. Legs
106. Write the contributions of Ibn Al Nafees in blood circulation.
107. What are the contributions of William Harvey towards circulation of blood?
108. Differentiate between atherosclerosis and arteriosclerosis.
109. What is silent heart attack?
110. What you know about myocardial infarction?
111. What is angioplasty? How is it done?
112. What do you know about bypass surgery?
113. Discuss the function of major arteries and veins.
114. What is Arterial System? Write the names of main arteries their respective organs.

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