

AL HUDA SCIENCE ACADEMY

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Guess Paper of Biology Class 11th

اللہ سب کو سچ کہنے کی ہمت عطا فرمائیں۔ آمین

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11th Class Biology Important Short Questions

Q. NO. 2 (Ch # 1, 3, 8, 11)

1. What are the three domains of life and how do they differ in terms of cellular structure?
2. Who proposed the three-domain system of classification and what are the three domains?
3. What is biodiversity and why is it important in Biology?
4. What is classification in Biology?
5. Who proposed the five-kingdom system of classification and when?
6. How do Archaea differ from Bacteria according to the three-domain system?
7. What are the general characteristics of domain Bacteria?
8. What is the cell structure of bacteria?
9. What is the composition of bacterial cell walls?
10. What are the types of bacterial respiration?
11. What are plasmids in bacteria?
12. What are the morphological shapes of bacteria?
13. What are flagella and their function in bacteria?
14. What are extremophile bacteria?
15. What is pathogenicity in bacteria?
16. What are the modes of reproduction in eukaryotes?
17. Describe the group Protozoa.
18. Describe the group Algae.
19. What is Zygomycota? Give examples.
20. What is Basidiomycota? Give examples.
21. What kingdoms are included in domain Eukarya?
22. What are fungi-like protists?
23. What are nonvascular plants? Give examples.
24. Which domain includes organisms with peptidoglycan in their cell walls?
25. Which kingdoms have a nuclear envelope in their cells?
26. What are the general characteristics of animals in Kingdom Animalia?
27. Describe the symmetry and organization level of sponges.

28. What are ostia and osculum in sponges?
29. What is meant by diploblastic and mesoglea in cnidarians?
30. What is the function of cnidocytes and nematocysts in cnidarians?
31. What are flatworms and what is their body structure?
32. Why are nematodes called pseudocoelomates?
33. Describe the body of molluscs.
34. What are the three body parts of a mollusc?
35. What is a radula?
36. Describe segmentation in annelids.
37. What is tagmata in arthropods?
38. What is the exoskeleton in arthropods made of?
39. What comprises the excretory system in arthropods?
40. What is the water vascular system in echinoderms?
41. What are tube feet?
42. What is the notochord in chordates?
43. Do all chordates retain the notochord throughout life?
44. What are pharyngeal slits?

Cell Structure & Function

1. List the structures and molecules which can cross the nuclear envelope.
2. Describe the role of the Golgi body in forming lysosomes.
3. What is the structure of the plasma membrane according to the fluid mosaic model?
4. What role does cholesterol play in the plasma membrane of eukaryotic cells?
5. Give a brief description of the nuclear pore complex.
6. What is chromatin, and how does it relate to chromosomes?
7. What are the functions of the smooth endoplasmic reticulum (SER)?
8. What are the functions of the ER in the cell?
9. What is the structure of a mitochondrion?
10. What are F1 particles and where are they found?
11. What is the main function of chloroplasts in plant cells?

12. What are thylakoids, and how are they organized?
13. What are lysosomes, and what is their primary function?
14. What are peroxisomes and what is their primary function?
15. What are glyoxysomes, and where are they found?
16. What is the "9 + 2" structure in cilia and flagella?
17. Distinguish each of the following pairs: exocytosis and endocytosis.
18. What are histones? Where are these found in eukaryotic cells?
19. How do prokaryotic flagella differ from eukaryotic ones?
20. What is cell signaling?
21. What are steroid hormones, and how do they enter cells?
22. What is the main purpose of membrane transport mechanisms?
23. What is facilitated diffusion?
24. What is active transport?
25. What happens during endocytosis?
26. What is exocytosis?
27. What is diffusion?
28. What is osmosis?
29. How are stem cells used in regenerative medicine?
30. What are embryonic stem cells (ESCs)?
31. What is the plasma membrane and which types of cells possess it?
32. What is the primary function of ribosomes?
33. What are the 'cis' and 'trans' faces of the Golgi apparatus?
34. What is tonoplast?
35. What is cell sap?
36. What are the three main components of the cytoskeleton?
37. Differentiate between hypertonic and hypotonic solution.
38. What are stomata and where are they found?
39. What is the role of guard cells in stomatal function?
40. What is the starch-sugar hypothesis?

41. What is the role of potassium ions (K^+) in stomatal movement?
42. How does blue light affect stomatal opening?
43. What is the apoplast pathway?
44. What is the symplast pathway in plants?
45. What is xylem and what does it do?
46. What are tracheids in xylem?
47. Describe vessels in xylem tissue.
48. What are xylem fibres and their function?
49. What does the TACT mechanism stand for?
50. What is transpiration and its role in water movement?
51. What is the function of phloem in plants?
52. What are sieve tube elements and their function?
53. What is the function of companion cells in phloem?
54. Who proposed the pressure-flow theory and when?
55. How is sugar unloaded at the sink end of phloem?
56. How is intercalary meristem different from apical meristem?

Plant Growth & Development

1. What is a meristem?
2. What happens during the cell division phase?
3. What is the function of vascular cambium?
4. What is secondary growth in plants?
5. What is bark made of?
6. How are annual rings formed in trees?
7. Differentiate between Vernalin and Florigen.
8. What is osmoregulation in plants?
9. What is plasmolysis?
10. What are hydrophytes?
11. What are mesophytes?
12. What is thermoregulation in plants?

13. What are heat-shock proteins and what is their function?
14. How do plants adapt to cold temperatures at the membrane level?
15. How do cold-region plants avoid intracellular ice formation?
16. Differentiate between Thigmotropism and Geotropism.
17. What is phototropism?
18. What is chemotropism in plants?
19. What is photoperiodism?
20. What are the three types of plants based on photoperiodic response?
21. What is the role of phytochrome in photoperiodism?
22. What is vernalisation?

Circulatory System

23. Enlist the four valves present in the heart and also state their locations.
24. State the phases of a heartbeat.
25. What is the pericardium and what are its layers?
26. What is the pericardial cavity and what is its function?
27. What are the three layers of the heart wall?
28. What are atrioventricular valves and what is their function?
29. What are semilunar valves and where are they located?
30. How is oxygenated and deoxygenated blood separated in the heart?
31. How does the human heart function as a double pump?
32. What is a cardiac cycle or heartbeat?
33. What causes the sounds of a heartbeat and what are they called?
34. What is the SA node and what is its role in heart excitation?
35. How do impulses travel from the SA node to cause heart contraction?
36. What is an artificial pacemaker and when is it used?
37. What does the P wave represent in an ECG?
38. List the principles and uses of an Electrocardiogram.
39. What are the two main circulatory pathways in humans?
40. What is the role of coronary circulation?

41. What is the significance of the hepatic portal circulation?
 42. State the role of baroreceptors and volume receptors in regulating blood pressure.
 43. Differentiate between systolic and diastolic pressure.
 44. How does antidiuretic hormone (ADH) help in blood pressure regulation?
 45. What is the role of atrial natriuretic hormone (ANH)?
 46. What is lymph and how is it formed?
 47. How do lymph capillaries differ from blood capillaries?
 48. What are the major components of the lymphatic system?
 49. What is the role of lymph nodes in the immune system?
 50. Name some larger lymphoid masses and their function.
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Q.NO. 3 (Ch # 2, 5, 9, 12)**Bacteria**

1. Write about the structural components of a bacterial cell wall and their arrangement.
2. Write the composition of the peptidoglycan layer in bacterial cell walls.
3. How does the cell wall differ between Gram-positive and Gram-negative bacteria?
4. What is the significance of lipopolysaccharides and lipoproteins in Gram-negative bacteria?
5. What are mesosomes? What are their functions?
6. What is the function of the bacterial capsule?
7. What are plasmids, and how do they contribute to enabling bacteria to resist unfavourable conditions?
8. How can plasmids be used in genetic engineering?
9. Describe the ribosomes in bacteria.
10. What is the nucleoid and what does it contain?
11. Define sporulation.
12. What are endospores and why do bacteria form them?
13. Outline the steps involved in sporulation (endospore formation).
14. What happens to the endospore when conditions become favorable again?
15. Write the role of pili in bacterial cells. How do they differ from flagella?

16. What is the function of flagella in bacteria?
17. Differentiate between atrichous and monotrichous bacteria.
18. What are peritrichous bacteria?
19. How is the structure of bacterial flagella different from eukaryotic flagella?
20. What is meant by 'normal flora' in the human body?
21. What are the benefits of bacterial flora in the human body?
22. What is bioremediation, and how do bacteria contribute to it?
23. Describe the bacterium *Bacillus thuringiensis* and its importance.
24. How do bacteria assist in biotechnology and genetic engineering?
25. Why do pathogens have fewer chances of invading tissues in presence of normal flora?

Viruses

26. What are naked viruses?
27. What is the structure of bacteriophages?
28. What is the function of tail fibers in a bacteriophage?
29. What is the structure of HIV?
30. What is the significance of reverse transcriptase in HIV?

Enzymes

31. Define enzyme and co-factor.
32. What is the active site of an enzyme?
33. How is the active site described in terms of its structure and position?
34. What is the specificity of the active site based on?
35. What are the two distinct regions of the active site, and what are their functions?
36. Differentiate between co-enzyme and prosthetic group.
37. How do metal ions function as enzyme cofactors?
38. How does the coenzyme NAD^+ function in enzyme-catalysed reactions?
39. What is meant by activation energy?
40. How do enzymes lower the activation energy required for a reaction to proceed?
41. Do enzymes affect the end products of a reaction? What determines their specificity?
42. What happens during the formation of the enzyme-substrate (ES) complex?

43. How do enzymes work in complex metabolic pathways like respiration or photosynthesis?
44. How is the first enzyme regulated in a metabolic pathway?
45. What is the Lock-and-Key model proposed by Emil Fischer in 1894?
46. What are the key postulates of the Lock-and-Key model?
47. Why was the Induced Fit model proposed and by whom?
48. What are the postulates of the Induced Fit model regarding the active site?
49. Define feedback inhibition.
50. What is the mechanism of feedback inhibition?
51. Give examples of competitive and non-competitive inhibitors.
52. How are inhibitors classified based on the type of bond formation with enzymes?
53. What are reversible inhibitors and how do they act?
54. What are irreversible inhibitors and how do they act?
55. How do many drugs exert their effects in the body?
56. What is the effect of toxins and poisons on enzymes in the body?
57. What are oxidoreductases and give an example?
58. What role do transferases play in enzyme-catalyzed reactions?
59. What do you mean by hydrolases? Give two examples.
60. What are proteases and how do they function?
61. How do lipases function and what is an example?
62. What are Carbohydrases and what substrates do they act upon?
63. What are nucleases and what is their function?

Digestive System

64. What is the main function of the digestive system?
65. Differentiate between physical and chemical digestion.
66. What is the mode of action of saliva in mouth?
67. What role does the muscular tongue play in the oral cavity?
68. What role does the epiglottis play during swallowing?
69. What is the difference between bolus and chyme?
70. What is the role of the cardiac sphincter in the stomach?

71. What is the mucosa layer of the stomach?
72. What protects the inner lining of the stomach from digestive enzymes?
73. What are parietal (oxyntic) cells and what do they secrete?
74. What is the function of chief cells in the stomach?
75. What is the composition of gastric juice?
76. Why is hydrochloric acid (HCl) important in the stomach?
77. How is pepsinogen activated and what is its function?
78. What is the role of the pyloric sphincter in digestion?
79. How is the small intestine structurally divided?
80. What is the length and function of the duodenum?
81. What is the role of pancreatic juice in digestion?
82. What are the enzymes present in pancreatic juice and their functions?
83. Which organ produces bile, and what is its function?
84. What do you understand by emulsification of fats?
85. What functions do jejunum and ileum perform?
86. What is intestinal juice and what enzymes does it contain?
87. What is chyle?
88. How do villi and microvilli help in nutrient absorption?
89. How are simple sugars and amino acids absorbed?
90. How are fatty acids and glycerol absorbed and transported in the body?
91. What are the main functions of the large intestine?
92. How many parts does the large intestine consist of?
93. What is the function of appendix in human digestive system?
94. What are the parts of the colon?
95. What do faeces consist of?
96. What triggers the defecation reflex?
97. How do children gain voluntary control of defecation?
98. What is the role of bacteria in colon?
99. What is the importance of vitamin K and how is it absorbed?

100. Besides producing bile, what other functions does the liver perform?
101. What is the function of the gallbladder?
102. What are the two portions of the pancreas and their functions?
103. How is the release of secretions from the pancreas and liver controlled?
104. What role does secretin play in regulating digestive secretions?
105. How does cholecystokinin (CCK) regulate pancreatic and gallbladder secretions?
106. What causes jaundice in the digestive system?

Skeletal System

107. Name three types of cells associated with bone and write their functions.
108. What is the periosteum, and what is its function?
109. What are Haversian systems in compact bone?
110. What are lamellae, and what materials do they contain?
111. What are lacunae and osteocytes?
112. What is the Haversian canal, and what does it contain?
113. What is spongy bone, and what is its structure like?
114. What is bone marrow, and what are the types and their functions?
115. Differentiate between: Compact and spongy bone.
116. What are osteoblasts and what is their function in bone formation?
117. What are osteocytes and what role do they play in bone tissue maintenance?
118. From which cells do osteoclasts develop and what is their function?
119. What is the perichondrium and what structures does it contain?
120. What composes the cartilage matrix, and what properties does it give to the cartilage tissue?
121. Why does cartilage heal very slowly compared to other connective tissues?
122. What are chondrocytes, where are they found, and what is their function?
123. How many bones are there in the human skeletal system and how is the skeleton divided?
124. Name the bones of cranium.
125. Enlist the bones in the five groups of vertebrae.

126. What bones make the rib cage?
127. Differentiate between: True ribs, false ribs and floating ribs.
128. Name the bones of pectoral girdle and pelvic girdle.
129. Name the bones of forelimbs and hindlimbs.
130. Differentiate between: Fibrous and cartilaginous joints.
131. Differentiate between: Cartilaginous and synovial joint.
132. What covers the ends of bones in synovial joints, and what is its function?
133. What surrounds synovial joints and what is its role?
134. What is the role of synovial fluid in joints?
135. Differentiate between: Ligament and tendon.
136. How many types of muscle tissues are found in the human body?
137. What is the major difference between voluntary and involuntary muscles?
138. What is the ultrastructure of a skeletal muscle fibre?
139. What are myofibrils and what filaments are they composed of?
140. What is a sarcomere and what is its structure?
141. Differentiate between: Tropomyosin and troponin.
142. What is the role of a nerve impulse in muscle contraction?
143. How are cross-bridges formed and what is a power stroke?
144. What causes the detachment of myosin heads from actin?
145. What is the sliding filament model of muscle contraction?
146. How do muscles work to move bones at a joint in two directions?
147. What is muscle fatigue?
148. How does depletion of ATPs cause muscle fatigue?
149. What are some common causes of muscle cramps?

Q.NO. 4 (Ch # 4, 6, 10)**Water & Carbohydrates**

1. What is the chemical formula of water?
2. Why is water known as the "medium of life"?

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3. What properties of water make it a good solvent?
4. What is a hydrogen bond in water molecules?
5. What role does water play in metabolism?
6. What is the specific heat capacity of water and why is it significant?
7. How does water's heat capacity affect temperature regulation in organisms?
8. What is meant by the heat of vaporization of water?
9. What is cohesion in water, and why is it important?
10. Why is ice less dense than liquid water, and how does it help aquatic life?
11. What are carbohydrates and what does the term mean?
12. What is the general formula of carbohydrates?
13. What are the three main types of carbohydrates?
14. What is the primary energy-storage monosaccharide?
15. What are isomers in the context of monosaccharides?
16. How do glucose and galactose differ?
17. What are Fischer and Haworth projections?
18. What are disaccharides and how are they formed?
19. What is maltose and where is it found?
20. What is lactose and what is its biological importance?
21. What is sucrose and what role does it play in plants?
22. What is the significance of pentoses in biological systems?
23. What are polysaccharides?
24. Why is starch suitable for storage in plant cells?
25. What makes amylopectin different from amylose?
26. Where is glycogen found, and what is its function?
27. What is cellulose and where is it found?
28. What is chitin and where is it found?
29. Draw the sketch of an amino acid.
30. Outline the synthesis of peptide linkages.
31. What are proteins and why are they important?

32. What are essential and non-essential amino acids?
33. What is a peptide bond?
34. What is the primary structure of a protein?
35. What causes sickle cell anaemia?
36. What is the secondary structure of a protein?
37. What is the tertiary structure of a protein?
38. What is the quaternary structure of a protein?
39. What are fibrous proteins? Give examples.
40. What are globular proteins? Give examples.
41. How do fibrous and globular proteins differ in solubility?
42. Draw the ring structure of glucose and fructose.
43. Draw the sketch of acylglycerol, phospholipid and terpene.
44. What are lipids and what is their solubility characteristic?
45. What are acylglycerols and how are they classified?
46. What is the difference between fats and oils in terms of origin?
47. What are saturated and unsaturated fatty acids?
48. Why are acylglycerols efficient energy-storage molecules?
49. What are waxes and what is their function in nature?
50. What is the structure of phospholipids and their role in cells?
51. What is a terpene and what are some examples?
52. What are steroids and how are they structured?
53. What are prostaglandins and what is their biological role?
54. Differentiate between nucleoside and nucleotide.
55. Illustrate the formation of a phosphodiester bond.
56. State the central dogma of gene expression.
57. What are pyrimidine and purine bases?
58. What are ribonucleotides and deoxyribonucleotides?
59. What is ATP and its function?
60. What is the structural model of DNA proposed by Watson and Crick?

61. Name the three types of RNA.
62. What are conjugated molecules?
63. What are glycoproteins and where are they found?
64. What is a glycolipid?
65. What is the function of lipoproteins in the human body?
66. What are nucleoproteins made of?

Photosynthesis

67. Differentiate between action spectrum and absorption spectrum.
68. How is photosynthesis a redox reaction?
69. Which molecule contributes oxygen in glucose? Water or carbon dioxide?
70. State the role of CO_2 in photosynthesis.
71. What are the reactants and products of photosynthesis?
72. Why is there no net yield of water in photosynthesis?
73. What was Van Neil's hypothesis?
74. What are photosystems in chloroplasts?
75. What are the two main components of a photosystem?
76. What type of chlorophyll-a do Photosystem I and Photosystem II contain?
77. Where do light-dependent and light-independent reactions take place?
78. What are the types of photophosphorylation?
79. What is photolysis?
80. What happens when light is absorbed by PS-I?
81. What is cyclic photophosphorylation and when does it occur?
82. What is chemiosmosis in photosynthesis?
83. How is the proton (H^+) gradient formed inside the thylakoid lumen?
84. What is the role of ATP synthase in photosynthesis?
85. What happens during the carbon fixation phase of the Calvin cycle?
86. What is the role of RuBisCO in photosynthesis?
87. How is glucose formed in the Calvin cycle?
88. What happens in the regeneration phase of the Calvin cycle?

89. What is bioenergetics?

Cellular Respiration

1. Define electron transport chain.
2. What do you mean by glycolysis?
3. Can pyruvic acid enter the Krebs cycle as such? If not, what changes are made to it before the Krebs cycle?
4. What is cellular respiration?
5. What is the general equation of cellular respiration?
6. What is meant by "respiratory fuel"?
7. What is anaerobic respiration?
8. What is alcoholic fermentation?
9. What is lactic acid fermentation?
10. Where does glycolysis occur in the cell?
11. What is the role of NAD^+ in glycolysis?
12. What is formed after glycolysis in aerobic respiration?
13. What happens to acetyl-CoA in the Krebs cycle?
14. What is the role of FAD in the Krebs cycle?
15. What is the role of oxygen in the electron transport chain?
16. Where is the electron transport chain located in the cell?
17. How does the electron transport chain contribute to the proton gradient?
18. How many ATP molecules are produced from one NADH and one FADH_2 ?
19. What is substrate-level phosphorylation?
20. What is the total ATP yield from aerobic respiration of one glucose molecule?
21. Why is aerobic respiration more efficient than anaerobic respiration?

Respiratory System

22. How does the nasal cavity function in filtering the inhaled air?
23. Trace the path of air through different parts of the respiratory system.
24. Describe the structure and function of alveoli.
25. What is the role of the diaphragm during inhalation and exhalation?

26. What is the structure and role of the nasal septum?
27. What is the pharynx and what system is it part of?
28. What is the structure and function of the larynx?
29. What is the function of the epiglottis and how does it work?
30. What is the structure and function of the trachea?
31. How do terminal bronchioles connect to alveoli?
32. How does gas exchange take place in the alveoli?
33. What is breathing or ventilation?
34. Which muscles are involved in the mechanism of breathing?
35. How does the expansion of the lungs during inspiration affect air pressure inside the lungs?
36. How does lung recoil affect air pressure and air movement during expiration?
37. Where is the control center for breathing located?
38. Differentiate between: Haemoglobin and myoglobin.
39. What is haemoglobin and what is its molecular structure?
40. What is a haem group and how does it contribute to oxygen transport in haemoglobin?
41. What is myoglobin and where is it found in the body?
42. What is the function of myoglobin and when does it release oxygen?
43. What are the advantages of having millions of alveoli rather than a pair of simple balloon-like lungs?
44. Differentiate between: Internal and external respiration.
45. Differentiate between: Upper and lower respiratory tract.
46. Differentiate between: Bronchi and bronchioles.
47. What is sinusitis and what are its symptoms?
48. What is pneumonia and what happens to the lungs during pneumonia?
49. What are the common causes of pneumonia?
50. What is pulmonary tuberculosis and what causes it?
51. How does tuberculosis affect lung tissue?
52. What complications occur in advanced pulmonary tuberculosis?
53. What type of disease is Chronic Obstructive Pulmonary Disease (COPD)?

54. What are the common causes of COPD?
55. Which genetic deficiency is linked to the development of COPD?
56. What is emphysema in relation to COPD?
57. What happens to the alveoli in emphysema?
58. What genetic factor can cause emphysema?
59. List the symptoms of emphysema.
60. How does quitting smoking affect emphysema?
61. What is the primary rehabilitation in the context of COPD and emphysema?

11th Class Biology Important Long Questions

Q.NO. 5

1. What are the major groups of Archaea? Describe the unique characteristics of Archaea that differentiate them from Bacteria and Eukarya.
2. Describe the main characteristics of the kingdoms Protocista, Fungi, Plantae, and Animalia. Provide examples for each kingdom.
3. Explain the structure and systems of organisms in Phylum Annelida.
4. Write a detailed note on the structure & function of human heart.
5. Describe the flow of blood through heart as regulated by the valves.
6. Explain how a heartbeat is initiated and controlled.
7. Write a detailed note on the pathways of circulation.
8. Define blood pressure and explain systolic and diastolic pressure.
9. Write a detailed note on the lymphatic system of humans.

Q.NO. 6 (Ch # 3, 9)

1. Discuss nuclear envelope and nuclear pore complex in detail.
2. Describe the basic structure of a mitochondrion, from outside inward.
3. Explain the structure, chemical composition and function of ribosomes.
4. What is the plasma membrane? Explain the fluid mosaic model of the plasma membrane.
5. What are chloroplasts? Explain their structure and function in photosynthesis with proper detail.
6. Write details of the structure and the chemical composition of cell walls of eukaryotes and prokaryotes.
7. Describe the pathway of protein signal and steroid signal from outside of a cell to inside.

8. Explain the structure, and functions of Golgi complex.
9. Categorize and explain different types of stem cells.
10. Describe the different types of transport across the plasma membrane in detail.
11. Explain the complete process of digestion, starting from ingestion in the mouth to egestion in the large intestine. Include the roles of mechanical and chemical digestion at each stage.
12. Describe the structure and function of the stomach in digestion.
13. Explain the absorption of food from the small intestine.
14. Discuss accessory organs (liver, gallbladder and pancreas) and their contributions in digestion.

Q.NO. 7 (Ch # 6, 10)

1. Explain the process of chemiosmosis in light-dependent reactions of photosynthesis. How is ATP synthesized during this process?
2. Describe light independent reactions of photosynthesis in terms of paragraph and illustrate in terms of Calvin cycle.
3. Explain the process of non-cyclic photophosphorylation in detail.
4. How is glucose broken down to pyruvic acid in glycolysis?
5. Describe how Krebs cycle is the completion of the oxidation of glycolytic products.
6. What happens with glucose in anaerobic respiration and how different organisms modify the end products?
7. Describe in detail the structure and function of the lower respiratory tract.
8. Describe the mechanism of inhalation and exhalation.
9. Describe the structure and function of haemoglobin.
10. Describe the causes, symptoms and treatment of pneumonia and pulmonary tuberculosis.

Q.NO. 8 (Ch # 2, 5)

1. Explain the process of endospore formation in bacteria.
2. Explain the structure of bacterium flagellum.
3. Explain the structure of a model bacteriophage and HIV.
4. Explain the structure of bone.
5. Explain the ultrastructure of skeletal muscle.
6. Write a detailed note on the sliding filament model of muscle contraction.
7. Explain the action of antagonistic muscles in the movement of knee joint.

8. Describe causes and symptoms of muscle fatigue, cramps and tetany.

Q.NO. 9 (Ch # 4, 8)

1. Justify the significance of the sequence of amino acids through the example of sickle cell hemoglobin.
2. Distinguish the properties and roles of monosaccharides and classify them.
3. Distinguish the properties and roles of disaccharides.
4. Define proteins and amino acids and outline the synthesis and breakage of peptide linkages.
5. Explain the double helical structure of DNA as proposed by Watson and Crick.
6. Explain the mechanism of translocation of food in plants.
7. Describe the physiological adaptation of plants to extreme conditions. How do plants adjust their cell membrane composition and protein structures to survive high and low temperatures?
8. What is the structure and function of xylem tissue in plants?
9. Describe the mechanism of opening and closing of stomata.
10. Explain the concept of photoperiodism and its influence on plant flowering. How do short-day, long-day, and day-neutral plants differ in their flowering responses, and what role does phytochrome play in this process?

11th Class Biology Important MCQs with solution

#	Question	Option A	Option B	Option C	Option D	Answer
1	Who proposed the five-kingdom system of classification in 1969?	Carl Woese	Charles Darwin	Robert Whittaker	Carolus Linnaeus	Robert Whittaker
2	The three-domain system consists of:	Monera, Protista, Eukarya	Archaea, Bacteria, Eukarya	Plantae, Fungi, Animalia	Prokaryotes, Eukaryotes, Fungi	Archaea, Bacteria, Eukarya

#	Question	Option A	Option B	Option C	Option D	Answer
3	What kind of reproduction occurs in Archaea?	Sexual	Binary and multiple fission	Mitosis	Meiosis	Binary and multiple fission
4	The genetic material of bacteria is:	Multiple linear chromosomes	A single, circular chromosome	RNA-based	Double helix with histones	A single, circular chromosome
5	Which of the following structures enable bacteria to move:	Pili	Fimbriae	Flagella	Ribosomes	Flagella
6	Pili and fimbriae help bacteria to:	Reproduce	Attach to surfaces	Perform photosynthesis	Produce toxins	Attach to surfaces
7	Facultative anaerobes:	Require oxygen to survive	Die in the presence of oxygen	Can live with or without oxygen	Only live in high temperature	Can live with or without oxygen
8	Mutualism is a symbiotic relationship in which:	Both organisms are harmed	One benefits, one is harmed	Both benefit	Neither benefits	Both benefit
9	Which protein is associated with eukaryotic DNA?	Actin	Tubulin	Histone	Collagen	Histone

#	Question	Option A	Option B	Option C	Option D	Answer
10	Eukaryotes are believed to have originated through:	Binary fission	Spontaneous generation	Endosymbiosis	Budding	Endosymbiosis
11	Sexual reproduction in eukaryotes involves:	Mitosis only	Conjugation	Meiosis and fertilization	Fragmentation	Meiosis and fertilization
12	Which taxonomic rank is the highest?	Species	Genus	Domain	Kingdom	Domain
13	Which domain includes humans?	Archaea	Bacteria	Eukarya	Protista	Eukarya
14	Which of the following kingdoms includes organisms that are mostly unicellular, eukaryotic, and can be autotrophic or heterotrophic?	Fungi	Animalia	Plantae	Protista	Protista
15	In which kingdom are	Fungi	Animalia	Plantae	Protista	Plantae

#	Question	Option A	Option B	Option C	Option D	Answer
	organisms predominantly multicellular, autotrophic, and have cell walls made of cellulose?					
16	What kind of organisms are included in the domain Eukarya?	Only bacteria	Only unicellular organisms	Only animals	All organisms with eukaryotic cells	All organisms with eukaryotic cells
17	Kingdom Protista includes:	Only multicellular or animals	Only unicellular bacteria	Unicellular, colonial, or simple multicellular	Viruses	Unicellular, colonial, or simple multicellular
18	Which group of protists is animal-like?	Algae	Protozoa	Myxomycota	Oomycota	Protozoa
19	Which of the following is NOT a protozoan?	Paramecium	Amoeba	Diatoms	Plasmodium	Diatoms
20	What do plant-like protists possess?	Not cell wall	Chitin in the wall	Cell walls made of cellulose and chlorophyll	Not chloroplasts	Cell walls made of cellulose and chlorophyll
21	Which group of protists	Algae	Protozoa	Myxomycota	Diatoms	Myxomycota

#	Question	Option A	Option B	Option C	Option D	Answer
	includes slime molds?					
22	Zygomycota fungi lack:	Nucleus	Chitin	Septa in hyphae	Hyphae	Septa in hyphae
23	Which group includes rusts and smuts?	Ascomycota	Zygomycota	Myxomycota	Basidiomycota	Basidiomycota
24	All plants develop from:	Spores	Buds	Embryos	Hyphae	Embryos
25	Which plant group lacks vascular tissues?	Angiosperms	Gymnosperms	Bryophytes	Ferns	Bryophytes
26	Which kingdoms show multicellularity in all forms?	Protista and Fungi	Plantae and Animalia	Bacteria and Archaea	Fungi and Protista	Plantae and Animalia
27	Which of the following kingdoms includes animals that are eukaryotic, multicellular and heterotrophic?	Plantae	Protista	Animalia	Fungi	Animalia

#	Question	Option A	Option B	Option C	Option D	Answer
28	In which phylum do sponges belong?	Cnidaria	Platyhelminthes	Mollusca	Porifera	Porifera
29	What type of symmetry is mostly found in sponges?	Bilateral	Radial	Asymmetrical	Spherical	Asymmetrical
30	What are the small pores on a sponge's body wall called?	Ostia	Oscula	Choanocytes	Mesohyle	Ostia
31	What is the name of large pore through which water exits a sponge's body?	Pinacocyte	Ostia	Mesohyle	Osculum	Osculum
32	Which cells form the inner layer of the sponge's body cavity?	Pinacocytes	Amoeboid cells	Choanocytes	Nematocyst	Choanocytes
33	Which of the following is a freshwater sponge?	Leucosolenia	Euplectella	Spongilla	Obelia	Spongilla

#	Question	Option A	Option B	Option C	Option D	Answer
34	What are gemmules?	Feeding structures	Reproductive organs	Resistant capsules for asexual reproduction	Excretory structures	Resistant capsules for asexual reproduction
35	Which phylum contains organisms like hydra, jellyfish and corals?	Porifera	Cnidaria	Platyhelminthes	Mollusca	Cnidaria
36	What type of symmetry is found in cnidarians?	Bilateral	Radial	Asymmetrical	None	Radial
37	What are cnidocytes?	Muscle cells	Digestive cells	Stinging cells	Reproductive cells	Stinging cells
38	What organelle is found in cnidocytes?	Flagellum	Chloroplast	Nematocyst	Contractile vacuole	Nematocyst
39	What type of digestive system is present in cnidarians?	Complete	Sac-like	Incomplete with anus	External digestion	Sac-like
40	Which of the following cnidarians is freshwater?	Coral	Obelia	Jellyfish	Hydra	Hydra

#	Question	Option A	Option B	Option C	Option D	Answer
41	How do medusae reproduce?	Asexually	Sexually	By budding	By gemmules	Sexually
42	Which phylum includes flatworms like tapeworm and liver fluke?	Annelida	Platyhelminthes	Cnidaria	Asymmetrical	Platyhelminthes
43	What type of body symmetry do flatworms show?	Radial	Spherical	Bilateral	Asymmetrical	Bilateral
44	Flatworms are:	Diploblastic	Triploblastic	Monoblastic	None	Triploblastic
45	What are flame cells in flatworms used for?	Digestion	Movement	Excretion	Respiration	Excretion
46	Which of the following component is not found in all kinds of bacteria?	Ribosomes	Cell membrane	Nucleoid	Capsule	Capsule
47	The bacterial chromosome is typically:	Linear, double-stranded DNA	Circular, single-stranded RNA	Circular, double-stranded DNA	Linear, single-stranded DNA	Circular, double-stranded DNA

#	Question	Option A	Option B	Option C	Option D	Answer
48	In bacterial cells, respiration occurs at:	Mitochondria	Cell membrane	Ribosomes	Endoplasmic reticulum	Cell membrane
49	What is the primary function of flagella in bacterial cells?	DNA replication	Cell division	Motility	Protein synthesis	Motility
50	Who proposed the five-kingdom classification system?	Charles Darwin	Robert H. Whittaker	Carl Woese	Aristotle	Robert H. Whittaker
51	In the five-kingdom system, prokaryotes are placed in which kingdom?	Protista	Plantae	Monera	Fungi	Monera
52	Which classification system is more aligned with molecular studies?	Binomial nomenclature	Five-kingdom system	Two-kingdom system	Three-domain system	Three-domain system
53	Bacteria belong to which domain in	Archaea	Eukarya	Monera	Bacteria	Bacteria

#	Question	Option A	Option B	Option C	Option D	Answer
	the three-domain system?					
54	What type of cellular organization do all bacteria have?	Multicellular eukaryotic	Unicellular eukaryotic	Unicellular prokaryotic	Multicellular prokaryotic	Unicellular prokaryotic
55	What is the major component of bacterial cell wall?	Cellulose	Chitin	Peptidoglycan	Lignin	Peptidoglycan
56	Peptidoglycan is composed of:	Amino acids and DNA	Lipids and starch	Glycan chains and peptide fragments	Proteins and RNA	Glycan chains and peptide fragments
57	What additional molecules are linked with peptidoglycan in bacterial cell walls?	Proteins	Nucleic acids	Lipids	Sterols	Lipids
58	Gram-positive bacteria have:	Thin peptidoglycan and high lipid content	Thick peptidoglycan and low lipid content	No peptidoglycan	No lipid content at all	Thick peptidoglycan and low lipid content

#	Question	Option A	Option B	Option C	Option D	Answer
59	What structural feature makes Gram-negative bacteria more resistant to antibiotics?	Capsule	Ribosomes	Outer membrane	Thick cell wall	Outer membrane
60	What protein acts as a pore in Gram-negative bacteria?	Actin	Myosin	Porin	Tubulin	Porin
61	What is the function of the capsule in some bacteria?	DNA replication	Cell division	Sticky nature of colonies	Photosynthesis	Sticky nature of colonies
62	In bacteria that lack a cell wall, which structure forms the outermost layer?	Cytoplasm	Capsule	Cell membrane	Nucleoid	Cell membrane
63	Which of the following is absent in bacterial cell membranes?	Peptidoglycan	Sterols (e.g., cholesterol)	Ribosomes	Porins	Sterols (e.g., cholesterol)

#	Question	Option A	Option B	Option C	Option D	Answer
64	What are mesosomes?	Pigments in bacteria	Invaginations of cell wall	Invagination of plasma membrane	Cell wall components	Invagination of plasma membrane
65	Which of the following is a function of mesosomes?	Digestion	Photosynthesis	DNA replication and respiration	Motility	DNA replication and respiration
66	What is absent in bacterial cytoplasm?	Ribosomes	Cytoskeleton	Mesosome	Nucleoid	Cytoskeleton
67	What is the sedimentation rate of bacterial ribosomes?	60S	80S	70S	90S	70S
68	What type of DNA is found in the nucleoid of bacteria?	Single-stranded circular	Double-stranded circular	Double-stranded linear	Single-stranded linear	Double-stranded circular
69	What are plasmids?	Parts of ribosomes	Non-replicating proteins	Extra-chromosomal, self-replicating DNA	Cell wall components	Extra-chromosomal, self-replicating DNA
70	What are endospores in bacteria?	Metabolically active cells	Resting, thick-walled, dormant cells	Cells that perform photosynthesis	Thin-walled reproductive cells	Resting, thick-walled, dormant cells

#	Question	Option A	Option B	Option C	Option D	Answer
71	The process by which bacteria form endospores is called:	Germination	Binary fission	Sporulation	Replication	Sporulation
72	During sporulation, the first step is:	Septum formation	DNA replication	Spore coat formation	Peptidoglycan layer formation	DNA replication
73	What surrounds the new DNA during endospore formation?	A single cell wall	A protein layer	Two membranes	One lipid membrane	Two membranes
74	What happens to the DNA of the vegetative cell during endospore formation?	It duplicates	It becomes active	It disintegrates	It is transferred to the endospore	It disintegrates
75	When do endospores germinate?	During nutrient depletion	When conditions are unfavorable	Under favorable conditions	At high temperature	Under favorable conditions
76	What type of bacteria do not possess any flagella?	Peritrichous	Monotrichous	Atrichous	Lophotrichous	Atrichous

#	Question	Option A	Option B	Option C	Option D	Answer
77	Lophotrichous bacteria have:	Flagella all over	A tuft of flagella at one pole	No flagella	Flagella on both poles	A tuft of flagella at one pole
78	Amphitrichous bacteria possess flagella:	Only on one pole	On all sides	On both sides	Only internally	On both sides
79	What surrounds the entire surface of peritrichous bacteria?	Pili	Axial filaments	Slime layer	Flagella	Flagella
80	What protein makes up bacteria flagella?	Tubulin	Actin	Flagellin	Myosin	Flagellin
81	What role do normal flora bacteria play in preventing pathogen colonization?	They produce toxins	They compete for attachment sites and nutrients	They synthesize vitamins only	They stimulate antibodies	They compete for attachment sites and nutrients
82	Which of the following vitamins are produced by bacteria in the human body?	Vitamin C and Vitamin	Vitamin A and Vitamin D	Vitamin K and Vitamin B12	Vitamin B1 and Vitamin B3	Vitamin K and Vitamin B12

#	Question	Option A	Option B	Option C	Option D	Answer
83	What is the main benefit of normal flora bacteria to humans?	They help produce energy	They synthesize essential vitamins	They clean up oil spills	They increase carbon dioxide	They synthesize essential vitamins
84	What does the term "normal flora" refer to?	Harmful bacteria	The community of microorganisms living in the human body	Bacteria that cause diseases	Bacteria used in pharmaceutical industries	The community of microorganisms living in the human body
85	Which bacterium is commonly used as a biopesticide in agriculture?	Bacillus thuringiensis	Nitrosomonas	Azotobacter	Pseudomonas	Bacillus thuringiensis
86	Which of the following is a function of the bacteria in the human intestine?	Produce antibiotics	Kill pathogens directly	Synthesize vitamins	Stimulate the immune response	Synthesize vitamins
87	How do normal flora bacteria contribute to immunity in humans?	They inhibit the growth of all bacteria	They produce substances that kill all pathogens	They stimulate the production of cross-reactive antibodies	They prevent all forms of infection	They stimulate the production of cross-reactive antibodies

#	Question	Option A	Option B	Option C	Option D	Answer
88	The enzyme responsible for converting HIV RNA into DNA is:	RNA polymerase	Reverse transcriptase	DNA helicase	Integrase	Reverse transcriptase
89	The HIV capsid contains:	Single-stranded DNA and reverse transcriptase	Single-stranded RNA and reverse transcriptase	Double-stranded DNA and integrase	Double-stranded RNA and RNA polymerase	Single-stranded RNA and reverse transcriptase
90	What is the size range of viruses?	10 nm to 500 nm	20 nm to 250 nm	50 nm to 500 nm	100 nm to 1000 nm	20 nm to 250 nm
91	Which of the following is not an accurate description of a chromosome?	It is a coloured body localized in the nucleus	It is a protein and nucleic acid complex	It is the cellular structure that contains the genetic material	In eukaryotes, it is composed of many DNA molecules attached end to end	In eukaryotes, it is composed of many DNA molecules attached end to end
92	The rough endoplasmic reticulum is:	An intracellular double-membrane system to which ribosomes are attached	An intracellular membrane studied with microtubular structures	A membranous structure found within mitochondria	Only found in prokaryotic cells	An intracellular double-membrane system to which ribosomes are attached

#	Question	Option A	Option B	Option C	Option D	Answer
93	Lysosomes are formed by budding from which cellular organelle?	Smooth endoplasmic reticulum	Golgi apparatus	Rough endoplasmic reticulum	Nucleus	Golgi apparatus
94	Which of the following is an example of prokaryotic organisms?	Euglena	Yeast	Bacteria	Plants	Bacteria
95	Which of the following is a unicellular eukaryote?	Bacteria	Yeast	Plants	Algae	Yeast
96	Plants and animals are example of:	Prokaryotes	Viruses	Unicellular organisms	Multicellular eukaryotes	Multicellular eukaryotes
97	What makes eukaryotic cells more complex than prokaryotic cells?	Simple structure	Lack of organelles	Presence of a nucleus and organelles	Smaller size	Presence of a nucleus and organelles
98	The cell wall is found in all of the following EXCEPT:	Bacteria	Algae	Animals	Fungi	Animals

#	Question	Option A	Option B	Option C	Option D	Answer
99	Which is the term for remaining compounds of a cell after the cell wall is removed?	Cytosol	Plasmodesmata	Protoplast	Cell membrane	Protoplast
100	The actual cell wall of a cell is called the:	Secondary wall	Middle lamella	Primary wall	Outer membrane	Primary wall
101	Which of the following is NOT a polysaccharide found in the primary cell wall?	Cellulose	Hemicellulose	Pectin	Lignin	Lignin
102	The gelatinous layer between primary walls of neighbouring plant cells is called?	Secondary wall	Cell plate	Middle lamella	Cell junction	Middle lamella
103	Which salts are commonly found in middle lamella?	Sodium and potassium pectates	Magnesium and calcium pectates	Iron and zinc pectates	Chloride and nitrate salts	Magnesium and calcium pectates

#	Question	Option A	Option B	Option C	Option D	Answer
104	What is added between the primary wall and protoplast in some mature plant cells?	Plasma membrane	Vacuole	Secondary wall	Middle lamella	Secondary wall
105	What is lignin's function in the secondary wall?	Makes the wall softer	Reduces rigidity	Provides flexibility	Increases rigidity	Increases rigidity
106	During plasmodesmata formation, which organelle gets trapped in the new cell wall?	Nucleus	Mitochondria	Endoplasmic reticulum	Golgi apparatus	Endoplasmic reticulum
107	One of the main functions of the cell wall is to:	Control cell division	Provide structural support	Assist in protein synthesis	Generate ATP	Provide structural support
108	The cell wall helps maintain:	Internal temperature	Hormone levels	Cell shape and direction of growth	DNA replication	Cell shape and direction of growth

#	Question	Option A	Option B	Option C	Option D	Answer
109	How does the cell wall help protect the plant?	By storing oxygen	By neutralizing toxins	By blocking sunlight	By resisting pathogens and environmental stress	By resisting pathogens and environmental stress
110	The cell wall also serve as a strong store for:	Fats	Proteins	Enzymes	Carbohydrates	Carbohydrates
111	What is the function of the plasma membrane in all cells?	It produces energy	It encloses cell contents and serves as a semi-porous barrier	It forms genetic material	It synthesizes proteins	It encloses cell contents and serves as a semi-porous barrier
112	Who proposed the fluid mosaic model of the plasma membrane?	Watson and Crick	Robert Hooke and Antonie Van Leeuwenhoek	S.J Singer and Garth Nicolson	Schleiden and Schwann	S.J Singer and Garth Nicolson
113	What is the primary structural component of the plasma membrane?	DNA	Phospholipids	RNA	Cellulose	Phospholipids
114	The phosphate end of a phospholipid is:	Hydrophobic	Non-polar	Hydrophilic	Amphipathic	Hydrophilic

#	Question	Option A	Option B	Option C	Option D	Answer
115	In the bilayer of plasma membrane, hydrophobic tails face:	Outwards	Toward cytoplasm	Inward	The nucleus	Inward
116	What maintains the fluidity of the plasma membrane at low temperature in eukaryotic cells?	Proteins	Phospholipids	Cholesterol	Carbohydrates	Cholesterol
117	Proteins in the plasma membrane can function as all of the following EXCEPT:	Channels for transport	Energy storage units	Enzymes	Receptors	Energy storage units
118	Which proteins are responsible for transmitting signals to the interior of the cell?	Channel proteins	Carrier proteins	Receptor proteins	Enzymatic proteins	Receptor proteins
119	Proteins that catalyze reactions related to the plasma	Channel proteins	Structural proteins	Enzymatic proteins	Messenger proteins	Enzymatic proteins

#	Question	Option A	Option B	Option C	Option D	Answer
	membrane are called:					
120	A protein with a sugar chain attached is known as:	Glycolipid	Glycoprotein	Glycogen	Glucose protein	Glycoprotein
121	Which cell type has 49% protein in its plasma membrane by weight?	Bacteria	Human red blood cells	Mitochondrial inner membrane	Plant cell	Human red blood cells
122	What percentage of lipids is found in the outer mitochondrial membrane?	24%	52%	48%	25%	52%
123	What is the carbohydrate percentage in bacterial membranes?	0%	8%	10%	25%	0%
124	Which structure enables selective transport across the membrane?	Lipids	DNA	Proteins	Carbohydrates	Proteins

#	Question	Option A	Option B	Option C	Option D	Answer
125	Glycolipids and glycoproteins vary between:	Species	Individuals of the same species	Different cell types	All of the above	All of the above
126	What is the basic function of plasma membrane?	Proteins synthesis	Energy production	Acts as a semi-porous barrier	DNA replication	Acts as a semi-porous barrier
127	The plasma membrane holds which of the following together?	Nucleus only	Cell wall	Organelles	Cell constituents	Cell constituents
128	Which of the following can freely pass through the plasma membrane?	Proteins	Amino acids	Sugars	Oxygen	Oxygen
129	Which of the following molecules is carefully regulated by the plasma membrane?	Water	Carbon dioxide	Amino acids	Oxygen	Amino acids
130	The internal organelle membranes of eukaryotic	Store water	Destroy waste	Regulate material flow	Create ribosomes	Regulate material flow

#	Question	Option A	Option B	Option C	Option D	Answer
	cells serve to:					
13 1	What is the cytoplasm composed of?	Only water and salts	Only organelles	Cytosol, organelles, and inclusions	Plasma and DNA	Cytosol, organelles, and inclusions
13 2	In eukaryotic cells, the cytoplasm is found between:	Cell wall and plasma membrane	Nucleus and ribosome	Plasma membrane and nuclear envelope	Mitochondria and nucleus	Plasma membrane and nuclear envelope
13 3	What is the primary function of the cytoplasm?	DNA replication	Protein transport only	Providing space for organelles and metabolic reactions	Storing genetic material	Providing space for organelles and metabolic reactions
13 4	Which metabolic reaction occurs in the cytoplasm?	Photosynthesis	Glycolysis	DNA replication	Protein transcription	Glycolysis
13 5	Which organelle stores the genetic material of eukaryotic cell?	Ribosome	Cytoplasm	Nucleolus	Nucleus	Nucleus
13 6	What is the chemical	H ₂ O ₂	HO	H ₂ O	OH ₂	H₂O

#	Question	Option A	Option B	Option C	Option D	Answer
	formula of water?					
137	What percentage of the human body is made up of water?	About one-third	About two-thirds	About 90%	About 50%	About two-thirds
138	What is the water content in bone cells?	10%	20%	50%	80%	20%
139	Brain cells contain approximately how much water?	65%	75%	95%	85%	85%
140	Which property of water makes it a good solvent?	Polarity and hydrogen bonding	Non-polarity	Low boiling point	High density	Polarity and hydrogen bonding
141	What are molecules with partial charges called?	Non-polar molecules	Polar molecules	Neutral molecules	Covalent molecules	Polar molecules
142	What is a hydrogen bond?	A covalent bond between hydrogen atoms	A weak attraction between polar molecules	A bond between two hydrogen atoms	A bond in metals	A weak attraction between polar molecules

#	Question	Option A	Option B	Option C	Option D	Answer
14 3	What happens when salt (NaCl) is placed in water?	It forms a gas	It sinks	It dissociates into Na ⁺ and Cl ⁻ ions	It burns	It dissociates into Na⁺ and Cl⁻ ions
14 4	What are molecules that do not dissolve in water called?	Hydrophobic	Hydrophilic	Polar	Aqueous	Hydrophobic
14 5	Which type of molecules are moved out by water molecules due to lack of bonding?	Ionic	Non-polar	Polar	Charged	Non-polar
14 6	What structure is maintained by lipid associations in water?	Ribosomes	Chloroplasts	Cell membranes	Cell wall	Cell membranes
14 7	What is specific heat capacity?	Energy required to boil a liquid	Energy to raise temperature of 1g by 1°C	Heat lost during freezing	Heat of reaction	Energy to raise temperature of 1g by 1°C
14 8	What is the specific heat capacity of water?	2.1 Joules	3.5 Joules	4,184 Joules	5.5 Joules	4,184 Joules

#	Question	Option A	Option B	Option C	Option D	Answer
149	Why does water resist temperature change?	Because of its density	Due to hydrogen bond breakage absorbing energy	Because of its color	Due to low boiling point	Due to hydrogen bond breakage absorbing energy
150	What is heat of vaporization ?	Temperature at which water freezes.	Temperature water boils	Heat required to convert liquid to gas	Heat required to melt ice	Heat required to convert liquid to gas
151	What role does water play in metabolism?	Prevents reactions	Acts as a medium for chemical reactions	Breaks bonds permanently	Blocks enzyme function	Acts as a medium for chemical reactions
152	What is water's heat of vaporization ?	400 Kcal/kg	450 Kcal/kg	574 Kcal/kg	600 Kcal/kg	574 Kcal/kg
153	How does water help in cooling during perspiration ?	It contracts the body	It blocks pores	Each gram removes 574 calories as it evaporates	It adds salt to the skin	Each gram removes 574 calories as it evaporates
154	What is cohesion in water?	Attraction between similar molecules	Repulsion between molecules	Movement against gravity	Adhesion with solids	Attraction between similar molecules
155	What helps water move	Gravity	Cohesion among	Sunlight	Oxygen	Cohesion among water molecules

#	Question	Option A	Option B	Option C	Option D	Answer
	upward in plants?		water molecules			
156	What is surface tension in water due to?	Temperature	Hydrogen bonds	Air pressure	Ionic strength	Hydrogen bonds
157	How is water ionized?	By sunlight	Through boiling	By breaking covalent bonds into H ⁺ and OH ⁻	Through electrolysis	By breaking covalent bonds into H⁺ and OH⁻
158	What is the concentration of H ⁺ ions in pure water at 25°C?	10 ⁻⁵ M	10 ⁻⁶ M	10 ⁻⁷ M	10 ⁻⁸ M	10⁻⁷ M
159	Why is ice less dense than water?	It contains air	Hydrogen bonds keep molecules further apart	It evaporates easily	It is heavier	Hydrogen bonds keep molecules further apart
160	What does the term "carbohydrate" literally mean?	Complex sugar	Hydrated carbon	Organic compound	Energy source	Hydrated carbon
161	Which process primarily synthesizes carbohydrates in nature?	Respiration	Digestion	Photosynthesis	Fermentation	Photosynthesis

#	Question	Option A	Option B	Option C	Option D	Answer
162	Carbohydrates are also known as:	Polymers	Lipids	Saccharides	Proteins	Saccharides
163	Which of the following is a monosaccharide?	Maltose	Lactose	Glucose	Sucrose	Glucose
164	Which type of sugar is most common in energy storage?	Ribose	Fructose	Galactose	Glucose	Glucose
165	Which of the following are isomers?	Glucose and maltose	Glucose and fructose	Fructose and sucrose	Ribose and deoxyribose	Glucose and fructose
166	Glucose and galactose differ in:	Number of carbon atoms	Presence of hydrogen	Orientation of hydroxyl group	Number of oxygen atoms	Orientation of hydroxyl group
167	Ribose and deoxyribose are examples of:	Disaccharides	Pentoses	Hexoses	Polysaccharides	Pentoses
168	Disaccharides are formed through what type of reaction?	Hydrolysis	Oxidation	Dehydration synthesis	Neutralization	Dehydration synthesis
169	The bond formed between	Hydrogen bond	Ionic bond	Peptide bond	Glycosidic bond	Glycosidic bond

#	Question	Option A	Option B	Option C	Option D	Answer
	two monosaccharides is called:					
170	What is the composition of maltose?	Glucose + Galactose	Glucose + Glucose	Glucose + Fructose	Fructose + Galactose	Glucose + Glucose
171	Lactose is commonly found in:	Sugarcane	Fruits	Milk	Cereals	Milk
172	Sucrose is a combination of which two sugars?	Glucose and maltose	Glucose and galactose	Glucose and fructose	Galactose and ribose	Glucose and fructose
173	Which monosaccharides are components of nucleic acids?	Trioses	Pentoses	Hexoses	Heptoses	Pentoses
174	Which of the following is a plant storage polysaccharide?	Glycogen	Cellulose	Starch	Chitin	Starch
175	Why is starch ideal for storage in plant cells?	It is sweet	It is insoluble and does not affect water potential	It digests proteins	It dissolves easily	It is insoluble and does not affect water potential

#	Question	Option A	Option B	Option C	Option D	Answer
176	Cellulose is composed of which type of glucose?	Alpha-glucose only	Beta-glucose	Fructose	Mixed sugars	Beta-glucose
177	Which polysaccharide is found in exoskeletons and fungal cell walls?	Glycogen	Agar	Chitin	Cellulose	Chitin
178	Which enzyme breaks down starch components ?	Amylase	Lactase	Cellulose	Protease	Amylase
179	Glycogen is primarily stored in which animal tissues?	Skin and lungs	Muscles and liver	Heart and kidneys	Brain and bones	Muscles and liver
180	Haemoglobin has:	Primary structure	Secondary structure	Tertiary structure	Quaternary structure	Quaternary structure
181	Who coined the term "protein"?	Robert Hooke	J.J. Berzelius	Watson	Linus Pauling	J.J. Berzelius
182	What are proteins made of?	Nucleotides	Monosaccharides	Amino acids	Fatty acids	Amino acids

#	Question	Option A	Option B	Option C	Option D	Answer
183	How many amino acids are commonly used in proteins?	10	20	30	50	20
184	What is the basic structure of an amino acid?	One carboxyl group only	A sugar ring	Amino group, carboxyl group, hydrogen, and R group	Phosphate and sugar	Amino group, carboxyl group, hydrogen, and R group
185	Which of the following is an essential amino acid?	Glycine	Alanine	Valine	Serine	Valine
186	How are two amino acids linked together?	Hydrogen bond	Ionic bond	Peptide bond	Disulphide bond	Peptide bond
187	What is formed when two amino acids link together?	Polypeptide	Dipeptide	Monopeptide	Lipid	Dipeptide
188	What is the primary structure of a protein?	Folding of a chain	Number of peptide bonds	Linear sequence of amino acids	Interaction with DNA	Linear sequence of amino acids
189	What is the secondary	Disulphide linkage	Coiling and folding like	Genetic code	Protein breakdown	Coiling and folding like

#	Question	Option A	Option B	Option C	Option D	Answer
	structure of a protein?		alpha helix and beta sheet			alpha helix and beta sheet
190	What is the tertiary structure of a protein?	Linear sequence	Arrangement of nucleotides	3D folding of a polypeptide	Double helix	3D folding of a polypeptide
191	What is the quaternary structure of a protein?	Sequence of amino acids	One folded chain	Association of multiple polypeptide chains	Chain of sugars	Association of multiple polypeptide chains
192	Which type of protein is non-crystalline and elastic?	Enzymes	Fibrous	Globular	Hormonal	Fibrous
193	Which type of protein forms the structure of nails and hair?	Collagen.	Fibrin	Keratin	Actin	Keratin
194	What type of role do fibrous proteins mainly perform?	Digestive	Structural	Catalytic	Transport	Structural
195	What are the two main structural	Active and Passive	Essential and Non-essential	Fibrous and Globular	Primary and Secondary	Fibrous and Globular

#	Question	Option A	Option B	Option C	Option D	Answer
	classes of proteins?					
196	Which of the following is a hormone and a globular protein?	Fibrin	Keratin	Collagen	Insulin	Insulin
197	What is the main role of enzymes in the body?	Storage	Biocatalyst	Defense	Structure	Biocatalyst
198	Which fibrous protein is primarily responsible for the structure of hair and nails?	Collagen	Keratin	Actin	Myosin	Keratin
199	Which protein hormone regulates blood glucose levels?	Oxytocin	Insulin	Antidiuretic hormone	Fibrinogen	Insulin
200	Which of the following is NOT a protein?	Haemoglobin	Cholesterol	Pepsin	Antibody	Cholesterol

#	Question	Option A	Option B	Option C	Option D	Answer
201	Which group is found in all fatty acids?	PO ₄	SO ₄	C-N	COOH	COOH
202	Which of the following best describes lipids?	Polar molecules soluble in water	Non-polar molecules soluble in water	Non-polar molecules insoluble in water	Polar molecules soluble in ether	Non-polar molecules insoluble in water
203	What are fats and oils collectively called?	Waxes	Triacylglycerol	Acylglycerols	Steroids	Triacylglycerol
204	Which type of acylglycerol is solid at room temperature?	Oil	Wax	Fat	Phospholipid	Fat
205	What is the backbone of a triacylglycerol molecule?	Fatty acid	Phosphate group	Glycerol	Glucose	Glycerol
206	Saturated fatty acids contain:	One double bond	Multiple double bonds	No double bonds	Triple bonds	No double bonds
207	Why are acylglycerols good energy-	They are polar	They contain oxygen	They have many C-H bonds	They are acidic	They have many C-H bonds

#	Question	Option A	Option B	Option C	Option D	Answer
	storage molecules?					
208	What causes the hydrophobic nature of lipids?	Polar bonds	Ionic groups	Non-polar structure	Hydroxyl groups	Non-polar structure
209	Waxes are mainly used in living organisms for:	Insulation	Structural support	Energy production	Protective coatings	Protective coatings
210	Which lipid forms the bilayer of plasma membranes?	Waxes	Phospholipids	Steroids	Triacylglycerols	Phospholipids
211	What is the basic building unit of terpenes?	Glucose	Glycerol	Isoprene	Carboxyl group	Isoprene
212	What is the structure of a steroid based on?	A branched fatty acid	Four fused carbon rings	A phosphate group	A triacylglycerol	Four fused carbon rings
213	Cholesterol is a type of:	Wax	Protein	Steroid	Phospholipid	Steroid
214	Prostaglandins are involved in:	Bone formation	Muscle contraction and	Membrane synthesis	Vitamin D production	Muscle contraction

#	Question	Option A	Option B	Option C	Option D	Answer
			inflammation			and inflammation
215	What are nucleic acids made up of?	Amino acids	Fatty acids	Nucleotides	Monosaccharides	Nucleotides
216	Which sugar is found in DNA?	Glucose	Ribose	Fructose	Deoxyribose	Deoxyribose
217	Which nitrogenous base is present only in RNA?	Thymine	Cytosine	Uracil	Adenine	Uracil
218	Which of the following is a purine base?	Cytosine	Thymine	Uracil	Guanine	Guanine
219	What is the function of mRNA?	Transport amino acids	Synthesize ribosomes	Carry genetic information from DNA	Store lipids	Carry genetic information from DNA
220	What type of bond connects nucleotides together?	Peptide bond	Glycosidic bond	Phosphodiester bond	Hydrogen bond	Phosphodiester bond
221	What is the structure of tRNA most similar to?	Spiral	Rod	Clover leaf	Ladder	Clover leaf

#	Question	Option A	Option B	Option C	Option D	Answer
22 2	What is the central dogma of molecular biology?	DNA - Protein - RNA	RNA - DNA - Protein	DNA - RNA - Protein	Protein - RNA - DNA	DNA - RNA - Protein
22 3	Who proposed the double helix model of DNA?	Rosalind Franklin	Chargaff	Watson and Crick	Avery and McCarty	Watson and Crick
22 4	How many hydrogen bonds form between adenine and thymine?	One	Two	Three	Four	Two
22 5	Which RNA type is most abundant in the cell?	mRNA	tRNA	rRNA	snRNA	rRNA
22 6	What holds the two DNA strands together?	Ionic bonds	Peptide bonds	Hydrogen bonds	Covalent bonds	Hydrogen bonds
22 7	What kind of sugar is present in RNA?	Glucose	Deoxyribose	Ribose	Maltose	Ribose
22 8	What is a gene?	A ribosomal structure	A sequence of amino acids	A DNA segment that codes	An RNA fragment	A DNA segment that codes for a polypeptide

#	Question	Option A	Option B	Option C	Option D	Answer
				for a polypeptide		
229	What are conjugated molecules composed of?	Similar molecules only	Molecules from the same category	Two or more molecules from different categories	Only proteins and carbohydrates	Two or more molecules from different categories
230	Glycoproteins are formed by the linkage of which two components?	Protein and lipid	Carbohydrate and lipid	Protein and carbohydrate	Lipid and nucleic acid	Protein and carbohydrate
231	Glycolipids are a combination of:	Lipids and nucleic acids	Proteins and carbohydrates	Lipids and carbohydrates	Proteins and lipid	Lipids and carbohydrates
232	Lipoproteins play an important role in:	Blood clotting	Transporting lipids in blood	Making enzymes	Digesting carbohydrates	Transporting lipids in blood
233	Histone proteins bind with DNA to form:	Liposomes	Enzymes	Nucleosomes	Glycoproteins	Nucleosomes
234	Where are glycolipids commonly located?	Inside the nucleus	In the cell membrane	In the mitochondria	In the Golgi apparatus	In the cell membrane

#	Question	Option A	Option B	Option C	Option D	Answer
235	What are enzymes?	Structural proteins that build tissues	Hormones that regulate metabolism	Globular proteins that lower activation energy	Lipids that provide energy	Globular proteins that lower activation energy
236	Enzymes are also known as:	Coenzymes	Substrates	Biological catalysts	Metabolites	Biological catalysts
237	What is the site of enzyme synthesis inside the cell?	Nucleus	Mitochondria	Ribosomes	Lysosomes	Ribosomes
238	What is the active site of an enzyme?	The region where energy is stored	The location at which catalysis occurs	The place where enzymes are destroyed	The outer surface of the substrate	The location at which catalysis occurs
239	Why can only a specific substrate bind to an enzyme's active site?	The substrate must have energy	The active site is three-dimensional and bears a specific charge	All substrates can fit any active site	Enzymes have no selectivity	The active site is three-dimensional and bears a specific charge
240	What are cofactors in enzyme activity?	Enzyme inhibitors	Non-protein components that assist in catalysis	Only metal ions	Denatured proteins	Non-protein components that assist in catalysis

#	Question	Option A	Option B	Option C	Option D	Answer
24 1	What is a prosthetic group in relation to an enzyme?	A loosely bound organic molecule	A permanently bound nonpeptide cofactor	A temporary metal ion	A non-functional enzyme part	A permanently bound nonpeptide cofactor
24 2	What role do enzymes play in chemical reactions?	They increase the activation energy required	They act as substrates for reactions	They speed up reactions by lowering activation energy	They are permanently consumed in reactions	They speed up reactions by lowering activation energy
24 3	What is activation energy?	The energy released by a reaction	The energy required to initiate a chemical reaction	The energy stored in substrates	The energy enzymes produce	The energy required to initiate a chemical reaction
24 4	How do enzymes lower activation energy?	By breaking the bonds of substrates directly	By bringing reactants together in the correct orientation or stressing bonds	By increasing temperature of the reaction	By changing the final products	By bringing reactants together in the correct orientation or stressing bonds
24 5	What happens when a substrate binds to an enzyme?	The enzyme is permanently altered	The enzyme-substrate (ES) complex is formed and catalytic site is activated	The substrate is destroyed immediately	The enzyme loses its specificity	The enzyme-substrate (ES) complex is formed and catalytic site is activated
24 6	Who proposed the Lock-and-Key	Daniel Koshland	Emil Fischer	Louis Pasteur	James Watson	Emil Fischer

#	Question	Option A	Option B	Option C	Option D	Answer
	model of enzyme action?					
24 7	Who proposed the Induced Fit model?	Emil Fischer	Daniel Koshland	Alexander Fleming	Robert Hooke	Daniel Koshland
24 8	What is an inhibitor in the context of enzymes?	A substance that enhances enzyme action	A chemical that blocks an enzyme's activity	A coenzyme that binds to the enzyme	A product of an enzymatic reaction	A chemical that blocks an enzyme's activity
24 9	What is a competitive inhibitor?	An inhibitor that binds at a different site on the enzyme	A product of the enzymatic reaction	A substance that resembles the substrate and competes for active site	An enzyme that helps other enzymes	A substance that resembles the substrate and competes for active site
25 0	How does a non-competitive inhibitor work?	It enters the active site and blocks it	It changes the shape of the enzyme by binding elsewhere	It resembles the enzyme's substrate	It enhances the enzyme's activity	It changes the shape of the enzyme by binding elsewhere
25 1	What determines whether an inhibitor is reversible or irreversible?	The presence of substrate	The enzyme's temperature tolerance	The type of bond formed with the enzyme	The number of products formed	The type of bond formed with the enzyme

#	Question	Option A	Option B	Option C	Option D	Answer
25 2	What is true about irreversible inhibitors?	They can be removed by dilution	They make covalent bonds and cannot be removed	They temporarily slow down reactions	They bind only to coenzymes	They make covalent bonds and cannot be removed
25 3	What is feedback inhibition in cells?	A process that accelerates all metabolic reactions	A mechanism that allows enzymes to function continuously	A control mechanism in which enzyme activity is inhibited by its end product	A method for DNA replication in cells	A control mechanism in which enzyme activity is inhibited by its end product
25 4	The enzymes that catalyse the reactions in which two molecules are joined together by synthesis of new bonds, using energy from ATP, are placed in group;	Hydrolase	Ligase	Lyase	Transferase	Ligase
25 5	Which class of enzymes catalyses oxidation and reduction reactions?	Transferases	Hydrolases	Oxidoreductases	Ligases	Oxidoreductases

#	Question	Option A	Option B	Option C	Option D	Answer
256	What is the function of transferase enzymes?	Transfer functional groups from one substrate to another	Break down large molecules by adding water	Remove CO ₂ from substrates	Rearrange molecular structure within the same molecule	Transfer functional groups from one substrate to another
257	Hydrolase enzymes catalyse which type of reaction?	Oxidation	Hydrolysis	Rearrangement	Addition of groups	Hydrolysis
258	What reaction do isomerases catalyse?	Oxidation	Transfer of phosphate	Intra-molecular rearrangement	Hydrolysis	Intra-molecular rearrangement
259	Ligases catalyse which type of reaction?	Hydrolysis	Joining two molecules with new bonds using ATP energy	Oxidation groups	Transfer of functional	Joining two molecules with new bonds using ATP energy
260	What main process occurs during the dark reaction of photosynthesis?	Release of oxygen	Energy absorption by chlorophyll	Adding of hydrogen to CO ₂	Formation of ATP	Adding of hydrogen to CO₂
261	Which of the following are produced by the reactions that occur in the thylakoid	CO ₂ and H ₂ O	Glucose and O ₂	NADP ⁺ and ADP	ATP and NADPH	ATP and NADPH

#	Question	Option A	Option B	Option C	Option D	Answer
	and consumed by the reactions that occur in the stroma?					
262	Which of these is CO ₂ acceptor during photosynthesis?	Malic acid	Ribulose biphosphate	Oxaloacetic acid	Phosphoglyceric acid	Ribulose biphosphate
263	What are the main reactants of photosynthesis in plants?	Oxygen, glucose, water	Glucose, carbon dioxide, ATP	Carbon dioxide, water, and light	Oxygen, ATP, water	Carbon dioxide, water, and light
264	What are the products of photosynthesis?	CO ₂ and H ₂ O	Glucose and oxygen	NADPH and ATP	Light and carbon dioxide	Glucose and oxygen
265	Which pigment absorbs light energy in photosynthesis?	Glucose	Chlorophyll	Starch	Ribulose	Chlorophyll
266	Where does carbon dioxide enter a leaf?	Through phloem	Through the cuticle	Through stomata	Through xylem	Through stomata

#	Question	Option A	Option B	Option C	Option D	Answer
267	What are photosystems?	Enzymes in the stroma	Clusters of pigments organized in chloroplasts	DNA-containing structures	Protein pumps in mitochondria	Clusters of pigments organized in chloroplasts
268	Which pigment is found in the reaction centre of a photosystem?	Chlorophyll-a	Chlorophyll-b	Xanthophyll	Phycobilin	Chlorophyll-a
269	What type of process is photosynthesis?	Hydrolysis	Fermentation	Redox (oxidation-reduction)	Neutralization	Redox (oxidation-reduction)
270	Where do light-dependent reactions occur?	Cytoplasm	Nucleus	Thylakoid membranes of grana	Mitochondria	Thylakoid membranes of grana
271	Where do light-independent reactions take place?	Stroma	Nucleus	Grana	Cytoplasm	Stroma
272	What is the "Z-scheme" in photosynthesis?	Calvin cycle shape	NADPH formation path	Zigzag electron flow through photosystems and chains	ATP transport path	Zigzag electron flow through photosystems and chains

#	Question	Option A	Option B	Option C	Option D	Answer
273	What is chemiosmosis in photosynthesis?	Splitting of water molecules	Release of oxygen from chloroplast	ATP synthesis using a proton gradient	Movement of CO ₂ into leaves	ATP synthesis using a proton gradient
274	Which molecule captures CO ₂ in the Calvin cycle?	Glucose	RuBP (Ribulose Biphosphate)	ATP	NADPH	RuBP (Ribulose Biphosphate)
275	What enzyme catalyzes carbon fixation?	ATP synthase	RuBisCO	Ferredoxin	NADP reductase	RuBisCO
276	Which scientist discovered the Calvin cycle?	Van Niel	Joseph Priestley	Melvin Calvin	Robert Hooke	Melvin Calvin
277	What is the primary function of cellular respiration?	Produce glucose	Break down carbon dioxide	Generate usable energy	Form nucleic acids	Generate usable energy
278	In which organelle does aerobic respiration mostly occur?	Nucleus	Cytoplasm	Mitochondria	Ribosome	Mitochondria

#	Question	Option A	Option B	Option C	Option D	Answer
279	Which process occurs in the cytosol of the cell?	Krebs cycle	Glycolysis	Pyruvic acid oxidation	Alcoholic fermentation	Glycolysis
280	What is the first step in both aerobic and anaerobic respiration?	Krebs cycle	Glycolysis	Alcoholic fermentation	Oxidative phosphorylation	Glycolysis
281	What does NAD ⁺ get reduced to during glycolysis?	FAD	CO ₂	NADH	ATP	NADH
282	What is the final electron acceptor in the electron transport chain?	Water	NAD ⁺	Oxygen	Hydrogen	Oxygen
283	What is chemiosmosis?	Movement of glucose across membranes	Redox reaction without ATP	Coupling redox reactions with ATP synthesis via membranes	Passive diffusion of water	Coupling redox reactions with ATP synthesis via membranes
284	How many net ATP molecules are	28	36	12	2	36

#	Question	Option A	Option B	Option C	Option D	Answer
	produced in complete aerobic respiration of one glucose?					
285	Process by which water evaporates from surface of leaf primarily through stomata?	Transpiration	Guttation	Imbibition	Cohesion	Transpiration
286	Through which structure does most of transpiration occurs?	Root hairs	Phloem	Xylem	Stomata	Stomata
287	What type of cells surround each stoma?	Palisade cells	Spongy cells	Guard cells	Epidermal cells	Guard cells
288	What happens to guard cells when water leaves them?	They become rigid	They become turgid	They become flaccid	They enlarge	They become flaccid
289	Which hypothesis explains stomatal	Protein hypothesis	Chloroplast hypothesis	Starch-sugar hypothesis	Osmotic pressure hypothesis	Starch-sugar hypothesis

#	Question	Option A	Option B	Option C	Option D	Answer
	movement based on sugar production?					
290	The TACT theory primarily explains:	The movement of nutrients in the plants	The transport of water in plants	The absorption of minerals	The process of photosynthesis	The transport of water in plants
291	What is the main function of root hairs in plants?	Photosynthesis	Water and mineral absorption	Gas exchange	Food storage	Water and mineral absorption
292	The apoplast pathway involves:	Cytoplasm of cells	Vacuoles	Cell walls of adjacent cells	Plasma membrane	Cell walls of adjacent cells
293	What is the symplast pathway?	Movement through cell walls	Movement through xylem only	Movement through interconnected protoplasts via plasmodesmata	Movement in the phloem	Movement through interconnected protoplasts via plasmodesmata
294	Which vascular tissue is responsible for transporting water in plants?	Phloem	Cambium	Xylem	Epidermis	Xylem

#	Question	Option A	Option B	Option C	Option D	Answer
295	What does TACT stand for?	Transport, Aeration, Circulation, Tension	Transpiration, Adhesion, Cohesion, Tension	Transport, Attraction, Capillarity, Tension	Translocation, Adhesion, Circulation, Turgor	Transpiration, Adhesion, Cohesion, Tension
296	What drives the TACT mechanism in plants?	Root pressure	Osmosis	Transpiration	Capillary action only	Transpiration
297	What is adhesion in the context of water transport?	Attraction of root hairs to soil	Binding of minerals to xylem	Attraction between water molecules and xylem walls	Interaction between xylem walls	Attraction between water molecules and xylem walls
298	How does cohesion help in water movement?	By helping roots absorb nutrients	By making water molecules stick to xylem walls	By enabling water molecules to stick to each other	By pulling nutrients into phloem	By enabling water molecules to stick to each other
299	Which of the following is not a function of xylem?	Transport of water	Transport of minerals	Transport of food	Mechanical support	Transport of food
300	In higher plant, transport of food materials occurs through:	Companion cells	Sieve tube	Vessel elements	Tracheids	Sieve tube

#	Question	Option A	Option B	Option C	Option D	Answer
30 1	Which of the following is NOT a component of phloem?	Xylem fibres	Sieve tube elements	Companion cells	Phloem parenchyma	Xylem fibres
30 2	Phloem transport is mainly responsible for moving:	Water	Sugars	Oxygen	Minerals	Sugars
30 3	Who proposed the pressure-flow theory?	Robert Hooke	Ernst Munch	Charles Darwin	Julius von Sachs	Ernst Munch
30 4	In the pressure-flow theory, sugars move from:	Sink to source	Roots to stem	Source to sink	Phloem to xylem	Source to sink
30 5	The sugar most commonly translocated in plants is:	Glucose	Fructose	Sucrose	Maltose	Sucrose
30 6	Sucrose is initially synthesized in:	Root cells	Stem cortex	Mesophyll cells	Companion cells	Mesophyll cells
30 7	Which process helps move	Active transport	Transpiration	Diffusion	Mass flow	Mass flow

#	Question	Option A	Option B	Option C	Option D	Answer
	sugar solution from source to sink?					
308	Companion cells are responsible for:	Evaporation	Providing structural support	Supplying ATP and proteins to sieve tubes	Photosynthesis	Supplying ATP and proteins to sieve tubes
309	The movement of water and sugars in phloem is caused by:	Transpiration pull	Root pressure	Difference in water potential	Active transport only	Difference in water potential
310	In which plants is the entire body capable of growth?	Lower plants	Higher plants	Woody plants	Flowering plants	Lower plants
311	What are meristems?	Non-dividing cells	Groups of continuously dividing cells	Dead tissues	Photosynthetic cells	Groups of continuously dividing cells
312	Where are apical meristems found?	Base of leaves	Tips of roots and shoots	Along the stem	In fruits	Tips of roots and shoots
313	What is the primary function of apical meristems?	Secondary growth	Extension of plant body	Leaf shedding	Seed formation	Extension of plant body

#	Question	Option A	Option B	Option C	Option D	Answer
314	Which plants usually show only primary growth?	Herbaceous plants	Woody plants	Trees	Vines	Herbaceous plants
315	What is secondary growth?	Formation of leaves	Elongation of roots	Increase in thickness	Decrease in height	Increase in thickness
316	What tissue is mainly responsible for secondary growth?	Apical meristem	Lateral meristem	Intercalary meristem	Parenchyma	Lateral meristem
317	What structures make up the bark?	Phloem only	Secondary phloem, cork cambium, cork	Xylem only	Intercalary tissues	Secondary phloem, cork cambium, cork
318	What are annual rings?	Rings formed due to cambial activity each year	Marks on leaves	Bud scars	Root layers	Rings formed due to cambial activity each year
319	Plants that are adapted to survive in dry conditions:	Xerophytes	Hydrophytes	Mesophytes	Halophytes	Xerophytes
320	What is osmoregulation in plants?	Energy production in cells	Maintenance of temperature	Regulation of water and solute balance	Leaf formation	Regulation of water and solute balance

#	Question	Option A	Option B	Option C	Option D	Answer
321	What happens when a plant cell is placed in a hypotonic solution?	Water enters the cell	Water exits the cell	Cell undergoes plasmolysis	The cell dies immediately	Water enters the cell
322	What are xerophytes?	Plants adapted to dry environments	Plants that live in water	Salt-loving plants	Temperate forest plants	Plants adapted to dry environments
323	Halophytes grow in:	Freshwater lakes	Humid jungles	Saline soils or salty water	Shaded areas	Saline soils or salty water
324	Exposure to low temperature stimulates the process of flowering in biennial or perennial plants:	Dormancy	Photoperiodism	Vernalization	All of above	Vernalization
325	What are tropic movements?	Locomotive movements	Internal movements	Growth in response to stimuli	Random bending	Growth in response to stimuli
326	What is geotropism?	Response to chemicals	Response to gravity	Response to water	Response to light	Response to gravity

#	Question	Option A	Option B	Option C	Option D	Answer
327	What is photoperiodism?	Response to temperature	Response to air pressure	Response to day length	Response to water availability	Response to day length
328	What type of plants flower under long nights?	Long-day plants	Short-day plants	Day-neutral plants	Biennials	Short-day plants
329	What is the hypothetical hormone responsible for flowering?	Auxin	Florigen	Cytokinin	Absciscic acid	Florigen
330	What is vernalisation?	Induction of dormancy in plants	Stimulation of flowering by high temperature	Stimulation of flowering by low temperature	Suppression of seed germination	Stimulation of flowering by low temperature
331	Where does chemical digestion of carbohydrates begin?	Stomach	Oesophagus	Small intestine	Mouth	Mouth
332	Which enzyme in saliva starts breaking down starch?	Lipase	Amylase (Ptyalin)	Trypsin	Pepsin	Amylase (Ptyalin)
333	What prevents	Epiglottis	Oesophageal sphincter	Uvula	Tongue	Epiglottis

#	Question	Option A	Option B	Option C	Option D	Answer
	food from entering the trachea during swallowing?					
334	Which stomach secretion activates pepsin and kills bacteria?	Bile	Hydrochloric acid (HCl)	Sodium bicarbonate	Mucus	Hydrochloric acid (HCl)
335	What is the function of villi and microvilli in the small intestine?	Produce enzymes	Increase surface area for absorption	Store bile	Neutralize stomach acid	Increase surface area for absorption
336	What is mastication?	Saliva production	Swallowing food	Physical breakdown of food	Chemical digestion	Physical breakdown of food
337	What is the benefit of chewing food?	It kills microorganisms	It moistens food	It increases surface area for enzymes	It decreases appetite	It increases surface area for enzymes
338	What is the moist mass of chewed food called?	Chyme	Bolus	Pellicle	Lumen	Bolus
339	What is the function of	Churns the food	Releases gastric juice	Opens to allow food	Prevents food from entering small intestine	Opens to allow food into the stomach

#	Question	Option A	Option B	Option C	Option D	Answer
	the cardiac sphincter?			into the stomach		
340	What type of digestion occurs due to stomach contractions?	Enzymatic digestion	Mechanical digestion	Chemical digestion	Bacterial digestion	Mechanical digestion
341	What does the mucosa layer of the stomach contain?	Smooth muscles only	Fat-absorbing cells	Glands secreting enzymes, HCl, and mucus	Goblet cells secreting bile	Glands secreting enzymes, HCl, and mucus
342	What protects the stomach lining from hydrochloric acid?	Goblet cells	Mucus secreted by mucus cells	Gastrin	Bile	Mucus secreted by mucus cells
343	What is the role of hydrochloric acid in the stomach?	Absorbs nutrients	Activates pepsinogen and kills microbes	Neutralizes stomach content	Produces bile	Activates pepsinogen and kills microbes
344	Which cells secrete the enzyme pepsinogen?	Parietal cells	Chief cells	Mucus cells	Endocrine cells	Chief cells
345	What is the main function of	Storage of food	Production of hormones	Digestion and absorption	Elimination of waste	Digestion and absorption

#	Question	Option A	Option B	Option C	Option D	Answer
	the small intestine?					
346	The small intestine is structurally divided into?	Duodenum, colon, ileum	Duodenum, jejunum, ileum	Duodenum, rectum, ileum	Colon, rectum, jejunum	Duodenum, jejunum, ileum
347	Which enzyme in pancreatic juice digests proteins into polypeptides?	Amylase	Lipase	Trypsin	Lactase	Trypsin
348	Which structure increases the surface area in the small intestine?	Pylorus	Cilia	Villi and microvilli	Sphincters	Villi and microvilli
349	Simple sugars and amino acids are absorbed into?	Lacteals	Lymph	Blood capillaries of villi	Pancreatic duct	Blood capillaries of villi
350	In the liver, glucose is stored as?	Starch	Glycogen	Cellulose	Glucagon	Glycogen
351	In epithelial cells, fatty acids and glycerol	Lactose	Polypeptides	Triglycerides	Chylomicrons	Triglycerides

#	Question	Option A	Option B	Option C	Option D	Answer
	combine to form?					
35 2	Which of the following is absorbed by the large intestine?	Amino acids only	Water, salts, and vitamin K	Proteins and fats	Glucose and oxygen	Water, salts, and vitamin K
35 3	What is the function of the appendix in humans?	Digests fats	Absorbs vitamins	No function, vestigial	Produces enzymes	No function, vestigial
35 4	What is the main function of the colon?	Absorption of fats	Absorption of water	Production of bile	Protein digestion	Absorption of water
35 5	What is the role of the rectum?	Digests proteins	Stores bile	Temporarily stores faeces	Produces vitamin K	Temporarily stores faeces
35 6	Which bacteria lives in the colon and produces vitamin K?	Streptococcus	E. coli	Salmonella	Lactobacillus	E. coli
35 7	What is the primary function of bile in digestion?	Digest proteins	Emulsify fats	Absorb vitamins	Break down carbohydrates	Emulsify fats

#	Question	Option A	Option B	Option C	Option D	Answer
358	Which organ stores and concentrates bile produced by the liver?	Pancreas	Small intestine	Gallbladder	Stomach	Gallbladder
359	What does the exocrine portion of the pancreas secrete?	Insulin and glucagon	Bile	Pancreatic juice	Gastric acid	Pancreatic juice
360	What happens when bile is released from the gallbladder?	It digests carbohydrates	It emulsifies fats in the small intestine	It breaks down proteins in the stomach	It neutralizes acids in the stomach	It emulsifies fats in the small intestine
361	During inhalation, the diaphragm;	Contracts and moves upward	Contracts and moves downward	Relaxes and moves upward	Relaxes and moves downward	Contracts and moves downward
362	Which part of the respiratory system acts as the respiratory surface?	Larynx	Trachea	Bronchi	Alveoli	Alveoli
363	What is the main function of the organs in the upper	Gas exchange	Transport of nutrients	Movement of air, cleaning, humidifying	Circulation of blood	Movement of air, cleaning, humidifying and warming it

#	Question	Option A	Option B	Option C	Option D	Answer
	respiratory tract?			and warming it		
364	Why is the larynx also called the voice box?	It filters air	It allows tasting	It contains vocal cords that produce sound	It connects to the stomach	It contains vocal cords that produce sound
365	What prevents food from entering the larynx during swallowing?	Vocal cords	Nasal septum	Glottis	Epiglottis	Epiglottis
366	What covers the outer surface of the lungs?	Parietal pleura	Bronchioles	Visceral pleura	Alveoli	Visceral pleura
367	How does gas exchange occur in the alveoli?	Active transport	Osmosis	Diffusion between alveoli and surrounding capillaries	Secretion of enzymes	Diffusion between alveoli and surrounding capillaries
368	Which muscle separates the thoracic cavity and abdomen?	Intercostal muscle	Diaphragm	Cardiac muscle	Skeletal muscle of the arm	Diaphragm
369	What is expiration?	Taking air into the lungs	Moving air out of the lungs	Exchanging oxygen in the alveoli	Contraction of the diaphragm	Moving air out of the lungs

#	Question	Option A	Option B	Option C	Option D	Answer
370	Where is the respiratory centre controlling breathing located?	Cerebellum	Medulla oblongata	Cerebrum	Spinal cord	Medulla oblongata
371	What is TRUE about respiratory pigments?	Transport oxygen from lungs to tissues	Transport oxygen and carbon dioxide	Transport less oxygen	Regulate the pH of blood	Transport oxygen from lungs to tissues
372	Which respiratory pigment is found in muscle tissue?	Haemoglobin	Melanin	Myoglobin	Chlorophyll	Myoglobin
373	How many oxygen molecules can one haemoglobin molecule carry?	One	Two	Three	Four	Four
374	What is myoglobin?	A blood protein in white blood cells	A hormone in the brain	The oxygen-binding protein in skeletal and cardiac muscle cells	A digestive enzyme	The oxygen-binding protein in skeletal and cardiac muscle cells
375	When does myoglobin release	When partial pressure of oxygen is	When partial pressure of oxygen is	During digestion only	Only when haemoglobin is absent	When partial pressure of oxygen is

#	Question	Option A	Option B	Option C	Option D	Answer
	oxygen to the muscles?	above 40 mm Hg	below 20 mm Hg			below 20 mm Hg
376	Which of the following is a common cause of pneumonia?	Bacterial infection	Viral infection	Fungal infection	All of these	All of these
377	Emphysema is characterized by:	Inflammation of airways	Narrowing of airways	Destruction of the alveoli in lungs	Fluid build-up in lungs	Destruction of the alveoli in lungs
378	What does pneumonia affect in the lungs?	Bronchi only	Alveoli	Trachea	Nasal cavity	Alveoli
379	Which of the following is the primary bacterial cause of pneumonia?	Mycobacterium tuberculosis	Streptococcus pneumoniae	Human rhinovirus	Candida albicans	Streptococcus pneumoniae
380	Pneumonia can be caused by?	Only bacteria	Only viruses	Bacteria, viruses, and sometimes fungi	Only fungi	Bacteria, viruses, and sometimes fungi
381	What is tuberculosis?	An acute respiratory infection	A chronic infection caused by bacteria	A fungal infection of lungs	A viral infection of nose	A chronic infection caused by bacteria

#	Question	Option A	Option B	Option C	Option D	Answer
382	Which bacteria causes tuberculosis ?	Streptococcus pneumoniae	Mycobacterium tuberculosis	Haemophilus influenzae	Staphylococcus aureus	Mycobacterium tuberculosis
383	What does tuberculosis do to the lung tissue?	Causes inflammation and damage including cavities	Causes formation of scar tissue only	Only affects the bronchi	Causes lung cancer	Causes inflammation and damage including cavities
384	What is a serious complication of advanced pulmonary tuberculosis ?	Respiratory failure	Diabetes	Liver failure	Kidney failure	Respiratory failure
385	What type of disease is COPD?	Acute infectious disease	Chronic inflammatory disease	Autoimmune disease	Genetic disease	Chronic inflammatory disease
386	What is the most common cause of COPD?	Viral infection	Tobacco smoking	Bacterial infection	Allergies	Tobacco smoking
387	Emphysema is a type of?	Asthma	Bronchitis	COPD	Pneumonia	COPD
388	What happens to alveoli in	They multiply rapidly	Inner walls are damaged and rupture	They fill with fluid	They shrink and harden	Inner walls are damaged and rupture

#	Question	Option A	Option B	Option C	Option D	Answer
	emphysema ?					
389	Which genetic factor can cause emphysema ?	Vitamin D deficiency	Alpha-1 antitrypsin deficiency	Sickle cell anemia	Hemophilia	Alpha-1 antitrypsin deficiency
390	What is the most important step in managing emphysema ?	Taking antibiotics	Quitting smoking	Increasing physical activity	Taking vaccines	Quitting smoking
391	Bicuspid valve guards the opening between;	Stomach and intestine	Pulmonary vein and left atrium	Right atrium and right ventricle	Left atrium and left ventricle	Left atrium and left ventricle
392	Closure of tricuspid and bicuspid valves produces sound;	"Lubb"	"Dubb"	First Lubb then Dubb	None of these but murmurs	"Lubb"
393	What type of circulatory system do humans possess?	Open circulatory system	Partially open system	Closed circulatory system	Single circulatory system	Closed circulatory system

#	Question	Option A	Option B	Option C	Option D	Answer
394	Which components are part of the human closed circulatory system?	Blood, lymph, and neurons	Heart, blood, and blood vessels	Lymph, blood vessels, and brain	Blood, liver, and spleen	Heart, blood, and blood vessels
395	What separates the heart from surrounding organs?	Sternum	Pericardium	Diaphragm	Rib cage	Pericardium
396	The blood circulatory system in humans is classified as:	Open and incomplete	Closed and complete	Partially open	Dual and open	Closed and complete
397	Which organ system is responsible for immune defense and transport of lymph?	Nervous system	Digestive system	Lymphatic system	Endocrine system	Lymphatic system
398	What does the P wave in an ECG represent?	Ventricular depolarization	Atrial depolarization	Ventricular repolarization	Atrial repolarization	Atrial depolarization
399	What does the QRS complex	Atrial repolarization	Ventricular repolarization	Atrial depolarization	Ventricular depolarization	Ventricular depolarization

#	Question	Option A	Option B	Option C	Option D	Answer
	represent in an ECG?					
400	Pulmonary circulation carries.....blood to the lungs.	Oxygenated	Deoxygenated	Both oxygenated and deoxygenated	None of the above	Deoxygenated
401	Pulmonary veins open into the:	Right atrium	Left atrium	Right ventricle	Left ventricle	Left atrium
402	Coronary arteries arise from which major artery?	Pulmonary artery	Aorta	Vena cava	Renal artery	Aorta
403	What is the main function of the hepatic portal circulation?	Supply oxygen to liver	Remove harmful substances and store nutrients	Supply oxygenated blood to the brain	Regulate blood pressure	Remove harmful substances and store nutrients
404	Blood pressure is highest in and blood moves most slowly in;	Veins, capillaries	Arteries, capillaries	Capillaries, arteries	Veins, arteries	Arteries, capillaries
405	The maximum pressure during ventricular	Diastolic pressure	Pulse pressure	Mean arterial pressure	Systolic pressure	Systolic pressure

#	Question	Option A	Option B	Option C	Option D	Answer
	contraction is called:					
406	What is the normal systolic pressure in a healthy young adult?	110 mm Hg	120 mm Hg	130 mm Hg	140 mm Hg	120 mm Hg
407	Which instrument is used for manual blood pressure measurement?	Barometer	Thermometer	Spirometer	Sphygmomanometer	Sphygmomanometer
408	What triggers the release of ADH in the body?	Increase in blood pressure	Increase in urine output	Decrease in blood volume and pressure	High salt intake	Decrease in blood volume and pressure
409	What is the function of antidiuretic hormone (ADH)?	Increases urine output	Lowers blood pressure	Causes vasoconstriction and water retention	Inhibits thirst center	Causes vasoconstriction and water retention
410	Atrial natriuretic hormone (ANH) is released in response to:	Low blood pressure	Dehydration	Stretching of right atrium due to increased blood volume	Low salt levels in blood	Stretching of right atrium due to increased blood volume

#	Question	Option A	Option B	Option C	Option D	Answer
41 1	In humans which one is the other system for the transport of materials, than blood circulatory system?	Lymphatic system	Digestive system	Nervous system	Respiratory system	Lymphatic system
41 2	What is the primary function of the lymphatic system in addition to circulation?	Digestion	Respiration	Transport of materials and return from tissues to blood	Hormone production	Transport of materials and return from tissues to blood
41 3	The lymphatic system begins with:	Lymph nodes	Lymph ducts	Lymph capillaries	Subclavian veins	Lymph capillaries
41 4	When interstitial fluid enters lymph capillaries, it is called:	Serum	Blood plasma	Lymph	Tissue fluid	Lymph
41 5	The two main lymph ducts are:	Jugular and carotid	Right-lymphatic and thoracic ducts	Subclavian and hepatic ducts	Aortic and pulmonary ducts	Right-lymphatic and thoracic ducts

#	Question	Option A	Option B	Option C	Option D	Answer
416	Valves in lymph vessels function to:	Absorb oxygen	Increase blood pressure	Prevent backflow of lymph	Filter lymph	Prevent backflow of lymph
417	Lymph nodes are rich in:	Neurons and glial cells	Lymphocytes and macrophages	Platelets and enzymes	Red blood cells	Lymphocytes and macrophages
418	The spleen filters blood and destroys:	Healthy RBCs	Aged RBCs and foreign particles	White blood cells	Nerve cells	Aged RBCs and foreign particles
419	Lymph nodes are present in all of the following regions except:	Neck	Axilla	Groin	Stomach	Stomach
420	Which of the following is NOT a lymphoid mass?	Spleen	Liver	Tonsils	Thymus	Liver
421	Which structures are part of the appendicular skeleton?	Ethmoid bone	Floating ribs	Lumbar vertebrae	Humerus bone	Humerus bone

#	Question	Option A	Option B	Option C	Option D	Answer
42 2	Tendons connect bone and;	Bone	Ligaments	Muscle	Cartilage	Muscle
42 3	What type of tissue are bones primarily made of?	Muscular tissue	Epithelial tissue	Connective tissue	Nervous tissue	Connective tissue
42 4	What is the name of the tough membrane that covers the surface of a bone?	Pericardium	Peritoneum	Perichondrium	Periosteum	Periosteum
42 5	What are the basic structural units of compact bone?	Osteons	Haversian systems	Canaliculi	Osteocytes	Osteons
42 6	What are osteocytes?	Bone-forming cells	Cartilage cells	Mature bone cells found in lacunae	Fat-storing cells	Mature bone cells found in lacunae
42 7	What type of bone marrow produces red blood cells, white blood cells, and platelets?	Yellow bone marrow	White bone marrow	Red bone marrow	Soft bone marrow	Red bone marrow

#	Question	Option A	Option B	Option C	Option D	Answer
428	What is the primary function of osteoblasts?	Destroying old bone tissue	Storing calcium in bones	Synthesizing and secreting unmineralized ground substance	Transporting blood through bones	Synthesizing and secreting unmineralized ground substance
429	What is the function of osteoclasts?	Form new bone cells	Transport blood cells	Break down bone and release calcium and phosphate	Convert fat into bone tissue	Break down bone and release calcium and phosphate
430	Why does cartilage heal very slowly?	Because it contains no chondrocytes	Because it has no blood vessels inside the cartilage matrix and is supplied by diffusion	Because it has a thick periosteum	Because osteocytes maintain the cartilage matrix	Because it has no blood vessels inside the cartilage matrix and is supplied by diffusion
431	How many bones are in the human skeletal system?	206	208	201	212	206
432	What are the two main divisions of the human skeleton?	Axial and Appendicular	Cranial and Facial	Vertebral and Pelvic	Thoracic and Lumbar	Axial and Appendicular
433	How many vertebrae are there in total?	32	33	34	31	33

#	Question	Option A	Option B	Option C	Option D	Answer
434	The pectoral girdle consists of which bones?	Femur and tibia	Clavicle and scapula	Ilium and ischium	Sternum and ribs	Clavicle and scapula
435	Which type of joint permits no movement?	Synovial joints	Cartilaginous joints	Fibrous joints	Ball-and-socket joints	Fibrous joints
436	What is the most common type of joint in the human body?	Fibrous joints	Cartilaginous joints	Synovial joints	Pivot joints	Synovial joints
437	What covers the ends of bones in synovial joints?	Fibrous capsule	Articular cartilage (hyaline cartilage)	Synovial membrane	Ligaments	Articular cartilage (hyaline cartilage)
438	Actin filaments are made of proteins;	Myosin and troponin	Actin and troponin	Actin and myosin	Actin, tropomyosin and troponin	Actin, tropomyosin and troponin
439	Which part of muscle fibre releases calcium ions which trigger contraction?	Sarcolemma	Sarcolemma	T-tubules	Sarcoplasmic reticulum	Sarcoplasmic reticulum

#	Question	Option A	Option B	Option C	Option D	Answer
440	When a muscle fibre shortens, which of the following also shortens?	Actin filament	Myosin filament	Sarcomere	Z-line	Sarcomere
441	Which type of muscle is responsible for moving parts of the body such as the limbs and trunk?	Cardiac muscle	Smooth muscle	Skeletal muscle	Involuntary muscle	Skeletal muscle
442	Where are cardiac muscles found?	In limbs	In the walls of internal organs	In the face muscles	In the walls of the heart	In the walls of the heart
443	The plasma membrane of a skeletal muscle fibre is called?	Sarcomere	Sarcolemma	Sarcolemma	Myolemma	Sarcolemma
444	A sarcomere is the section between?	Two M-lines	Two H-zones	Two Z-lines	Two A-bands	Two Z-lines
445	According to the sliding filament model, muscle contraction	Myosin filaments break down	Thin filaments slide past thick filaments	Sarcomeres expand	Z-lines disappear	Thin filaments slide past thick filaments

#	Question	Option A	Option B	Option C	Option D	Answer
	occurs when:					
446	What role does troponin play during muscle contraction?	Blocks myosin-binding sites	Binds calcium ions and shifts tropomyosin	Breaks ATP	Binds myosin to actin	Binds calcium ions and shifts tropomyosin
447	What are skeletal muscles attached to bones by?	Ligaments	Cartilage	Tendons	Joints	Tendons
448	What is the end of the muscle called that is attached to the stationary bone during contraction?	Insertion	Origin	Belly	Extension	Origin
449	What is the arrangement of muscles called when they produce opposing actions?	Cooperative arrangement	Antagonistic arrangement	Symbiotic arrangement	Linear arrangement	Antagonistic arrangement
450	Which compound is depleted during	Glucose	Oxygen	ATP	Calcium	ATP

#	Question	Option A	Option B	Option C	Option D	Answer
	exercise, leading to muscle fatigue?					

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