



**ZIAUDDIN UNIVERSITY**  
EXAMINATION BOARD

# **Secondary School Certificate (SSC)**

## **Examination syllabus**

### **Biology X**

**Based on Provincial revised curriculum  
(Sindh)**

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## PREFACE

Ziauddin University Examination Board (ZUEB) was established by the Sindh ACT XLI 2018, with the aim of improving the quality of education. The Board administers examinations for the Secondary School Certificate (SSC) and Higher Secondary School Certificate (HSSC) based on the latest Reviewed National Curriculum by Directorate Curriculum Assessment and Research (DCAR) Sindh. ZUEB has a mandate by Ordinance to offer such examination services to English /Urdu and Sindhi medium candidates for SSC and HSSC from private schools in Sindh. This examination syllabus exemplifies ZUEB's commitment to provincial educational goals

The Examination Board has prepared with the help of subject professors, subject wise syllabus. It is important to make the difference between syllabus and curriculum. The syllabus of a subject is considered as a guide for the subject teacher as well as the students. It helps the students understand the subject in detail. It also helps students to anticipate what is expected from them while preparing for the exams.

This examination syllabus brings together all those cognitive outcomes of the Provincial Curriculum statement which can be reliably and validly assessed. While the focus is on the cognitive domain, particular emphasis is given to the application of knowledge and understanding.

The examination syllabus is uploaded on the ZUEB website. This is done to help affiliated schools in planning their teaching. It is the syllabus, not the prescribed textbook which is the basis of the ZUEB examinations. In addition, the ZUEB examination syllabus is used to develop learning support materials for students and teachers. The examination board stand committed to all students who have embarked upon the SSC, and HSSC courses in facilitating their learning outcomes. Our examination syllabus document ensures all possible support.

On the Ziauddin University Examination Board website a tab e –resource is made available which provides resource material in all subjects both in text form in line with the curriculum and also videos on topics to give students access to learn at their own pace and own time. These 15 to 20 minutes videos are prepared around subject concept / topics. These videos are available to the students for revisiting a lesson taught by their teacher or watch it prior to the lesson and as a reinforcement strategy. The work on videos is in progress and new titles will be uploaded.

*Please look out for the videos on the given website*



Humbly Yours;

**Shahbaz Nasim**  
**Academic Head**

## **AIMS AND OBJECTIVES:**

### **AIMS:**

- The curriculum for Biology for grades IX-X aims to help individual students develop:
- A scientific understanding of the living world
- Mental and motor abilities appropriate to the acquisition and use of biological understanding
- An appreciation of the products and influences of science and technology, balanced by a concern for their wise application
- An understanding of the nature and limitations of scientific activity
- An ability to apply biological understanding to appropriate problems (including those of everyday life) and to approach those problems in rational ways
- Respect for evidence, rationality and intellectual honesty
- Capacities to express themselves coherently and logically, both orally and in writing, and to use appropriately modes of communication characteristic of scientific work
- An ability to work effectively with others.

### **OBJECTIVES:**

- A statement of objectives relevant to each of the general aims is listed below. The sequence of objectives used here should not be taken as indicating relative weightings. Understanding the Living World: Students should understand the scientific concepts inherent in the theme for each chapter to be covered well enough to be able to:
- state, exemplify and interpret the concept
- use appropriately, fundamental terms and classifications related to the concept
- cite, and explain or interpret, scientific evidence in support of the concept. Appropriate Mental and Motor Abilities: Students should show some ability to:
- formulate questions that can be investigated by gathering first or second-hand data
- find relevant published background information
- formulate hypotheses and make predictions from them
- plan an investigation and carry out the planned procedures
- use the motor skills required to carry out investigations
- observe phenomena, and describe, measure and record these as data
- classify, collate and display data
- interpret and construct visual representations of phenomena and relationships (diagrams, graphs, flow charts, physical models etc.
- analyze data and draw conclusions
- evaluate investigative procedures and the conclusions drawn from investigations. Understanding the Nature and Limitations of Scientific Activity: For each of the facets of scientific activity selected for study, students should:
- describe and exemplify it
- use appropriately any fundamental terms and classifications related to it
- recognize that the problem-solving nature of science has limitations

- acknowledge that people engaged in science, a particularly human enterprise, have the characteristics of people in general. Appreciation of the Influences of Science and Technology: Students should:
- recognize that the technology resulting from scientific activity influences the quality of lifestyle and economic development through or by improvements in medical/health care, nutrition, agricultural techniques
- understand that these influences may be the result of unforeseen consequences, rapid exploitation or rapid cultural change
- realize that advances in technology require judicious application. Ability to apply Understanding to Problems: Students should:
- recognize that biological knowledge and scientific approaches have relevance to many situations in everyday life
- recognize when biological knowledge is relevant to a problem
- recognize when a scientific approach is relevant to a problem
- select and apply appropriate biological knowledge and skills to clarify and help produce solutions to problems, especially the personal and social problems of everyday life to which such knowledge and skills can apply
- use thoughtful, rational strategies for decision-making in those everyday situations to which both biological knowledge and value positions are relevant.
- Respect for Evidence, Rationality and Intellectual Honesty:
- \*Given the number of emotive issues in the area of biology, students should display respect for evidence, rationality and intellectual honesty.

### **Capacities to Communicate:**

- Students should:
- comprehend the intention of a scientific communication, the relationships between its parts and its relationship to what they already know
- select the relevant parts from a communication
- translate information from communications in particular modes (e.g. spoken word, written word, tables, graphs, flow sheets, diagrams) to other modes
- Structure information and use appropriate modes (including the spoken word, writing and diagrams) to communicate it. Ability to work with others
- Students should participate in group work in such a way that he or she:
- shares the responsibility for achieving a group task
- shows concern for the fullest possible participation of each group member.

**ZIAUDDIN UNIVERSITY EXAMINATION BORD**  
**SLOs CATEGORIZATION AND SCHEME OF ASSESSMENT**  
**Detailed Syllabus**

UNIT	SLOS	CATEGORIS ATION as per curriculum			Table of Specification			
		K	U	A	MCQ s	CRQs	ERQs	
Chapter1  Gaseous exchange	Student will: <ul style="list-style-type: none"> <li>• Differentiate among respiration, gas exchange and breathing.</li> <li>• Draw diagram of stomata of a leaf indicating the movement of gases.</li> <li>• Explain Gaseous Exchange in Humans</li> <li>• Describe the roles of the parts of air passageway and of lungs.</li> <li>• Describe the mechanism of breathing in term of movements of ribs and diaphragm.</li> <li>• State the rate of breathing at rest and after exercise.</li> <li>• Differentiate between the composition of inspired and expired air.</li> <li>• Draw diagram of organs of human respiratory system from model/chart.</li> <li>• Identify the structure of air sac in humans by slide/photomicrograph.</li> <li>• Investigate the breathing rate at rest and after exercise.</li> <li>• Demonstrate through experiment of breathing out air into limewater that carbon dioxide is exhaled during respiration.</li> <li>• Describe briefly diseases related to respiratory system like bronchitis, emphysema, pneumonia, asthma, and lung cancer.</li> <li>• Describe the biological consequences of smoking in relation to the lungs and circulatory system.</li> </ul>				<b>2</b>	<b>1</b>	---	
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	<ul style="list-style-type: none"> <li>Trace the movement of a molecule of urea from blood to urethra using a flow chart diagram.</li> <li>Identify the causes of kidney stone.</li> <li>Identify lithotripsy and surgery as the methods to remove kidney stones.</li> <li>Outline the causes of kidney failure.</li> <li>Describe the types of dialysis.</li> <li>Rationalize why dialysis machine is considered as artificial kidney.</li> </ul>			✓				
<b>Chapter 3</b>	<b>Control And Coordination</b>	<p>Student will:</p> <ul style="list-style-type: none"> <li>Explain what coordination means.</li> <li>Identify the two main types of coordination in living organisms, i.e., Nervous and Hormonal (chemical).</li> <li>Differentiate between the modes of coordination i.e., electrical in case of nervous and chemical in case of hormonal.</li> <li>Identify the main organs responsible for coordination and control.</li> <li>State that receptors receive stimuli and transmit information to effectors through CNS.</li> <li>Compare the two types of coordination in tabular form.</li> <li>Record the difference in quickness of response of the two types of coordination (by asking a student to say a few words in front of the class and observe the change in heartbeat).</li> <li>Label the diagram of human brain.</li> <li>Explain the function of these parts of brain; cerebrum, cerebellum, pituitary gland, thalamus, hypothalamus, medulla oblongata.</li> <li>Differentiate between the cross-sectional views of brain and spinal cord, with reference to white and grey matter.</li> <li>Define neuron and describe the structure of a general neuron.</li> <li>Define reflex action and reflex arc.</li> <li>Name the three types of neurons involved in reflex action.</li> </ul>		✓ ✓		MCQs <b>1</b>	CRQs <b>2</b>	ERQs <b>1</b>
		✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓		✓ ✓	✓ ✓			



	<ul style="list-style-type: none"> <li>• Perform an experiment in which a scale held at its lower end between the thumb and index finger is allowed to fall and then recording the time taken to catch it again. Receptors of the Human Body (Eye and Ear)</li> <li>• Describe the structure of human auditory and visual receptors.</li> <li>• Describe the pupil reflex in dim and bright light.</li> <li>• State how short and long sightedness can be treated.</li> <li>• Associate the role of Vitamin A with vision and effects of its deficiency on retina.</li> <li>• Explain the role of ear and eye in maintenance of homeostasis through balance and accommodation.</li> <li>• Identify different parts and draw a labeled diagram of the longitudinal section of the eye of sheep or bull.</li> <li>• Check the vision of a friend to diagnose whether he/she is suffering from long or shortsightedness.</li> <li>• Define the terms; hormone and endocrine system.</li> <li>• Outline the parts of endocrine system; major glands of this system (Pituitary, Thyroid, Pancreas, Adrenal, Gonads) and names of their respective hormone.</li> <li>• Describe the term “Negative feedback” with reference to Insulin and glucagon.</li> <li>• Explain the two common kinds of nervous disorders (Vascular i.e. paralysis and Functional i.e. epilepsy).</li> <li>• Enlist some of the symptoms and treatments of Paralysis and Epilepsy.</li> <li>• Explain the way nervous system helps to coordinate complex and intricate movements of hand to play a piano, or write alphabets.</li> <li>• Justify the time difference between seeing the flash of lightening and hearing the roar of a thunderstorm.</li> <li>• Explain why and how eyes are important to survival in wild animals.</li> </ul>		<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>			
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	<ul style="list-style-type: none"> <li>• Explain how color blindness could be a hurdle for aircraft pilots.</li> <li>• Relate how the knowledge of nervous system has helped humans to treat diseases like epilepsy, paralysis.</li> </ul>						
<b>Chapter 04</b>	Student will:				<b>MCQs</b>	<b>CRQs</b>	<b>ERQs</b>
<b>Support And Movement</b>	<ul style="list-style-type: none"> <li>• Define skeleton and differentiate between cartilage and bone.</li> <li>• Describe the role of skeleton in support and movement.</li> <li>• Explain that skeleton system is actually a dynamic, living tissue that is capable of growth, adapts to stress and repairs itself after injury.</li> <li>• Describe the main components of the axial skeleton and the appendicular skeleton.</li> <li>• Identify and draw labeled diagrams of different bones of the axial and appendicular skeleton from real specimen models or charts.</li> <li>• Differentiate between moveable joints and immovable joints.</li> <li>• State the role of ligaments and tendons.</li> <li>• Describe the location and movement of hinge joints.</li> <li>• Identify ball-n-socket joints in human body.</li> <li>• Describe the movement of various human joints through observation of models.</li> <li>• Define antagonism.</li> <li>• Describe the action of flexors and extensors as a pair of opposing muscles selecting biceps and triceps as example.</li> <li>• Describe the movement of biceps and triceps through presentation of the movement of his/her elbow.</li> <li>• Compare the effect of by deficiency of calcium on bones and relate this deficiency with osteoporosis.</li> <li>• Discuss the causes, symptoms, and treatment of arthritis.</li> <li>• Relate the onset of arthritis with age and weight-bearing joints.</li> </ul>	✓			<b>1</b>	<b>1</b>	<b>1</b>
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	<ul style="list-style-type: none"> <li>State the principles of arthroplasty for the replacement of joints.</li> </ul>						
<b>Chapter 05</b>	Student will:				<b>MC</b>	<b>CRQs</b>	<b>ERQs</b>
<b>Reproduction</b>	<ul style="list-style-type: none"> <li>Define reproduction and describe its importance.</li> <li>State types of Asexual Reproduction in Protists, Bacteria and Plants.</li> <li>Describe different types of asexual reproduction i.e. binary fission, budding, spore formation and vegetative propagation.</li> <li>Distinguish between vegetative propagation and artificial propagation.</li> <li>Explain vegetative propagation in plants (through stem, suckers and leaves).</li> <li>Describe the two methods of artificial vegetative propagation (stem cuttings and grafting).</li> <li>Rationalize how parthenogenesis is a type of asexual reproduction.</li> <li>Define cloning.</li> <li>Identify different stages of budding in the prepared slides / charts of yeast and draw diagrams.</li> <li>Describe sexual reproduction in plants by explaining the life cycle of a flowering plant.</li> <li>Describe the adaptations in the structure of wind-pollinated and insect-pollinated flowers.</li> <li>Describe the structure of seed.</li> <li>Distinguish between epigeal and hypogeal germination.</li> <li>Describe the conditions necessary for germination of seeds.</li> <li>State the contributions of Theophrastus in the discovery of sex in plants.</li> <li>Identify different parts of flower.</li> <li>Identify and draw the component of the seeds of pea or gram.</li> <li>List some of the ripened ovaries and ovules, which are eaten in daily life.</li> </ul>	✓ ✓	✓	✓	<b>2</b>	<b>1</b>	<b>1</b>

	<ul style="list-style-type: none"> <li>• Perform experiment to investigate the necessary conditions for seed germination.</li> <li>• Outline the binary fission, multiple fission, budding and fragmentation as asexual methods of reproduction in animals.</li> <li>• Define fertilization and differentiate between external and internal fertilization.</li> <li>• Describe different organs of the male and female reproductive systems of rabbit.</li> <li>• Explain AIDS as an example of sexually transmitted diseases.</li> <li>• State the role of National AIDS Control Program and different NGOs in educating people with reference of AIDS.</li> <li>• Locate the different organs of rabbit's male and female reproductive systems on a chart or diagram.</li> <li>• Describe commercially important applications of asexual reproduction in plants.</li> </ul>	✓	✓				
<b>Chapter 06</b>  <b>Inheritance</b>	Student will: <ul style="list-style-type: none"> <li>• Define genetics.</li> <li>• Explain how genes control inheritance of characters.</li> <li>• Describe the composition of chromatin material</li> <li>• State clearly the difference between a gene and an allele.</li> <li>• Explain that gene is a unit of inheritance and that it can be copied and passed on to the next generation.</li> <li>• Describe the central dogma stating the role of gene in protein synthesis.</li> <li>• Draw the chromosomes of a plant cell after observing in a preserved slide / unlabeled chart.</li> <li>• 3-Mendel's Law of Segregation and Independent Assortment</li> <li>• Describe complete dominance using the terms dominant, recessive, phenotype, genotype, homozygous, heterozygous, P1, F1, F2 generations and proving it</li> </ul>	✓	✓ ✓ ✓ ✓ ✓	✓ ✓	MC Qs  <b>1</b>	CRQs  <b>2</b>	ERQs  <b>1</b>
		✓	✓	✓			

	<p>diagrammatically through a monohybrid genetic cross.</p> <ul style="list-style-type: none"> <li>• Demonstrate that the 3:1 monohybrid F-2 phenotypic ratio is evidence of segregation of alleles.</li> <li>• State Mendel’s law of Segregation.</li> <li>• Demonstrate that 9:3:3:1 dihybrid F-2 phenotypic ratio is evidence of independent assortment.</li> <li>• State Mendel’s law of Independent Assortment.</li> <li>• Selecting the example of ABO blood group system, explain co-dominance.</li> <li>• Explain incomplete dominance in Japanese 4 O’ Clock plant.</li> <li>• Describe the sources of variation.</li> <li>• Relate meiosis with variation.</li> <li>• Describe variation and explain difference between continuous and discontinuous variation by giving examples like, height, weight, IQ, gender and blood groups in population.</li> <li>• Develop an understanding of artificial selection as a means of improvement of yield in economically important plants, like wheat, rice etc.</li> <li>• Analyze a case study of variation and selection e.g., peppered moth.</li> <li>• Interpret how artificial selection can lead to the development of crop plants with higher yield.</li> <li>• Describe various possibilities if humans could be able to control the functioning of genes.</li> <li>• Prepare a report using newspaper clippings of the recent advances and future possibilities in genetics.</li> <li>• Rationalize life as a product of the diversity brought about by chromosomes, genes and DNA molecule.</li> <li>• Analyze the concept of a gene to produce various proteins of the body, examples could be related to both plants and animals. .</li> </ul>	<p>✓</p> <p>✓</p>	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>			
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Chapter 07	Student will:				MC Qs	CRQs	ERQs
<b>Man, And his Environm ent</b>	<ul style="list-style-type: none"> <li>Describe levels of ecological organization.</li> </ul>	✓	✓				
	<ul style="list-style-type: none"> <li>Define ecosystem.</li> </ul>	✓	✓				
	<ul style="list-style-type: none"> <li>Describe components of the ecosystem.</li> </ul>		✓				
	<ul style="list-style-type: none"> <li>Describe the interrelationships between different components of the ecosystem.</li> </ul>						
	<ul style="list-style-type: none"> <li>Identify and list producers and consumers in pond ecosystem and describe the interrelations among biotic and abiotic factors, involved here.</li> </ul>	✓					
	<ul style="list-style-type: none"> <li>Explain that the sun is the principal source of energy for all biological systems.</li> </ul>		✓	✓			
	<ul style="list-style-type: none"> <li>Compare and contrast the flow of materials (cyclic) and the flow of energy (non-cyclic) in the ecosystem.</li> </ul>			✓			
	<ul style="list-style-type: none"> <li>Describe food chains and food webs.</li> </ul>			✓	✓		
	<ul style="list-style-type: none"> <li>Interpret pyramids of numbers and biomass.</li> </ul>				✓		
	<ul style="list-style-type: none"> <li>Describe carbon and nitrogen cycles.</li> </ul>			✓			
	<ul style="list-style-type: none"> <li>Relate biogeochemical cycles with flow of energy and ecological balance.</li> </ul>			✓			
	<ul style="list-style-type: none"> <li>Explain competition, predation and symbiosis (parasitism, mutualism, commensalisms).</li> </ul>			✓			
	<ul style="list-style-type: none"> <li>Describe the importance of balance in nature.</li> </ul>			✓			
	<ul style="list-style-type: none"> <li>Explain some global and regional environmental problems (population growth, urbanization, global warming, deforestation, acid rain).</li> </ul>	✓					
	<ul style="list-style-type: none"> <li>Explain causes of air, water, and land pollution.</li> </ul>	✓					
	<ul style="list-style-type: none"> <li>Describe effects of pollution on plants, animals and human beings or literature search)</li> </ul>		✓				
	<ul style="list-style-type: none"> <li>State the names of endangered and threatened species of Pakistan (data may be collected</li> </ul>						
	<ul style="list-style-type: none"> <li>State that our city / town or village is an ecosystem and we are part of this ecosystem. Also</li> </ul>						

	<ul style="list-style-type: none"> <li>Identify environmental problems in your community. What are possible causes? Suggest measures to solve the problems.</li> </ul>						
<b>Chapter:08</b>  <b>Biotechnology</b>	Student will <ul style="list-style-type: none"> <li>Define biotechnology and explain its importance.</li> <li>Relate biotechnology with genetic engineering and fermentation.</li> <li>Define fermentation.</li> <li>Explain the method of fermentation by yeast and bacteria.</li> <li>Identify different fermentation products and their importance in daily life i.e. yogurt making, bread making, making of cheese and production of alcohol.</li> <li>Explain the use of fermenter in large-scale production of microorganisms and their products.</li> <li>Describe the procedure of using fermenters.</li> <li>Describe the advantages / profitability of using fermenters in preparing medical products.</li> <li>Define genetic engineering and describe its objectives.</li> <li>Describe major achievements of genetic engineering with reference to improvement in agricultural crops (herbicide resistance, virus resistance and insect resistance).</li> <li>Discover the application of genetic engineering in the production of human insulin and growth hormones.</li> <li>Define the significance of single-cell protein in animal feed.</li> <li>Apply knowledge to identify different products of animal and human food having single-cell proteins.</li> <li>varieties of agriculture crops in Pakistan</li> </ul>	✓  ✓ ✓        ✓   ✓   ✓  ✓	✓  ✓  ✓  ✓  ✓  ✓  ✓	✓                      ✓	MCQs  <b>1</b>	CRQs  <b>1</b>	ERQs  -----
<b>Chapter 09</b>	Student will: <ul style="list-style-type: none"> <li>Define Pharmacology as the detailed study of drugs.</li> </ul>	✓ ✓			MCQs	CRQs	ERQs

<b>Pharmacology</b>	<ul style="list-style-type: none"> <li>Define the term 'drug' (the substance or product that is used to modify physiological systems of the body).</li> <li>Enlist the various sources of drugs i.e. minerals, animals, plants, synthetics, microorganisms.</li> <li>Describe the principle usages of painkillers, antibiotics, vaccines and sedatives.</li> <li>State the contributions of Joseph Lister in the discovery of antiseptics and of Alexander Fleming in the discovery of penicillin.</li> <li>Categorize and describe the effects of addictive drugs (sedatives, narcotics and hallucinogens).</li> <li>Define hallucinogen (drugs that alter ordinary mental and emotional processes) and relate it with Marijuana.</li> <li>Define narcotics (drugs that produce semi-consciousness and sleep to get relieve from pain) and relate it with Morphine and Heroine (as the most widely used / abused).</li> <li>State the associated problems of drugs addictions i.e. severe social abandonment and crimes.</li> <li>Name different plants, which are common in Pakistan and used for getting hallucinogens and narcotics.</li> <li>Categorize sulfonamides, tetracyclines and cephalosporins as the major groups of antibiotics being used. <ul style="list-style-type: none"> <li>Categorize major antibiotics as per their bactericidal and bacteriostatic effects.</li> <li>Rationalize the resistance developed in bacteria against the widely used antibiotics.</li> <li>Compile a list of various painkillers, antibiotics and sedatives being used in daily life.</li> <li>Justify the effects of probable over-dosage, under-dosage and drug interactions when using antibiotics without doctor's consultation. ).</li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li></li> <li>✓</li> <li></li> <li></li> <li>✓</li> <li></li> <li>✓</li> <li></li> <li></li> <li>✓</li> <li></li> <li>✓</li> <li></li> <li></li> <li>✓</li> <li></li> <li></li> <li></li> <li></li> <li></li> <li></li> </ul>	<b>1</b>	<b>1</b>	<b>1</b>
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	<ul style="list-style-type: none"> <li>Describe the major pathway of blood through circulatory system.</li> <li>Describe the external and internal structure of human heart.</li> <li>Describe the circulation of blood through atria and ventricles of the heart, explaining the role of the bicuspid, tricuspid and semilunar valves.</li> <li>Define the terms heartbeat, heart rate and pulse rate.</li> <li>Identify in a diagram of the heart the right atrium, right ventricle, left atrium, left ventricle, bicuspid valve, tricuspid valve, semi-lunar valves, pulmonary artery, pulmonary vein, aorta, superior and inferior vena cava and septum.</li> <li>Compare the structure and function of an artery, a vein and a capillary.</li> <li>Describe the transfer of materials between capillaries and tissue fluid.</li> <li>Describe the originating areas, locations and target heart chambers of main veins i.e. Pulmonary veins, Superior vena cava, Inferior vena cava with Femoral veins, Renal veins and Hepatic vein.</li> <li>Identify the main arteries and veins in charts, diagrams, models etc.</li> <li>Describe the contributions of Ibn-al-Nafees and William Harvey in revealing the knowledge about the circulation of blood in human body. <ul style="list-style-type: none"> <li>Define cardiovascular disorders and differentiate between Atherosclerosis and Arteriosclerosis.</li> <li>State the causes, treatments and prevention of Myocardial infarction.</li> </ul> </li> </ul>									
<b>Total</b>	<b>No of question and attempts</b> <b>MCQs=20%</b> <b>CRQs = 40%</b> <b>ERQs = 40%</b>				<b>12</b>	<b>08</b>	<b>4</b>	<b>out</b>	<b>out</b>	<b>out</b>
					<b>of</b>	<b>of</b>	<b>of</b>	<b>12</b>	<b>12</b>	<b>06</b>
<b>Total Marks</b>	<b>60</b>				<b>12</b>	<b>24</b>	<b>21</b>			

**Scheme of Assessment**  
**Grade X**  
**Table of Specification (TOS)**

Sections	Chapters	Weightage in Evaluation as per Curriculum	MCQs			CRQs			ERQs		
<b>Section 03</b> <b>Life Process</b>	1. Gaseous Exchange	<b>59 %</b>	1			1			-----		
	2. Homeostasis		2			2			1		
	3. Coordination		2			1			1		
	4. Support and Movement		1			1			1		
	<b>Total</b>		<b>06</b>			<b>05</b>			<b>03</b>		
	<b>Cognitive Level</b>		K	U	A	K	U	A	K	U	A
<b>Distribution</b>	2	2	2	2	1	2	1	1	1		
<b>Section 04</b> <b>Continuity In Life</b>	5. Reproduction	<b>14 %</b>	1			2			1		
	6. Inheritance		2			1			1		
	<b>Total</b>		<b>03</b>			<b>03</b>			<b>02</b>		
	<b>Cognitive Level</b>		K	U	A	K	U	A	K	U	A
	<b>Distribution</b>		1	1	1	1	1	1	1	1	-- -
<b>Section 05</b> <b>Ecology</b>	7. Man, and his environment	<b>06 %</b>	1			2			----- -		
	<b>Total</b>		<b>01</b>			<b>02</b>			<b>-----</b>		
	<b>Cognitive Level</b>		K	U	A	K	U	A	K	U	A
	<b>Distribution</b>		---	1	--	1	1	--	---	---	-- -
<b>Section 06</b> <b>Application Of Biology</b>	8. Biotechnology	<b>08%</b>	1			1			1		
	9. Pharmacology		1			1			-----		
	<b>Total</b>		<b>02</b>			<b>02</b>			<b>01</b>		
	<b>Cognitive Level</b>		K	U	A	K	U	A	K	U	A
<b>Distribution</b>	1	---	1	---	1	1	1	1	---		
<b>Paper Scheme as per new scheme of studies.</b> <b>Total Marks of Theory paper: 60</b>		<b>Total Questions</b>	<b>12</b>			<b>24</b>			<b>24</b>		
		<b>Percentage Attempt</b>	<b>20%</b>			<b>40%</b>			<b>40%</b>		
		<b>Attempt</b>	<b>12 out of 12</b>			<b>08 out Of 12</b>			<b>4 Out Of 06</b>		

## DEFINITIONS OF COGNITIVE LEVELS

### Remember

Remembering is the act of retrieving knowledge and can be used to produce things like definitions or lists. The student must be able to recall or recognise information and concepts. The teacher must present information about a subject to the student, ask questions that require the student to recall that information and provide written or verbal assessment that can be answered by remembering the information learnt.

### Question Stems

- Can you name all the ...?
- Describe what happens when ...?
- How is (are) ...?
- How would you define ...?
- How would you identify ...?
- How would you outline ...?
- How would you recognise...?
- List the ... in order.
- What do you remember about ...?
- What does it mean?
- What happened after?
- What is (are) ...?
- What is the best one?
- What would you choose ...?
- When did ...?
- Where is (are) ...?
- Which one ...?
- Who spoke to ...?
- Who was ...?
- Why did ...?

### Understand

The next level in the taxonomic structure is Understanding, which is defined as the construction of meaning and relationships. Here the student must understand the main idea of material heard, viewed, or read and interpret or summarise the ideas in their own words. The teacher must ask questions that the student can answer in their own words by identifying the main idea.

### Question Stems

- Can you clarify...?
- Can you illustrate ...?
- Condense this paragraph.
- Contrast ...
- Does everyone think in the way that ... does?
- Elaborate on ...
- Explain why ...
- Give an example
- How can you describe
- How would you clarify the meaning
- How would you compare ...?
- How would you differentiate between ...?
- How would you describe...?
- How would you generalise...?
- How would you identify ...?
- Is it valid that ...?
- Is this the same as ...?
- Outline ...
- Select the best definition
- State in your own words
- This represents ...
- What are they saying?
- What can you infer from ...?
- What can you say about ...?
- What could have happened next?
- What did you observe?

	<ul style="list-style-type: none"> <li>• What does this mean?</li> <li>• What expectations are there?</li> <li>• What information can you infer from...?</li> <li>• What is the main idea of ...?</li> <li>• What restrictions would you add?</li> <li>• What seems likely?</li> <li>• What seems to be ...?</li> <li>• What would happen if ...?</li> <li>• What would happen if ...?</li> <li>• Which are the facts?</li> <li>• Which statements support ...?</li> </ul>
<p><b>Apply</b></p> <p>The third level in Bloom’s taxonomy, Applying, marks a fundamental shift from the pre-Bloom’s learning era because it involves remembering what has been learnt, having a good understanding of the knowledge, and applying it to real-world exercises, challenges or situations. Students must apply an abstract idea in a concrete case to solve a problem or relate it to prior experience. The teacher must provide opportunities for students to use theories and problem-solving techniques in new situations and review and check their work. Assessment questions should be provided that allow students to define and solve problems.</p> <p><b>Question Stems</b></p> <ul style="list-style-type: none"> <li>• Can you group by characteristics such as ...?</li> <li>• Choose the best statements that apply</li> <li>• Clarify why ...</li> <li>• Do you know of another instance where ...?</li> <li>• Draw a story map</li> <li>• Explain why a character acted in the way that he did</li> <li>• From the information given, can you develop a set of instructions about ...?</li> <li>• How could you develop ...?</li> <li>• How would you change ...?</li> <li>• How would you demonstrate...?</li> </ul>	<p><b>Analyse</b></p> <p>Analysing is the cognitive level where students can take the knowledge they have remembered, understood and applied, then delve into that knowledge to make associations, discernments or comparisons. Students should break down a concept or idea into parts and show relationships between these parts. Teachers must give students time to examine concepts and their requisite elements. Students are required to explain why they chose a solution.</p> <p><b>Question Stems</b></p> <ul style="list-style-type: none"> <li>• Can you distinguish between ...?</li> <li>• Can you explain what must have happened when ...?</li> <li>• Determine the point of view, bias, values, or intent underlying the presented material</li> <li>• Discuss the pros and cons of ...</li> <li>• How can you classify ... according to ...?</li> <li>• How can you compare the different parts?</li> <li>• How can you sort the different parts...?</li> <li>• How is ... connected to ...?</li> <li>• How is ... similar to ...?</li> <li>• How would you categorise...?</li> <li>• How would you explain ?</li> </ul>

<ul style="list-style-type: none"> <li>• How would you develop ... to present ?</li> <li>• How would you explain ...?</li> <li>• How would you modify ...?</li> <li>• How would you present...?</li> <li>• How would you solve ... ?</li> <li>• Identify the results of ...</li> <li>• Illustrate the ...</li> <li>• Judge the effects of ... What would result ...?</li> <li>• Predict what would happen if ...</li> <li>• Tell how much change there would be if ...</li> <li>• Tell what would happen if ...</li> <li>• What actions would you take to perform ...?</li> <li>• What do you think could have happened next?</li> <li>• What examples can you find that ?</li> <li>• What other way would you choose to ...?</li> <li>• What questions would you ask of ...?</li> <li>• What was the main idea ...?</li> <li>• What would the result be if ...?</li> <li>• Which factors would you change if ...?</li> <li>• Who do you think...?</li> <li>• Why does this work?</li> <li>• Write a brief outline ...</li> <li>• Write in your own words ...</li> </ul>	<ul style="list-style-type: none"> <li>• If ... happened, what might the ending have been?</li> <li>• State the point of view of ...</li> <li>• What are some of the problems of ...?</li> <li>• What assumptions ...?</li> <li>• What can you infer about...?</li> <li>• What can you point out about ?</li> <li>• What conclusions ...?</li> <li>• What do you see as other possible outcomes?</li> <li>• What does the author assume?</li> <li>• What explanation do you have for ...?</li> <li>• What ideas justify the conclusion?</li> <li>• What ideas validate...?</li> <li>• What is the analysis of ...?</li> <li>• What is the function of ...?</li> <li>• What is the problem with ...?</li> <li>• What motive is there?</li> <li>• What persuasive technique is used?</li> <li>• What statement is relevant?</li> <li>• What was the turning point?</li> <li>• What were some of the motives behind ...?</li> <li>• What's fact? Opinion?</li> <li>• What's the main idea?</li> <li>• What's the relationship between?</li> <li>• Which events could not have happened?</li> <li>• Why did ... changes occur?</li> <li>• Why do you think ?</li> </ul>
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## BLOOMS TAXONOMY WITH EXAMPLES

### Conclusion

If you are a teacher looking for ways to engage your students in learning, this LIST of questions might be interesting for your classroom practice. Bloom's Taxonomy question stems can help elicit higher-order thinking skills and promote critical thinking among learners at different taxonomy levels. These question stems can also encourage students to think about their knowledge through reflection before answering questions.

### ACTION WORDS FOR COGNITIVE LEVELS

<b>Knowledge</b>	<b>Understand</b>	<b>Apply</b>	<b>Analyze</b>	<b>Evaluate</b>	<b>Create</b>
	 <small>UNDERSTAND</small>				
define	explain	solve	analyze	reframe	design
identify	describe	apply	appraise	criticize	compose
describe	interpret	illustrate	judge	evaluate	create
label	paraphrase	modify	support	order	plan
list	summarize	use	compare	compare	combine
name	classify	calculate	decide	classify	formulate
state	compare	change	discriminate	contrast	invent
match	differentiate	choose	recommend	distinguish	hypothesize
recognize	discuss	demonstrate	summarize	infer	substitute
select	distinguish	discover	assess	separate	write
examine	extend	experiment	choose	explain	compile
locate	predict	relate	convince	select	construct
memorize	associate	show	defend	categorize	develop
quote	contrast	sketch	estimate	connect	generalize
recall	convert	complete	grade	differentiate	integrate
reproduce	demonstrate	construct	measure	divide	modify
tabulate	estimate	dramatize	predict	order	organize
tell	express	interpret	rank	prioritize	prepare
Copy	identify	manipulate	score	survey	produce

discover	indicate	paint	select	calculate	rearrange
duplicate	infer	prepare	test	conclude	rewrite
enumerate	relate	teach	argue	correlate	adapt
listen	restate	act	conclude	deduce	anticipate
observe	select	collect	consider	devise	arrange
omit	translate	compute	critique	diagram	assemble
read	ask	explain	debate	dissect	choose
recite	cite	list	distinguish	estimate	collaborate
record	discover	operate	editorialize	evaluate	facilitate
repeat	generalize	practice	justify	experiment	imagine
retell	group	simulate	persuade	focus	intervene
visualize	illustrate	transfer	rate	illustrate	make
	judge	write	weigh	organize	manage
	observe			outline	originate
	order			plan	propose
	report			question	simulate
	represent			test	solve
	research				support
	review				test
	rewrite				validate
	show				

**SSC PART II EXAMINATION  
MARKS BREAKUP GRID FOR EXAMINATION 2023**

**SCIENCE GROUP:**

<b>SUBJECT</b>	<b>THEORY</b>	<b>PRACTICAL</b>	<b>TOTAL</b>
ENGLISH	100	-	100
URDU NORMAL / SINDHI NORMAL	75	-	75
PAKISTAN STUDIES	75	-	75
PHYSICS	60	15	75
CHEMISTRY	60	15	75
BIOLOGY	60	15	75
MATHEMATICS	75	-	75
<b>TOTAL</b>	<b>505</b>	<b>45</b>	<b>550</b>

**COMPUTER SCIENCE GROUP:**

<b>SUBJECT</b>	<b>THEORY</b>	<b>PRACTICAL</b>	<b>TOTAL</b>
ENGLISH	100	-	100
URDU NORMAL/SINDHI NORMAL	75	-	75
PAKISTAN STUDIES	75	-	75
PHYSICS	60	15	75
CHEMISTRY	60	15	75
COMPUTER STUDIES	60	15	75
MATHEMATICS	75	-	75
<b>TOTAL</b>	<b>505</b>	<b>45</b>	<b>550</b>

**GENERAL GROUP:**

<b>SUBJECT</b>	<b>THEORY</b>	<b>PRACTICAL</b>	<b>TOTAL</b>
ENGLISH	100	-	100
URDU NORMAL / SINDHI NORMAL	75	-	75
PAKISTAN STUDIES	75	-	75
GENERAL SCIENCE	75	-	75
GENERAL MATH	75	-	75
EDUCATION	75	-	75
ECONOMICS	75	-	75
CIVICS	75	-	75
ISLAMIC STUDIES	75	-	75
<b>TOTAL</b>	<b>550</b>	<b>-</b>	<b>550</b>





Class: X

MODEL PAPER EXAMINATION 2024

Time Allowed: 20minutes

SUBJECT: BIOLOGY

Q1:

(SECTION "A")

Marks: 12

Note: Attempt all questions from section 'A'. Each question carries **ONE** mark.

(i) \_\_\_\_\_ is usually associated with smoking.

A. Lung cancer

B. Asthma

C. Pneumonia

D. Fever

(ii) Which of the following disorder is associated with the inflammation of air passage ways:

A. Asthma

B. Bronchitis

C. Lung cancer

D. Pneumonia

(iii) The male gonads in rabbit are:

A. Testis

B. Ovaries

C. Scrotal sac

D. Yolksac

(iv) The exact duplication of DNA is called:

A. Duplication

B. Replication

C. Transcription

D. Transtormation

(v) Which of the following is the part of kidney:

A. Pelvis

B. Atrium

C. Seminiferous tubule

D. Testis

(vi) The bread dough rises during alcoholic fermentation is due to:

A. Methyl alcohol

B. CO<sub>2</sub>C. H<sub>2</sub>OD. CH<sub>4</sub>

(vii) Conversion of atmospheric free nitrogen gas into nitrates called:

A. Nitrification

B. Denitrifications

C. Nitrogen fixation

D. Duplication

(viii) In human body \_\_\_\_\_ bones are present:

A. 204

B. 206

C. 205

D. 199

(ix) Seeds do not germinate at temperature below 0°C or above:

A. 350c

B. 450c

C. 25°C

D. 15°C

(x) \_\_\_\_\_ is more common in female than male:

A. Osteoporosis

B. Rickets

C. Arthritis

D. Stroke

(xi) Cartilage is made up of \_\_\_\_\_ cells.

A. Chondrocytes

B. Osteocytes

C. Osteoclast

D. Amoeba

(xii) Removal of extra liquid (water) from plant is:

A. Guttation

B. Transpiration

C. Respiration

D. Replication

**END OF SECTION A**



Class: X

MODEL PAPER EXAMINATION 2024

Time: 2 hours 40 minutes SUBJECT: BIOLOGY (SECTION "B" AND SECTION "C")  
SECTION "B" (SHORT ANSWER QUESTIONS)Total Marks 48  
24 MarksNote: Answer any **EIGHT** questions from section. 'B'. Each question carries **THREE** marks.

- Q2. Why skin considered an excretory organ?
- Q3. Write any three differences between cartilage and bone OR Asexual and sexual reproduction.
- Q4. What is pollination? Discuss the types of pollination.
- Q5. What are the main function of skeleton
- Q6. Define muscles? Describe the type of muscles?
- Q7. Write a brief note on lung cancer OR Acid rain OR Kidney stone.
- Q8. What is brain? Write the name of important parts of brain.
- Q9. Why is the stomata generally open during day time?
- Q10. What do you know about unicellular & multi-cellular?
- Q11. What is a Joint? Discuss the types of joints
- Q12. Draw a neat and labelled diagram of nephron?
- Q13. Define vaccine. How does a vaccine work against a pathogen?

**SECTION "C" (DETAILED ANSWER QUESTIONS)****24 Marks**Note: Answer any **FOUR** questions from this section. Each question carries **SIX** marks.

- Q14. Describe the human urinary system in man?
- Q15. Describe the structure of kidney with the help of a labeled diagram.
- Q16. What is germination? Give the conditions that is necessary for seed germination.
- Q17. Describe the biotic factors of an ecosystem OR describe the Mendel's law of independent assortment with the help of checker board.
- Q18. Explain the difference between mitosis and meiosis
- Q19. Define biotechnology. Describe the scope and importance of biotechnology.

OR

Describe different types of asexual reproduction in animals.

**END OF PAPER**