



**ZIAUDDIN UNIVERSITY**  
EXAMINATION BOARD

**RESOURCES FOR**  
**“SSC-I BIOLOGY”**  
**ZUEB EXAMINATIONS 2021**



## **PREFACE:**

The ZUEB examination board acknowledges the serious problems encountered by the schools and colleges in smooth execution of the teaching and learning processes due to sudden and prolonged school closures during the covid-19 spread. The board also recognizes the health, psychological and financial issues encountered by students due to the spread of covid-19.

Considering all these problems and issues the ZUEB Board has developed these resources based on the condensed syllabus 2021 to facilitate students in learning the content through quality resource materials.

The schools and students could download these materials from [www.zueb.pk](http://www.zueb.pk) to prepare their students for the high quality and standardized ZUEB examinations 2021.

The materials consist of examination syllabus with specific students learning outcomes per topic, Multiple Choice Questions (MCQs) to assess different thinking levels, Constructed Response Questions (CRQs) with possible answers, Extended Response Questions (ERQs) with possible answers and learning materials.

## **ACADEMIC UNIT ZUEB:**

## 2. Constructed Response Questions (CRQs)

## HOW TO ATTEMPT CRQs:

- Write the answer to each Constructed Response Question/ERQs in the space given below it.
- Use black pen/pencil to write the responses. Do not use glue or pin on the paper.

## SECTION B (SHORT ANSWER QUESTIONS)

### 1. Explain the Factors affecting the rate of transpiration

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

S.NO	CRQ	ANSWER	CL	DL
1.	Explain the Factors affecting the rate of transpiration	<p>Factors affecting the rate of transpiration: The rate of transpiration is also affected by some of the following environmental factors.</p> <p>(i) Temperature: Rate of evaporation of water from cell surface increases with increase in temperature.</p> <p>(ii) Humidity: Transpiration takes place only when concentration of the vapours must be low outside than inside, so dry atmosphere is also the condition for transpiration. The rate of transpiration decrease with the increase in water vapours in atmosphere i.e. humidity.</p> <p>(iii) Wind: The increase in wind velocity increases the rate of transpiration. The wind decreases the water vapours around plant and make the atmosphere dry.</p>	K/R-U	M

		(iv) Atmospheric Pressure: Low atmospheric pressure increases the rate of transpiration through reduction in the density of air.		
2.	Write a short note on BLOOD DISORDER?	<p>Blood disorders:</p> <p>Leukemia: It is a type of cancer that affects the blood, bone marrow and lymphatic system. In this type of blood cancer, number of W.B.Cs increases and R.B.Cs decreases.</p> <p>Symptoms: Fever or chill Persistent fatigue, weakness Frequent or severe infections Loss of weight without try Swollen lymph node Enlarge liver or spleen Easy bleeding or bruising Recurrent nose bleeding Ting red spots on skin Sweating at night Bone pain or tenderness</p> <p>Thalassemia: It is the name of a group of inherited conditions that affect the blood haemoglobin. Persons having thalassemia do not produce or produce little amount of haemoglobin, which is used by red blood cells to carry oxygen around the body. Person having problems of thalassemia having following symptoms. Symptoms: A pale and restless appearance Poor appetite Slowed growth and delayed puberty Dark urine An enlarged spleen, liver or heart Jaundice</p> <p>Thalassemia major: It occurs when a child inherits two mutated genes, one from each parent. Children born with this disorder usually develop the symptoms of severe anemia within the first year of life. They lack the ability to produce normal, haemoglobin and feel chronic fatigue. Thalassemia minor have occurred when a child inherit it from one of the parent. Persons have mild anemia and slight lowering of haemoglobin level in the blood. It resembles with mild iron deficiency anemia. People with this disorder do not have any symptoms.</p>	K/R-U	E

3.	Write a short note on Xylem and Phloem?	<p>Xylem tissue is responsible for the transport of water and dissolved substances from roots to the aerial parts. Due to the presence of lignin, the secondary walls of its cells are thick and rigid. That is why xylem tissue also provides support to plant body. Two main types of cell are found in xylem tissue i.e. vessel and tracheids. Vessels have thick secondary cell walls. Their cells lack end walls and join together to form long tubes. Tracheids are made up of slender cells with overlapping ends.</p> <p>Phloem tissue is responsible for the conduction of dissolved organic matter (food) between different parts of plant body. Phloem tissue mainly contains sieve tube cells and companion cells. Sieve tube cells are long and their end walls have small pores. Many sieve tube cells join to form long sieve tubes. Companion cells are parenchymatous, narrow, elongated cells, and are closely associated with the sieve tube. Conduction with the sieve tube is done through the pores present on the walls of these cells. They help the sieve tubes in conduction of food materials and make proteins for sieve tube cells.</p>	K/R-U	M
4.	Write a short note on Acidic fermentation	<p>Acidic fermentation: In animals when aerobic respiration is not enough to produced required energy they start anaerobic respiration. During this process glucose breaks down into a substance called lactic acid. Glucose Lactic→ acid + Some energy</p> $C_6H_{12}O_6 \rightarrow 2C_3H_6O_3$ <p>A limited amount of energy is produced as compared to aerobic respiration but this is enough to power the athlete's muscles during start time of sprint. He experiences pain, this condition of pain is called Muscle fatigue. The lactic acid is produced in his muscles and bool stream.</p>	K/R-U	E

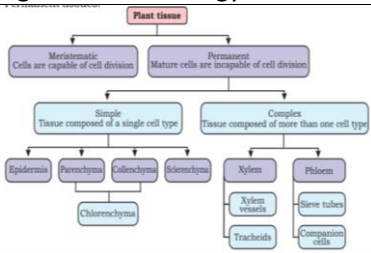
5.	Define biology and mention its 6 branches	<p><b>BIOLOGY:</b> The word biology comes from Greek language "Bios" meaning "live" and "Logos" meaning "thought or reasoning". Thus biology meaning study of life</p> <p><b>BRANCHES OF BIOLOGY:</b> (i) Morphology (Gr. morph; form, logos; discourse): The study of external form and structure of organisms. (ii) Anatomy (Gr. ana; part/up, tome; cutting): The study of internal parts of body of living organisms by cutting them open. (iii) Cell biology (L. cells, compartment, Gk. Bios= life; logos; discourse): The study of cell and its organelle. (iv) Histology (Gr. histos: tissue; logos, discourse): The study of structure of tissues of plant and animals. (v) Physiology (Gr. physis; nature, logos, discourse): The study about functions of living organisms. (vi) Taxonomy (Gr. taxis, arrangement, nomos: name): The study of the rules, principles, grouping and naming the living organisms.</p>	K/R-U	E
6.	Write a short note on Endoplasmic reticulum	<p>Endoplasmic reticulum: The endoplasmic reticulum (ER) is an organelle found in eukaryotic cells only. The ER has a double membrane consisting of a network of hollow tubes, flattened sheets, and round sacs. These flattened, hollow folds and sacs are called cisternae. The ER is located in the cytoplasm and is connected to the nuclear envelope. There are two types of endoplasmic reticulum: smooth and rough ER.</p> <p>Smooth Endoplasmic Reticulum: does not have any ribosomes attached. It is involved in the synthesis of lipids, including oils, phospholipids and steroids. It is also responsible for metabolism of carbohydrates, regulation of calcium concentration and detoxification.</p> <p>Rough Endoplasmic Reticulum: is covered with ribosomes giving the endoplasmic</p>	K/R-U	M

		reticulum its rough appearance. It is responsible for protein synthesis and plays a role in membrane production. The folds present in the membrane increase the surface area allowing more ribosomes to be present on the ER, thereby allowing greater protein production.		
7.	<b>Mention the principles of classification of living organisms?</b>	<p><b>PRINCIPLES OF CLASSIFICATIONS:</b></p> <p>Some organisms share similar fundamental characteristics or functions. It is further explained by means of Morphology (external features of an organism) in which we study the organisms on the basis of their Homologous (similar in structure and have different functions) and Analogous. Sometimes it is impossible to classify organisms using morphological characters, therefore scientists use other characteristics to classify organisms which include; Cytology and genetics in which organisms are classified on the basis of cellular study, genetic constitution and their development pattern. Biochemistry is also employed in which the chemical substances of the organisms are compared.</p>	<b>K/R-U</b>	<b>E</b>
8.	<b>What are the two types of biological reasoning?</b>	<p>Reasoning: Biologists collect information about the problem and formulate the hypothesis by using a reasoning process i.e. 'inductive reasoning and deductive reasoning'.</p> <p>• Inductive reasoning moves from specific to general e.g. Shark is a fish. All fishes have scales therefore sharks also have scales.</p> <p>• Deductive reasoning moves from general to specific. It is based on "ifthen" statement. Deductive reasoning can be tested and verified by experiments. In malaria case, the following deduction is made: "If Plasmodium is the cause of malaria, then all the malaria patient should have Plasmodium in their blood"</p>	<b>K/R-U</b>	<b>M</b>

9.	<p>Write a note on the role of small intestine in digestion in man</p>	<p>The small intestine is made up of three parts: The duodenum, about 25 cm (10 inches) long, C-shaped first part. The jejunum, the coiled mid section. The ileum, the final section that leads into the large intestine. The duodenum receives chyme from the stomach and it is a part of alimentary canal where most of the digestive process occurs. Ducts that empty into the duodenum deliver pancreatic juice and bile from the pancreas and liver, respectively. Bile salts have detergent action on particles of dietary fat which causes fat globules to break down or be emulsified into minute, microscopic droplets. Pancreatic juice is a liquid secreted by the pancreas, which contains a variety of enzymes, including protease like trypsinogen, pancreatic lipase and amylase, which digest protein, lipids and carbohydrates respectively. Goblet cell Lacteal Vein returning blood to liver Artery bringing blood from heart Blood capillaries Intestinal juices produced from the small intestine contain enzymes and pancreatic juice break down all four groups of molecules found in food (polysaccharides, proteins, fats, and nucleic acids) into their component molecules.</p>	K/R-U	M																		
10.	<p>Write three differences between Prokaryotic cell and Eukaryotic cell.</p>	<table><tr><th>Cellular Structures</th><th>Prokaryotic cell</th><th>Eukaryotic cell</th></tr><tr><td>Example;</td><td>Bacteria and Cyanobacteria</td><td>Animals and plants</td></tr><tr><td>Nucleus</td><td>Without membrane</td><td>Membrane bounded</td></tr><tr><td>Number of chromosomes</td><td>One but not true chromosomes</td><td>More than One</td></tr><tr><td>Number of cells</td><td>Unicellular</td><td>Unicellular and Multicellular</td></tr><tr><td>True membrane bound organelles</td><td>Absent</td><td>Present</td></tr></table>	Cellular Structures	Prokaryotic cell	Eukaryotic cell	Example;	Bacteria and Cyanobacteria	Animals and plants	Nucleus	Without membrane	Membrane bounded	Number of chromosomes	One but not true chromosomes	More than One	Number of cells	Unicellular	Unicellular and Multicellular	True membrane bound organelles	Absent	Present	K/R-U	D
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11.	<p>Draw neat and labelled diagram of smooth muscles.</p>	<p>The diagram illustrates the structural differences between striated and smooth muscle. Striated muscle fibers are long, cylindrical, and contain multiple nuclei at the periphery. They show distinct striations (myofibrils) and are connected by discs between cells. Smooth muscle fibers are shorter, spindle-shaped, and contain a single central nucleus. They have non-striated cytoplasm and are connected by bridges linking two adjacent cells. A single muscle fiber is also shown, highlighting its elongated shape and internal structure.</p>	K/R-U	D																		
12.	<p>Define any four types of chromosomes depending upon position of centromere.</p>	<p>The chromosomes are of different types, depending upon position of centromere. These types are:</p>	K/R-U	E																		



		<p>Metacentric: Chromosomes with equal arms.</p> <p>Sub-meta centric: Chromosomes with un equal arms</p> <p>Acrocentric or sub-telocentric: Rod like chromosomes with one arm very small and other very long. The centromere is sub terminal.</p> <p>Telocentric: Location of centromere at the end of chromosomes</p>		
13.	<p><b>Why meiosis is called reduction division?</b></p> <p><b>Name different stages of Prophase-I of meiosis.</b></p>	<p><b>MEIOSIS (Reduction Division)</b></p> <p>Meiosis is a type of cell division in which single cell divides into four daughter cells and number of chromosomes becomes half in each daughter cell. In animal meiosis takes place in germ cell to produce gametes i.e. Sperms and Eggs whereas in plants it takes place in spore mother cells (S.M.C) to produce spores. This is why meiosis is known as reduction division.</p> <p>Prophase I: It consists of the longest phase of meiosis. It can be subdivided into following sub stages:</p> <p>Leptotene</p> <p>Zygotene</p> <p>Pachytene</p> <p>Diplotene</p> <p>Diakinesis</p>	K/R-U	M
14.	<p><b>Define Anaerobic and Aerobic respiration. Write chemical equation of aerobic respiration.</b></p>	<p><b>Anaerobic Respiration:</b> The primitive type of respiration which takes place in the absence of O<sub>2</sub> or without O is called anaerobic respiration or fermentation. There are 2 special conditions where O is not available so the organisms adapt 2 themselves to break down their food without oxygen which is called anaerobic respiration or fermentation. It takes place in some bacteria, fungi, endoparasite and sometimes in animal.</p> <p><b>Aerobic Respiration:</b></p> <p>Type of respiration where food breakdown occurs in the presence of oxygen to produce energy. It is a method of respiration found in majority of organisms. It takes place in the presence of free</p>	K/R-U	E

		<p>oxygen, oxidizing the food and releasing the maximum amount of energy i.e. 2827 kJ / mole of glucose or 36 ATP molecules/glucose.</p> <p>The end products of aerobic respiration are CO<sub>2</sub> and H<sub>2</sub>O</p> <p>Glucose + oxygen → Carbon dioxide + water + Energy (36 ATP)</p> <p><math>C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + 36 \text{ ATP}</math></p>		
15.	<p><b>What is Nutrition? Define Autotrophic nutrition and Heterotrophic nutrition.</b></p>	<p>Process by which organisms obtain and use the nutrients required for maintaining life is called nutrition. Essential substances that our body needs in order to grow and stay healthy are known as nutrients. There are two processes by which food is obtained or prepared such as:</p> <p>Autotrophic nutrition - it is the mode of nutrition in which an organism makes its own food from the simple inorganic materials like carbon dioxide, water and minerals present in the surrounding (with the help of energy). The processes are photosynthesis or either chemosynthesis. Heterotrophic nutrition - it is the mode of nutrition in which an organism can't make its own organic material but depends on other organisms for its food and use it for growth and energy.</p>	K/R-U	M
16.	<p><b>Draw a flowchart showing different types of plant tissues.</b></p>	 <pre> graph TD     PT[Plant tissue] --&gt; M[Meristematic Cells are capable of cell division]     PT --&gt; P[Permanent Mature cells are incapable of cell division]     M --&gt; S[Simple Tissue composed of a single cell type]     M --&gt; C[Complex Tissue composed of more than one cell type]     P --&gt; S     P --&gt; C     S --&gt; E[Epidermis]     S --&gt; P1[Parachyma]     S --&gt; C1[Collenchyma]     S --&gt; S1[Sclerenchyma]     S --&gt; Ch[Chlorenchyma]     C --&gt; X[Xylem]     C --&gt; Ph[Phloem]     X --&gt; XV[Xylem vessels]     X --&gt; Tr[Tracheids]     Ph --&gt; ST[Sieve tubes]     Ph --&gt; CC[Companion cells] </pre>	K/A-U	M
17.	<p><b>Define parasitology, Developmental Biology and Pharmacology.</b></p>	<p>Developmental biology (Gr. embryo; embryo, logos, discourse): The study of formation and development of embryo.</p> <p>Parasitology (Gr. para; up): The study of parasites.</p> <p>Pharmacology (Gr. pharmakon, drug;). The study about action of drugs.</p>	K/R-U	E
18.	<p><b>Mention the levels of organization?</b></p>	<p>Levels of organization:</p> <p>Atomic level of organization</p> <p>Molecular level of organization</p>	K/R-U	E

		Cellular level of organization Taxonomic level Population level Community level Ecological system Biosphere level		
19.	Explain the five kingdom classifications?	<p>THE FIVE KINGDOMS:</p> <p>(i) Kingdom Monera: It includes all the prokaryotes i-e Bacteria and cyanobacteria.</p> <p>(ii) Kingdom Protista: It is the place for all the eukaryotic unicellular organisms, except yeast which some of them have the features of both plant and animal like. Most protists are aquatic. It includes protozoa and unicellular algae.</p> <p>(iii) Kingdom Fungi: It includes all the multicellular eukaryotic fungi. They are Achlorophyllous, absorptive heterotrophs. They have cell wall made up of mainly chitin. They have a body called Mycelium which is made up of a thread like structure called hyphae.</p>	K/R-U	M
20.	Give the postulates of cell theory?	<p>Cell theory: One of the most important concepts in biology is that a cell is a basic structural and functional unit of living organism. This is known as a cell theory and was proposed jointly by two scientists in 1839. A Belgian Botanist called Schleiden and the German zoologist called Schwan. In 1855 Rudolf Virchow, a German physician proposed an important extension of cell theory-that all living cells arise from pre-existing. The postulates of cell theory are:</p> <p>1. All Living organisms are made of one or more cells.</p>		

		<p>2. The cell is the fundamental unit of structure and function in all living organisms.</p> <p>3. The new cell is derived from pre-existing cells dividing into two by cell division.</p> <p>4. The cell contains the hereditary material which is passed from generation to generation.</p>		
21.	<p><b>Write a short note on energy currency in living organism</b></p>	<p>In our home we store energy in batteries when electricity is available from usual source or when light energy is available we capture it by solar plates. This energy of battery then is utilized at the time of power shutdown (load shedding). Living organisms also have similar type of system to store energy. This energy is stored in a special molecule called Adenosine Tri-Phosphate (ATP). In organisms, energy is liberated during any oxidation reaction, this energy is utilized by molecules called Adenosine Di-Phosphate (ADP) to form a bond with phosphate (P). As a result the ADP become ATP, energy of oxidation is now stored in ATP.</p> <p>The amount of energy stored is 7.3 Kcal / mole, this stored energy in ATP will be utilized by living organism for performing any type of work e.g. transport of molecules against the concentration gradient. The energy is now become free (liberated) by breaking ATP molecule.</p> <p><math>ATP \rightarrow ADP + P + \text{Energy (7.3 K Cal / mole)}</math></p> <p>So the formation of ATP is endergonic (energy intake) process and breakdown of ATP is exergonic (energy liberating) process.</p>	K/R-U	M
22.	<p><b>Write a short note on large intestine and its functions?</b></p>	<p>Large intestine and its functions: From the small intestine, food that has not been digested (and some water) travels to the large intestine through a muscular ring, that prevents food from returning to the small intestine. By the time food reaches the large intestine, the work of absorbing nutrients is nearly finished. The large</p>	K/R-U	M

		<p>intestine's main function is to remove water from the undigested matter and form solid waste that can be egested. The large intestine is made up of three parts: The caecum is a pouch at the beginning of the large intestine that joins the small intestine to the large intestine. This transition area expands in diameter, allowing food to travel from the small intestine to the large. The appendix, a small, hollow, finger-like pouch, hangs at the end of the cecum. It no longer appears to be useful to the digestive process.</p> <p>The colon extends from the caecum up the right side of the abdomen, across the upper abdomen, and then down the left side of the abdomen, finally connecting to the rectum. The colon has three parts: the ascending colon and transverse colon, which absorb fluids and salts, and the descending colon, which holds the resulting waste (faeces). Faeces mainly consist of undigested material, large number of bacteria, sloughed off gastrointestinal cells, bile pigments and water. Bacteria in the colon help to digest the remaining food products. The rectum is where faeces are stored until they leave the digestive system through the anus as a bowel movement.</p>		
23.	<p><b>Mention the two processes of transport of water and minerals in plants?</b></p>	<p>The root absorb water and minerals from soil through root hairs. There are two processes of transport:</p> <p>(a) Passive transport: The uptake of water and mineral by osmosis and diffusion without using energy of ATP. It is due to concentration gradient i.e. always takes place from high to low quantity of substances.</p> <p>(b) Active transport: Movement of substances from low quantity to high quantity i.e. against the gradient and it requires energy of</p>	K/R-U	E

		ATP. This movement is called active transport.		
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