ZIAUDDIN UNIVERSITY
EXAMINATION BOARD

RESOURCES FOR

"HSC-I "ZOOLOGY"

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 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. What is an IDE? Which two short-keys are used to compile the program?

1	Name any 4 major branches of biology and define them.	MOLECULAR BIOLOGY: It deals with the study of the structure and the function of the molecules that take part in biological processes of an organism e.g. nucleic acid and protein molecules. MICROBIOLOGY: The study of microorganisms is called microbiology e.g. Bacteria, viruses etc. ENVIRONMENTAL BIOLOGY: It deals with the study of environment and its effect on organisms is called environmental biology. PARASITOLOGY: The study of parasitic organisms, there life cycles, mode of transmission and effect on hosts.	R	C

2	Explain the level of organization from species to the highest level of organization.	SPECIES: A group of similar type of interbreeding organisms is called species. POPULATION: The total number of individuals of a species at a particular place is called population. COMMUNITY: A group of populations is called community. ECOSYSTEM: A community together with its non-living environment is called	U	B

		ecosystem. BIOSPHERE: The part of earth inhabited by organisms is called biosphere.		

3	What are organic molecules? Define any two of the following. a) Macromolecules b)Monomers c) Hydrolysis d) Condensation.	The molecules of carbon are called organic molecule. These are formed inside the cell in the following state. MACROMOLECULES:- These are huge and highly organized molecules e.g. DNA, haemoglobin. MONOMERS:- Those molecules which are formed by the combination of two or more than two monomers are called polymers it means the monomers are the building blocks of polymers e.g. Amino acids are the monomers of protein etc. SYNTHESIS OF LARGE MOLECULES:- The joining of two monomers is called condensation. BREAKING OF LARGE MOLECULES:- The process in which macromolecules or polymers are broken down into smaller monomers by the addition of water is called hydrolysis.	U	B

4	Define a) endoenzymes b) exoenzymes c) energy of activation.	ENERGY OF ACTIVATION: Activation energy is also called THRESHOLD ENERGY, is a term introduced in 1889 by Swedish scientist SVANTE ARRHENIUS, which is defined as "The energy that must be overcome in order for a chemical reaction to occur". Denoted by:- Ea Unit:- kilojoules per mol ENDOENZYMES :Those enzymes which perform their activities within the living cell where they have been prepared are called endoenzymes. EXOENZYMES :While those enzymes which act out side the cell are called exoenzymes	R	B

5	Why are amphibians unsuccessful land vertebrates.	**AMPHIBIAN AS UNSUCCESSFUL LAND VERTEBRATES** The amphibians are considered as the unsuccessful land vertebrates because they are failed to adapt completely to the land environment. **i.** They are cold blooded animals and do not have any exoskeleton, so they can not bear the extremes of temperature in terrestrial environment. **ii.** Their thin naked skin can not prevent the loss of water from their body. **iii.** Their eggs are small and without a shell and external fertilization is a rule. **iv.** They lay their eggs in water. **v.** Their eggs hatch out into the larvae which are gill breathing. There fore they need water to survive.	R	B

6	Why are reptiles successful land vertebrates?	**REPTILES ARE SUCCESSFUL LAND VERTEBRATES:** 1. Unlike amphibians they don't have to go to water to reproduce (internal fertilization). 2. The sperms and egg are fused inside the body. 3. They have amniotic eggs with leathery shells. 4. Their body is covered with an exoskeleton of horny scales and plates which helps to protect the body against the extremes of temperature. 5. They have developed kidneys to retain enough water and excrete concentrated urine. 6. Their clawed- limbs made them fit not only to move, dig and climb but also to defend themselves against the predators.	K/R	B

7	Explain the classification of Housefly.	CLASSIFICATION OF HOUSE-FLY Kingdom Animalia Phylum Arthropoda Class Insecta Order Diptera Family Family Musidae Genus Musca Species Species Musca domestica	R	B

8	Why do birds make certain adaptations and what are those adaptations?	***Birds*** evolved not only wings, but many other ***adaptations*** that ***make*** it possible to ***fly***. **FLIGHT ADAPTATIONS IN BIRDS:** **1) SHAPE OF THE BODY:** The Streamlined compact, spindle shaped body which offers least resistance to air is the primary flight adaptations. **2) LOSS OF WEIGHT:** The hollow bones are light, strong and pneumatic (air filled). They have no teeth and tail vertebrae. The urinary bladder, an ovary and oviduct have also disappeared. **3) WINGS:** Fore limbs are modified into wings which are moved up and down by strong flight muscle keeping the body afloat. **4) ENERGY REQUIREMENT:** It is brought about by a rich oxygen supply to the tissues by a powerful heart and an extra-ordinary respiratory system. **4) MAINTENANCE OF BODY TEMPERATURE:** The body temperature is regulated by the ventilating action of the air sacs	K	B

9	Define metamorphosis. Mention its two types.	*METAMORPHOSIS:* Definition: It is a set of changes which transforms a larva into its developed adult form.	A	B

		Larva: A larva is creature comes out of egg in an immature and undeveloped stage. There are two types of metamorphosis. (i) Complete Metamorphosis: In this metamorphosis a larva hatches out of the egg and develops into a resting stage, the pupa which is converted into an adult. e.g., Metamorphosis of Butterfly. (ii) Incomplete Metamorphosis: In this metamorphosis a tiny immature but adult like creature called nymph comes out of the egg and grows directly into an adult. e.g. **Metamorphosis of grasshopper.**		

10	Mention the salient features of phylum Echinodermata.	**PHYLUM ECHINODERMATA** ➢ Echinoderms have spiny skin. There are about 6000 species of exclusively marine animal in this phylum. ➢ They are radially symmetrical animals. ➢ They lack head, brain and segmentation. ➢ They are triploblastic, coelomate deutrostomes. ➢ They have tube feet which help in locomotion, holding of food and respiration. ➢ They have a water vascular system. ➢ They also produce a larva which is called bipinnaria. It is bilaterally symmetrical e.g. Star fish, Brittle star & sea cucumber.	K	B

11	Define the classes of Phylum Cnidaria.	CLASSES OF CNIDARIA (1) CLASS HYDROZOA: ⍰ Mostly they are marine animals. ⍰ Mesogloea is non cellular. ⍰ Some animals live singly without any group e.g. Hydra and some form groups e.g. Obelia. ⍰ The hydrozoans are of two types, one is polyp and other is medusa. The polyp is the sessile form of animal while medusa is motile. (2) CLASS SCYPHOZOA: ⍰ This class includes jelly fishes or true medusa. ⍰ Mesogloea is cellular. ⍰ The largest jelly fish CYANEA is 4 meter in diameter and its tentacles are 30 meters longs. ⍰ They have umbrella shaped body in which mouth is present on the lower side and it is surrounded by oral arms. (3) CLASS ANTHOZOA: ⍰ In this class sea anemones and corals are included. ⍰ Mesogloea is fibrous. ⍰ They are polypoid animals which may be solitary or colonial. ⍰ They do not have free-	R	B

		swimming animals. They are all marine animals. The gastro- vascular cavity is divided into many chambers called mesenteries		

12	Define the classes of phylum Mollusca .	(i) CLASS GASTROPODA (FOOT ON VISCERAL MASS): This is the largest class of this phylum which includes whelks, snails and slugs. They are mostly marine animals, but some are fresh water and terrestrial. Many of them become asymmetrical by the twistening of visceral mass at 180o by a phenomenon called torsion. They have a prominent head and a broad muscular foot. External shell may be present or absent e.g. Pila. (ii) CLASS BIVALVIA: This is the second largest class of this phylum. These animals are called bivalvia because their bodies are enclosed in a shell which consists of a right and left pieces. These pieces called valves are moveably hinged together. The foot is laterally compressed. They are marine or fresh water animals e.g. Unio, Pearl oysters. (iii) CLASS CEPHALOPODA (FOOT ON HEAD): These are marine animals. In these animals the foot is transformed into suckers bearing tentacles and arms. They have external shell (Nautilus) or external shell (Loligo) or some times shell is absent (Octopus).	R	B

13	Write the general characteristics of phylum Chordata.	This phylum includes about 45000 species of the most advanced animals of the world. FUNDAMENTAL CHARACTERS OF CHORDATES: 1) Notochord: (i) It is a flexible cartilaginous skeletal rod which forms in the early stage in the embryos of all the chordates in the mid dorsal line. (ii) It persists in a few chordates through out their life, where as in most of them it is replaced by a vertebral column. ii) Hollow, Dorsal, Tubular Nerve Cord: (i) In all the chordates a hollow, tubular, fluid filled, nerve cord always develops in the mid dorsal line. (ii) In the group craniata it becomes differentiated into brain and spinal cord. iii) Pharyngeal Gill Slits: (i) In all the chordates an early embryonic stage, walls of pharynx become perforated to form pharyngeal gill slits. (ii) In aquatic forms these perforations develop gills where as in terrestrial forms they close & disappear.	R	B

14	Why monocytes are called antigen presenting cells?	Another type of phagocytes is called **monocytes.** They are **big-eaters** i.e. kill microorganisms, live for a long time and act as presenting cells for antigens, so they **are also called antigen presenting cells.**	A	A

15	What is large intestine? Mention about its three parts.	LARGE INTESTINE: It is about 6.5 cm wide. It is divided into a short caecum, a long colon and a terminal rectum. i.CAECUM: It is the last first part of large intestine which gives off a blind tube of about 18 cm long, which is known as vermiform appendix which is a vestigeal organ in human body. It is very important in herbivores because it contains cellulose digesting bacteria. ii.COLON: It is the largest part of large intestine which consists of three parts i.e. ascending colon, transverse colon and descending colon. Function: Absorption of water, salts and vitamins iii.RECTUM: It is the last part of large intestine which receives undigestable food which is released from the body through the anus in the form of faece	U	B

16	Write a short note on the Functions of liver.	LIVER Liver is a very important organ of our body which is also considered as the largest gland of the body. It performs a lot of functions. Some of them are as under; 1. METOBOLISM: It performs the metabolism of carbohydrates, proteins and lipids. Therefore, it is also known as the metabolic factory of the body. Carbohydrate Metabolism: Surplus amount of glucose is deposited in liver cells after a meal. Then the glucose is converted into glycogen in the presence of insulin hormone. The glycogen can later be converted into glucose in the presence of glucagon when the glucose level of blood becomes low. Protein Metabolism: Liver store amino acids after deamination i.e. removal of amino group. The amino groups are released in the form of ammonia which is a highly toxic compound. Liver convert the ammonia into urea by the urea cycle. Lipid Metabolism: Liver also processes the fatty acids and stores the products as ketone bodies which later are released as nutrients for active muscles. 2. DETOXIFICATION: It prevents certain poisons from harming the body by converting them into harmless compounds. 3. STORAGE ORGAN: It stores carbohydrates, lipids etc.	U	B

		4.BLOOD COAGULATION: It produces blood clotting factors including vitamins. 5.DIGESTION OF FOOD: It produces bile juice for the digestion of food. 6.EXCRETION: It excretes out the bile pigments and other waste products		

17	What is Oral cavity. Write a short note on it.	. ORAL CAVITY: It is the first part of G.I Tract which has an external opening which is called Mouth. In this cavity two types of digestion takes place; i. Mechanical Digestion: This digestion is performed by the chewing action of teeth .In this process the tongue also plays an important role. ii. Chemical Digestion: The chemical digestion is performed by saliva, which is secreted by the salivary glands .There are three types of salivary glands Parotid Salivary Glands: These salivary glands are found at the base of pinnae. Sub – lingual Salivary Glands: These glands are found below the tongue. Sub – Mandibular Salivary Glands: These glands are found at the base of lower jaws	U	B

18	How does respiration occur in frogs?	RESPIRATORY ORGANS OF FROG: There are four types of respiration in frog. 1. Respiration by Gills: In larval stage frog breathes by means of external gills. 2. Respiration by Skin: It takes place by the moist and vascularized skin of frog, this is known as cutaneous respiration. It takes place when the frog is present in water or inside the mud during hibernation. 3. Bucco-pharyngeal respiration: The exchange of respiratory gases by the help of thin highly vascularized mucous membrane of buccal cavity is called bucco-pharynreal respiration. 4. Pulmonary respiration: The exchange of gases on land through lungs is termed as pulmonary respiration.	U	C

19	What are lungs? Mention the parts of a human lung.	LUNGS: Lungs are paired, soft, spongy and highly vascularized structures. The right lung is composed of three lobes while the left lung has two lobes. PLEURAL MEMBRANES: -Each lung is enclosed by two, thin membranes known as pleural membranes i.e. parietal pleura (outer) and visceral pleura (inner). PLEURAL CAVITY: - Inside the pleural membrane there is a fluid filled, narrow cavity called pleural cavity. The fluid of this cavity is called pleural fluid which acts as a lubricant. BRONCHIOLES: - The bronchus forms very fine branches inside the lung, these branches are called bronchioles. ALVEOLI: - Each bronchiole terminates at a tiny, hollow sac- like alveolar duct containing a number of air sacs or alveoli, which are considered as the respiratory	R,U	B

		surfaces of lungs. The alveolus is composed of single layer of epithelial cells. Each alveolus is surrounded by extensive network of blood capillaries for the exchange of gases. The internal area of an alveolus is provided with a thin layer of fluid containing surfactant, which reduces the surface tension to prevent if from collapsing during gas exchange.		

20	Explain the mechanism of breathing in Man.	BREATHING IN MAN In man including mammals, breathing is termed as negative pressure breathing. In this kind of breathing, air is drawn into the lung due to negative pressure. There are two events of breathing. 1. INSPIRATION (INHALATION): In this process the air is taking in into the lungs. Contraction of external intercoastal muscles, move the ribs as well as sternum outward and upward while the contraction of diaphragm makes it flat. In this way the thoracic cavity enlarges and a negative pressure is developed inside the thoracic cavity and ultimately in the lungs. So the air through respiratory passage rushes into the lungs up to alveoli where exchange of gases occurs. 2. EXPIRATION (EXHALATION): The process of given out of air from the lung is called expiration. It is a passive process which is caused by relaxation of external intercoastal muscles and the contraction of internal costal muscles, which move ribs as well as sternum inward and down ward. Similarly, diaphragm also relaxes which makes it dome-shaped thus reducing the volume of the thoracic cavity. In this way lungs are compressed so the air along with water vapours is exhaled outside.	A	B

21	What are the two types of circulatory system?	TYPES OF CIRCULATORY SYSTEM: There are two types of circulatory system, (i) Open type (ii) Closed type (i) Open type circulatory system: In this circulatory system the blood does not flow in blood vessels, it directly and freely flows throughout the body. The body cavity is called haemocoel. This body cavity consists of many parts, called sinuses (cavities). Because there is no differentiation between blood and interstitial fluid of cells, so the body fluid is also called haemolymph. Open type of circulatory system is found in Arthropods, Molluscs and Tunicate animals. (ii) Closed type of circulatory system: In this system the blood flows in blood vessels, which	A	B

		carry this blood to all parts of the body. The blood does not flow freely in the body cavity. In this system the distribution of blood is controlled properly. The heart pumps the blood with a high pressure. It is supplied to the body organs by blood vessels and then carried back to the heart. This type of circulation is found in earthworm, chordates etc.		

22	Define A) Blood pressure B) Blood flow.	BLOOD PRESSURE The hydrostatic force exerted by the blood against the walls of blood vessels is called blood pressure. This pressure is produced by the ventricle systole i.e. contraction of ventricles. Blood pressure is measured in millimeters of Hg (Mercury). Mercury monometer is widely used throughout the world, called sphygmomanometer to measure the blood pressure. The normal blood pressure is 120 / 80 mm Hg. The difference between the systolic and diastolic pressure is called pulse pressure. BLOOD FLOW The flow of blood is very fast in larger arteries. It is highest in aorta, then it is gradually reduces in arteries and much slower in capillaries. The total diameter of capillaries is greater than arteries, so the blood flows slowly in capillaries. It helps in the exchange of materials between blood and interstitial tissues	R	B

23	What are the four chambers of human heart?	CHAMBERS OF HEART:- The human heart consists of four chambers: (i) Right atrium (auricle) (ii) Left atrium (auricle) (in) Right ventricle (iv) Left ventricle. ATRIA:-The two atria (auricle) form the anterior part of the heart. The two atria are separated from each other by a septum, called inter-atrial-septum. In the right atrium there are openings by which one precaval and one postcaval open separately and bring deoxygenated blood from all parts of the body. In the left atrium two pulmonary veins open by separate apertures and bring oxygenated blood from the lungs. In this way in the right atrium deoxygenated and in the left atrium oxygenated blood is collected. VENTRICLES:-The two ventricles form the posterior part of the heart. They are also separated from each other by a septum, called inter-ventricular-septum. The right atrium opens into the right ventricle by an aperture, called right auriculo-ventricular aperture. This aperture is guarded by a tricuspid valve, which allows the blood to flow from right atrium into right ventricle but not in backward direction. The left atrium also opens into left ventricle by an aperture, called left	R	C

		auriculo-ventricular aperture. It is guarded by a bicuspid or mitral valve, which allows the flow of blood from left atrium into left ventricle, but not in backward direction.		

24	What is Innate immune system? Write about the first and second line of defense briefly.	INNATE IMMUNE SYSTEM: (Non specific immune system) It is the natural immune system and non-specific i.e. this immunity prevents the infection of all microorganisms. It includes physical barriers like skin and mucous membrane and also chemical substances like gastric juice, lysozyme etc. This system is responsible to control the activity of microorganisms. In innate immune system there are two lines of defences. (i) FIRST LINE OF DEFENCE: The intact skin and mucous membrane with their secretions act as the first line of defence. (a) Physical barriers: Skin does not allow the infectious agents to enter. Mucous membrane is present along the lining of digestive, respiratory and urino-genital tracts. (b) Chemical barriers: The secretions of mucous membranes act as chemical barriers e.g. mucus, lysozyme enzyme etc. (ii) SECOND LINE OF DEFENCE: When due to certain reasons microorganisms enter the body, here is another line of defence for the protection of body from microorganisms, this is known as second line of defence. It is composed of following components. (i) Phagocytes (ii) Antimicrobial proteins (iii) Inflammatory response	A	A

25	What is an inflammatory response?	INFLAMMATORY RESPONSE: Introduction:- It is the condition of fire in any certain part of the body due to any injury or infection of microorganisms. In such condition the infected part becomes swollen, reddish, it feels heat and pain. Mechanism:- When injury occurs, a chemical substance is released by basophils and mast cells, called histamine. The histamine helps in the attraction of phagocytes and macrophages towards injured place. The phagocytes destroy microorganisms and remove dirt and cell broken parts. FEVER or PYREXIA:-By the infection and inflammation fever is caused in warm-blooded animals. It is due to the release of a substance, by certain W.B.Cs, called pyrogen. It increases the body temperature. Moderate fever is useful to the body because it prevents the growth of microorganisms and increases the production of	U	B

		phagocytes and interferon, so damaged tissues are repaired rapidly. High fever is dangerous for the internal tissues of the body		