ZIAUDDIN UNIVERSITY
EXAMINATION BOARD

RESOURCES FOR

"HSC-I BOTANY"

ZUEB EXAMINATIONS 2021

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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.

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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**

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S.NO	CRQS	ANSWER	CL	DL
1	Name the Five kingdoms of living organisms and tell the type of organisms belonging to them.	**CLASSIFICATION OF LIVING ORGANISMS** According to the modern system of taxonomy, living organisms have been classified into the following five kingdoms; **1. KINGDOM PROKARYOTAE (MONERA):** These organisms are prokaryotes e.g. Bacteria and Cyanobacteria (Blue green algae) **2. KINGDOM PROTOCTISTA (PROTISTA):** These organism are unicellular eukaryotic organisms, which can not be classified as animals, plants or fungi e.g. Protozoans, algae (both unicellular and multicellular) and primitive type of fungi etc. . **3. KINGDOM FUNGI:** These organisms are non-chlorophyllous, multicellular (except yeast) having chitinous cell wall and coenocytic body called mycelium. They are absorptive heterotrophs e.g. Mushrooms, Yeasts etc. **4. KINGDOM PLANTAE:** The organisms of this kingdom are chlorophyllous, multicellular eukaryotes, photosynthetic autotrophs having cell wall made up of cellulose and their zygote develops into an embryo e.g. *Rosa indica* (Rosa), *Cassia fistula*, Bryophytes etc. **5. KINGDOM ANIMALIA:** This kingdom includes multicellular eukaryotes which are non-chlorophyllous, ingestive heterotrophs having no cell wall e.g. *Homo sapiens* (Human), *Felis domestica* (cat), *Rana tigrina* (Frog).		
2	Define Fungi and Name the four groups of Fungi.	Fungi are a group of organisms which are mostly multicellular, eukaryotic organisms,		

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		having a cell wall but they lack chlorophyll. A fungal body is called mycelium which is made up of many thread-like structures which are called hyphae. **CLASSIFICATION OF FUNGI** The fungi are classified into following four divisions. 1. Zygomycota 2. Ascomycota 3. Basidiomycota 4. Deuteromycota		

3	Define tracheophytes. Name the major groups of vascular plants.	**TRACHEOPHYTES** • All tracheophytes have vascular system for the internal distribution of water, minerals, and food. • They are the dominant land plants and include all trees and flowering plants. **MAJOR GROUPS OF VASCULAR PLANTS:** **The tracheophytes are further sub-divided into five sub-divisions:** Sub-division Psilopsida (Psilopsids) Sub-division Lycopsida (Club Mosses) Sub-division Sphenopsida (Horse Tail) Sub-division Pteropsida (Ferns) Sub-division Spermopsida (Seed Plant)		

4	Write a short note on subdivision spermopsida and mention the names of it's types with their definition.	**SUB-DIVISION SPERMOPSIDA (The Seed Plants)** • First appeared in late Devonian and became dominant in Carboniferous Period. • Gametophyte stage is even more reduced than in the ferns, and non-photosynthetic or free-living. • The sperms of most modern species are not independent free-swimming flagellated cells. • Young embryo is enclosed within a seed coat and can remain dormant for long periods. • Spermosida can be divided into two main sub-groups, which are as follows: • Gymnosperms		

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		• Angiosperms **GYMNOSPERMS** These plants have naked seed because ovules are not covered by ovary i.e. fruit is absent. **ANGIOSPERMS** • They have their seeds enclosed in fruit because ovules are covered by ovary. • These plants became the dominant flora of the Cenozoic era. • Their reproductive structures are called flowers.		
5	Write a short note on photorespiration.	**PHOTORESPIRATION** **INTRODUCTION:-** This process is found in C3-plants, in which they consume oxygen and release carbon dioxide during day time. **MECHANISM:-** When the environmental conditions are hot and dry, the C3 plants closes their stomata to prevent the loss of water. But due to the on going process of photosynthesis, the oxygen concentration is increased inside the leaves. This oxygen competes with carbon dioxide to combine with **ribulose bisphosphate** (RuBP) in the presence of **ribulose bisphosphate carboxylase / oxygenase** (Rubisco) enzyme to form **phosphoglycerate** (PGA) and **phosphoglycolate**. Then phosphogylcolate splits into **Serine** (amino acid) and CO_2. $\mathbf{RuBP + O_2 \xrightarrow{Rubisco} PGA + Phosphoglycolate}$ $\mathbf{Phosphoglycolate \longrightarrow Serine + CO_2}$		

6	Name and define the types of transpiration.	**TYPES OF TRANSPIRATION** There are three main types of transpiration 1. Lenticular transpiration 2. cuticular transpiration 3. Stomatal transpiation **1. LENTICULAR TRANSPIRATION**		

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		• The transpiration by the lenticels of old stem is called lenticular transpiration. • Lenticels are longitudinal pores, on stem which are produced during the secondary growth. **2. CUTICULAR TRANSPIRATION** • The transpiration by the cuticle of leaf is called cuticular transpiration. • Cuticle is a waxy layer which is made up of a lipid called cuties. **3. STOMATAL TRANSPIRATION** • The transpiration by the stomata of leaf is called stomatal transpiration. • It is the most important type of transpiration because most of the water is lost in this transpiration		

7	Write the postulates of cell theory.	**CELL THEORY:** **Introduction:** This theory was presented by two German biologist Schleiden (1838) and Schwann (1839). Later on in 1855 a German Pathologist Rudolf Virchow improved this theory. **Important postulates of cell theory:** 1. All living organisms are composed of one or more cells. 2. The cell is the structural unit of life 3. The cell is a "de novo" structure i.e. could arise from non living materials. But according to R. Virchow (1855) "Cells can arise only by the division of pre existing cell". 4. Each cell has complete life it obtains energy from its surrounding to perform its vital activities.		

8	Define a) Lytic cycle b) Lysogenic cycle	**1: LYTIC CYCLE** The life cycle of a phage in which it enters into bacterium, overcomes its biochemical control, increases its number and destroys the bacterial cell is known as lytic cycle e.g. the life cycle of T4 phage. **LYSOGENIC CYCLE:** **Introduction:-** In contrast to the lytic cycle, the lysogenic cycle replicates the viral genome without		

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		destroying the host bacterium. Viruses that are capable of using both modes of reproduction with in a bacterium are called temperate viruses e.g. Lambda (λ) phage.		

9	Define Ascent of sap. Name the two components of xylem.	**ASCENT OF SAP** The upward movement of water and dissolved substances (sap) from the lower parts towards the upper parts of a plant is called ascent of sap. **PATH OF WATER:** It has been proved by experiments that xylem is the tissue, which provides a passage for the conduction of water. These are two main components of xylem which act as passages. i) Vessels ii) Tracheids		

10	Explain the role of ATP as the energy currency.	**ROLE OF ATP:** The ATP performs the following important function in a living body; • It acts as a mediator, capable of receiving energy from one reaction and transfers it to drive another reaction. • It plays a role in several endergonic reactions e.g. synthesis of proteins, lipids and carbohydrates, active transport etc. • In exergonic reactions it acts as co-enzymes e.g. anaerobic glycolysis and oxidative phosphorylation		

11	Write the economic importance of fermentation.	**Economic importance of fermentation:** 1. Brewing and dairy industries rely on fermentation. It is a source of ethyl alcohol in wines and beers. Wines are produced by fermenting fruits particularly grapes. Beers are produced fermenting malted cereals such as barley. 2. Lactic acid imparts flavour to yoghurt and cheese. The characteristic flavour of pickles is due to lactic acid and acetic acid. 3. Acetone and other industrially produced solvents are also the by-products of fermentation.		

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12	Write a note on phototrophic nutrition in plants.	**PHOTOTROPHIC NUTRITION:** ❖ The organisms which have the ability to convert solar energy into food energy are called phototrophic organisms and this nutrition is known as phototrophic nutrition. ❖ Phototrophic organisms require green pigments i.e. chlorophyll a and chlorophyll-b to absorb sunlight in the presence of this sunlight, these organisms synthesize food energy in the form of simple carbohydrates. This process is called photosynthesis. $\mathbf{6CO_2 + 12H_2O} \xrightarrow[Sunlight]{Chlorophyll} \mathbf{C_6H_{12}O_6 + 6H_2O + 6\ O_2}$ ❖ Some bacteria are also capable to prepare their food by the process of "Photosynthesis". These bacteria were discovered by Von Neil in 1930. They contain different type of chlorophylls which are called bacterio-chlorophyll and chlorobium chlorophyll. ❖ In photosynthetic bacteria H_2S gas is used instead of H_2O. Therefore these bacteria release sulphur during photosynthesis. Green sulphur bacteria and purple sulphur bacteria are the examples of photosynthetic bacteria. $\mathbf{CO_2 + 2H_2S} \xrightarrow{light} \mathbf{(CH_2O)_n + H_2O + 2S}$		

13	Write a note on heterotrophic mode of nutrition in plants.	**PARASTIC PLANTS:** These plants obtain their food from the other living organisms (host). **SAPROPHYTES:** Those plants which break up complex dead organic food material into simple compound and use them for their growth and development are saprophytes e.g. ***Neotia*** (bird's net or orchid) and ***Monotrapa*** (Indian pipe). **CARNIVOROUS PLANTS** **INSECTIVOROUS PLANTS:** **Introduction:**		

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		These are the plants which have their prey insects and small birds J.D Hooker suggested that the digestion of carnivorous plant is that of animals.		

14	Write about the role of water and carbon dioxide in photosynthesis.	**ROLE OF WATER IN PHOTOSYNTHESIS:** Photosynthesis requires H+ ions (protons) and e- (electrons) and both of these things are obtained from water molecules. Each water molecule splits to produce electrons and protons which are transferred to CO2 to form sugar molecules. $H_2O \longrightarrow 2H^+ + 2e^- + \frac{1}{2} O_2$ **ROLE OF CARBONDIOXIDE (CO2):** The CO2 provides the carbon for the basic skeleton to photosynthetic product. Plants absorb CO2 from air through the stomatal apertures of a leaf.		

15	Define diffusion and facilitated diffusion.	**DIFFUSION:** The movement of molecules from higher concentration towards the lower concentration towards the lower concentration is called diffusion. **FACILITATED DIFFUSION:** The movement of molecules or ions across the plasma membrane by carrier or channel proteins is called facilitated diffusion.		

16	Define Osmosis and Imbibition.	**OSMOSIS:** The movement of solvent molecules from the higher concentration towards the lower concentration through a semi-permeable membrane is called osmosis **IMBIBITIONS:** The absorption of water and swelling up of the hydrophilic substances is called imbibition.		

17	Write the classification of Wheat.	**CLASSIFICATION OF WHEAT** Kingdom Plantae Division Tracheophyta		

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		Class Monocotyledonae Order Poales Family Poaceae Genus Triticum Species ***Triticum indicum***		

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