



آغا خان یونیورسٹی ایگزامینیشن بورڈ
AGA KHAN UNIVERSITY EXAMINATION BOARD

Notes from E-Marking Centre on SSC-I Biology Annual Examinations 2024

Introduction

This document has been produced for the teachers and candidates of Secondary School Certificate (SSC) Part I Biology. It contains comments on candidates' responses to the 2024 SSC-I Examination indicating the quality of the responses and highlighting their relative strengths and weaknesses.

E-Marking Notes

This includes overall comments on candidates' performance on every question and *some* specific examples of candidates' responses that support the mentioned comments. Please note that the descriptive comments represent an overall perception of the better and weaker responses as gathered from the e-marking session. However, the candidates' responses shared in this document represent some specific example(s) of the mentioned comments.

Teachers and candidates should be aware that examiners may ask questions that address the Student Learning Outcomes (SLOs) in a manner that requires candidates to respond by integrating knowledge, understanding and application skills they have developed during the course of study. Candidates are advised to read and comprehend each question carefully before writing the response to fulfil the demand of the question.

Candidates need to be aware that the marks allocated to the questions are related to the answer space provided on the examination paper as a guide to the length of the required response. A longer response will not in itself lead to higher marks. Candidates need to be familiar with the command words in the SLOs which contain terms commonly used in examination questions. However, candidates should also be aware that not all questions will start with or contain one of the command words. Words such as 'how', 'why' or 'what' may also be used.

General Observations

Most candidates performed well in constructing responses, especially regarding the concepts of structural adaptations in leaves. Many candidates also excelled in describing the steps of the pressure flow mechanism in phloem translocation. However, it is crucial for teachers to focus on the following content areas and provide students with more practice to ensure a thorough understanding.

- Application of the knowledge of cell specialisation and division of labour in body organs to solve problems or make predictions.
- Identification of independent, dependent and controlled variables in various experimental scenarios. Recognise the role of controls in ensuring valid results.
- Develop a thorough understanding of the two-kingdom and five-kingdom classification systems and enhance analytical skills.
- Analyse the effect of pH on enzyme activity.

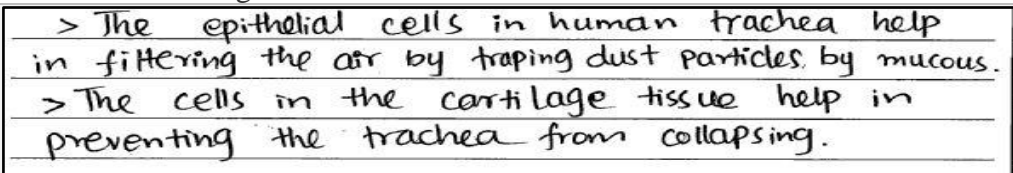
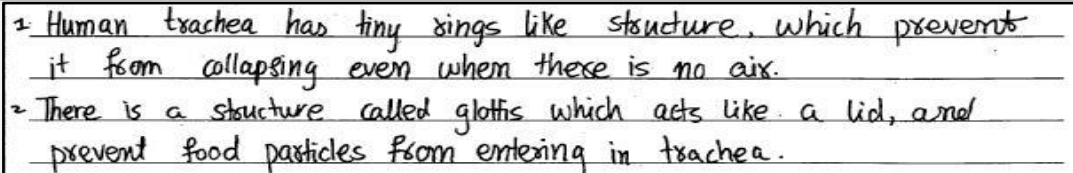
- Identification of permanent tissues in plants and relating their structural features to their functions.
- Extraction of facts from diagrams.
- Analyse scenarios and identify underlying factors affecting outcomes.

Note: Candidates' responses shown in this report have not been corrected for grammar, spelling, format, or information.

DETAILED COMMENTS

Constructed Response Questions (CRQs)

Question No. 1

Question Text	Describe the concept of division of labour among the different types of cells in human trachea in any TWO points.
SLO No.	1.8.3
SLO Text	Discuss the concept of division of labour.
Max Marks	2
Cognitive Level	U*
Checking Hints	1 mark for describing the concept of division of labour 1 mark for describing each type of cell with respect to relevant function
Overall Performance	Candidates have shown an average performance on this question. While candidates showed some understanding of the division of labour, many did not fully integrate how different cells' functions contribute to the overall health and functionality of the trachea.
Description of Better Responses	<i>Better responses</i> clearly identified the specific cell types along with their functions in the context of the trachea. For example, ciliated epithelial cells use cilia to sweep mucous or dust particles, mucous from goblet cells traps pathogens and cartilage prevents airway collapse during breathing. These responses demonstrate a clear understanding of how the division of labour among different cell types contributes to the efficiency and specialisation in multicellular organisms.
Image of Better Response	 <p>> The epithelial cells in human trachea help in filtering the air by trapping dust particles by mucous. > The cells in the cartilage tissue help in preventing the trachea from collapsing.</p>
Description of Weaker Responses	<i>Weaker responses</i> provided vague descriptions of cell functions, lacking details on how each cell type contributes to the division of labour. For example, they stated 'trachea has rings/ glottis/ epiglottis' without identifying the cells or tissues that constitute these structures, such as cartilage, epithelial or muscle tissues. Some of these responses included incorrect or irrelevant information, such as describing cell types not found in the trachea or inaccurately explaining their functions, which weakened the overall response.
Image of Weaker Response	 <p>1 Human trachea has tiny rings like structure, which prevents it from collapsing even when there is no air. 2 There is a structure called glottis which acts like a lid, and prevent food particles from entering in trachea.</p>

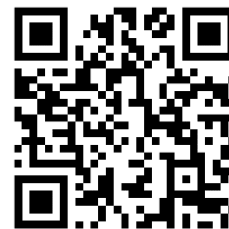
Suggestions for improvement (Highlight all that apply)

Maximising SLO Achievement	Preferred Pedagogy** Used for this SLO	Assessment Strategies
<ul style="list-style-type: none"> Identify the expectation of command words (use Command Word Guide) Ensure the content is taught at the relevant cognitive level Identify necessary content required (skills + concepts) 	<ul style="list-style-type: none"> Story Board Cause and Effect Fish and Bone Concept Mapping Audio Visual Resources Think, Pair and Share Knowledge Platform videos 	<ul style="list-style-type: none"> Past paper questions Discussion on E-Marking Notes AKU-EB Digital Learning Solution powered by Knowledge Platform <p>https://akueb.knowledgeplatform.com/login</p>

- Review past paper questions on the concept
- Utilise the resource guide for additional materials

- Questioning Technique (Socratic approach)
- Practical Demonstration

** For description of each Pedagogy, refer to Annexure A



Any Additional Suggestion: Teachers should integrate this topic with broader lessons on cell biology and physiology, showing how the division of labour in different organs fits into larger biological systems.

*K = Knowledge U = Understanding A = Application and other higher-order cognitive skills

Question No. 2

Question Text Shoab conducted an experiment to determine the effect of a fertiliser on the growth of plants.
He used four pots with different species of plants and varying amounts of soil and fertiliser for his experiment. However, he could not obtain the required result.
Identify any THREE errors in his experimental set-up.

SLO No. 2.1.2

SLO Text Solve a biological problem following the scientific method.

Max Marks 3

Cognitive Level A

Checking Hints 1 mark for identifying each error (any 3 required)

Overall Performance Candidates demonstrated average performance on this question. While many candidates showed an understanding of the concept of controlling variables, they struggled to apply this knowledge effectively to the given experimental setup.


Description of Better Responses *Better responses* highlighted that different species of plants, varying amounts of soil, and fertiliser could affect plant growth. This shows a grasp of experimental design principles, where only the independent variable should be varied. Additionally, candidates demonstrated an understanding of the importance of control variables in experiments to isolate the effect of the independent variable on the dependent variable.

Images of Better Responses

Description of Weaker Responses *Weaker responses* lack specificity and failed to identify errors in the experimental design accurately. For example, general statements like 'the setup was not placed in sunlight or not watered' do not provide precise or accurate information.

Images of Weaker Responses

Suggestions for improvement (Highlight all that apply)

Maximising SLO Achievement	Preferred Pedagogy Used for this SLO	Assessment Strategies
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Any Additional Suggestion: Teachers should offer a variety of practice problems and scenario-based questions where candidates can apply their understanding of variable control. Integrate this concept into practical tasks to reinforce their learning.

Question No. 3


Question Text	Complete the given table by mentioning the demerits of kingdom classification systems.						
	<table border="1"> <thead> <tr> <th>Classification System</th> <th>Demerit</th> </tr> </thead> <tbody> <tr> <td>Two-kingdom classification system</td> <td>1. 2.</td> </tr> <tr> <td>Five-kingdom classification system</td> <td>1.</td> </tr> </tbody> </table>	Classification System	Demerit	Two-kingdom classification system	1. 2.	Five-kingdom classification system	1.
Classification System	Demerit						
Two-kingdom classification system	1. 2.						
Five-kingdom classification system	1.						
SLO No.	3.3.3 and 3.3.4						
SLO Text	Compare two-kingdom and five-kingdom classification systems. (discuss how the five-kingdom classification system better explains diversity of living organisms.)						
Max Marks	3						
Cognitive Level	U						
Checking Hints	1 mark for mentioning each demerit of two-kingdom classification system (any 2 required) 1 mark for mentioning ONE demerit of five-kingdom classification system						
Overall Performance	Most candidates mentioned the demerits of the two-kingdom classification system but struggled to specify the demerits of the five-kingdom classification system.						
Description of Better Responses	<i>Better responses</i> accurately identified specific demerits, such as the two-kingdom system's failure to differentiate between unicellular and multicellular organisms and prokaryotes and eukaryotes. These responses also provided specific examples to illustrate the limitations of each classification system. For instance, they noted that the two-kingdom system groups algae and fungi with plants, while the five-kingdom system does not effectively classify viruses.						

Image of Better Response	Classification System	Demerit
	Two-kingdom classification system	1. Two Kingdom classification was based on ^{modest} only nutrition and mobility and cellular organisation was not included 2. It was questionable due placement of certain organisms in kingdom plantae like fungi.
	Five-kingdom classification system	1. Five Kingdom is not yet able to place virus in correct and accurate Kingdom.

Description of Weaker Responses Weaker responses lacked essential details of the demerits of classification systems. For example, students mentioned that the two-kingdom system is 'outdated' without explaining why this is the case or how it affects classification or they only mentioned the names of the kingdoms without further elaboration.

Image of Weaker Response	Classification System	Demerit
	Two-kingdom classification system	1. It is determine the on basis of similarities, differences, size, shape. 2. Among evolutionary systematic.
	Five-kingdom classification system	1. It can be determine on basis of cells and according to field name. Monera Fungi plantae. Protista Anamalia

Suggestions for improvement (Highlight all that apply)

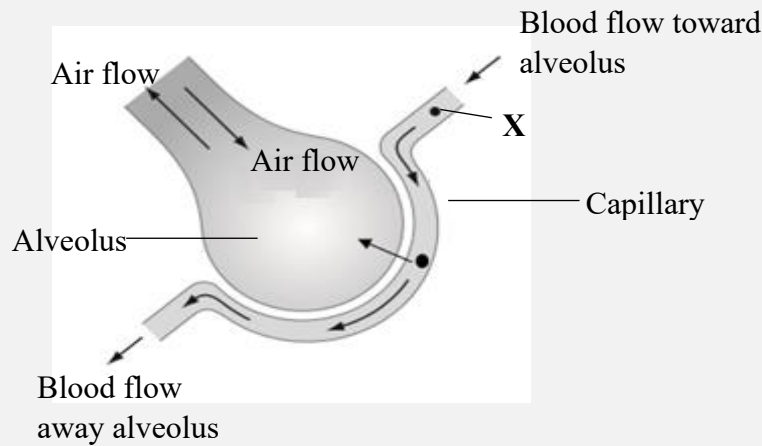
Maximising SLO Achievement	Preferred Pedagogy Used for this SLO	Assessment Strategies
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Any Additional Suggestion: Teachers can use case studies and real-life examples to illustrate the limitations of the two-kingdom and five-kingdom systems. Highlight specific scenarios where these systems fall short and discuss alternative approaches.

Question No. 4

Question Text

The given diagram represents an alveolus and blood capillary. **X** represents a gas molecule.



- i. Identify molecule **X**.
- ii. What would be the effect of rigorous exercise on the concentration of molecule **X** in the human body?
- iii. Why is the percentage composition of molecule **X** in alveolar air different from the atmospheric air?

SLO No.

5.3.3

SLO Text

Explain the adaptation of alveoli for gaseous exchange by diffusion between air in the lungs and blood in the capillaries.

Max Marks

3

Cognitive Level

U

Checking Hints

- i. 1 mark for the correct identification
- ii. 1 mark for describing the effect
- iii. 1 mark for the correct reason

Overall Performance

Most of the candidates responded well to this question. Responses generally included clear and concise descriptions of the mechanisms behind the rise in CO₂ levels, linking it effectively to an increased metabolic rate and cellular respiration.

Description of Better Responses

Better responses correctly identified molecule **X** as carbon dioxide in the blood capillaries surrounding the alveolus. Additionally, these responses accurately stated that the concentration of CO₂ increases following rigorous exercise, providing a precise description that links the rise in CO₂ levels to the increased metabolic rate and cellular respiration associated with strenuous physical activity.

Image of Better Response

The molecule is Carbon dioxide (CO₂)

During rigorous exercise the concentration of CO₂ will increase.
Due to fact that more oxygen is required for oxidation of glucose molecule.

During different metabolic processes like respiration CO₂ is liberated as a bi-product and is released out of cell thus, the O₂ is more surrounding.

Description of Weaker Responses

Most of the *weaker responses* incorrectly identified molecule **X** as oxygen. These responses were unable to state that the CO₂ concentration increases after exercise. Additionally, they provided vague reasons for the increased concentration of the identified molecule **X** during rigorous exercise, without delving into the mechanisms of increased CO₂ production, such as metabolic rate, cellular respiration, or aerobic respiration.


Image of Weaker Response

Molecule x is Oxygen (O₂)

The concentration of Oxygen (O₂) will increase hence it results in the increase of heart beat and our heart will beat at fastest rate

As the abject is surrounded by blood capillaries for the easy diffusion of gases & it^{also} helps to warm and moist the air

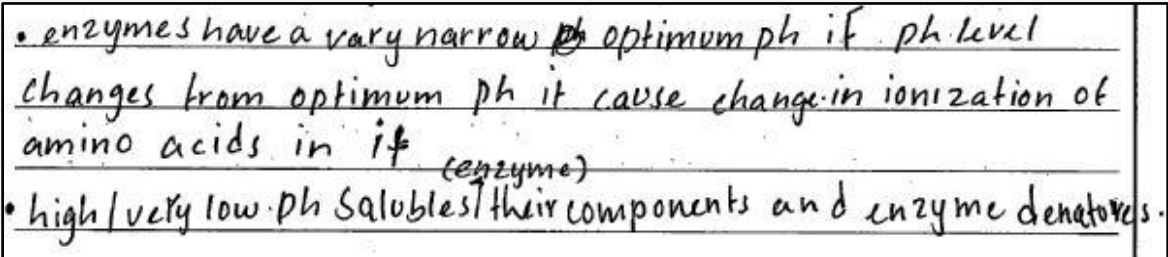
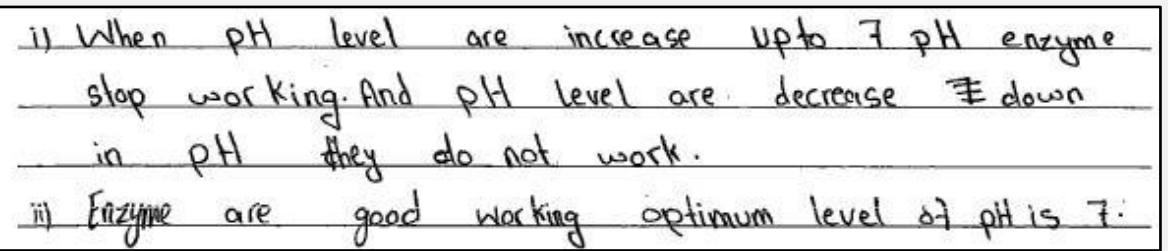
Suggestions for improvement (Highlight all that apply)

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Any Additional Suggestion: Teachers conduct hands-on activities like measuring breathing rates and CO₂ levels before and after exercise. This practical approach can make the learning experience more engaging and tangible. Further, encourage group discussions and peer teaching sessions where candidates can explain the concepts to each other. This can reinforce their understanding and allow them to learn from different perspectives.

Question No. 5

Question Text	How can change in the pH beyond the optimum level affect the structure of enzyme? Describe in TWO points.
SLO No.	6.2.1
SLO Text	Relate pH, temperature and concentration of substrate with enzyme activity.
Max Marks	2
Cognitive Level	U
Checking Hints	1 mark for each point (any 2 required)
Overall Performance	Most of the candidates did not perform well on this question. Several responses lacked specificity regarding how pH changes affect enzyme structure, often providing generic statements rather than precise explanations.

Description of Better Responses	<i>Better responses</i> provided accurate information about the concept that pH changes can cause denaturation and the specific structural changes in the shape of enzymes that prevent substrates from binding to the active site. These responses included precise scientific terms such as 'denaturation,' 'active site,' 'ionic bonds,' and 'hydrogen bonds'. Furthermore, they clearly described the cause-and-effect relationship between pH changes and enzyme structure, explaining how altering the ionisation states of amino acids leads to structural changes and subsequent loss of enzyme function.
Image of Better Response	
Description of Weaker Responses	Many <i>weaker responses</i> wrongly assumed that pH 7 is the optimum pH for all enzymes and that any deviation from this pH results in denaturation. This shows a lack of understanding that different enzymes have different optimum pH levels. Some responses mistakenly described the effect of temperature on enzyme activity instead of focusing on the effect of pH, indicating that the question was not read or understood correctly.
Image of Weaker Response	

Suggestions for improvement (Highlight all that apply)

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<p>Any Additional Suggestion: Teachers could consider using diagrams and videos to demonstrate enzyme structures and the impact of pH changes on these structures. Visual aids, such as diagrams highlighting the enzyme's active site and showing how ionic and hydrogen bonds are affected, can be especially beneficial.</p>		

Extended Response Questions (ERQs)

Extended response questions offered a choice between parts 'a' and 'b'


Question No. 6(a)	
Question Text	Describe structural adaptations in any THREE of the permanent tissues in plants that help to perform their function efficiently.
SLO No.	4.4.4
SLO Text	Compare major plant tissues, i.e., simple tissues (meristematic tissues and permanent tissues including epidermal, parenchyma, collenchyma and sclerenchyma) and compound tissues (xylem and phloem) in terms of their cell specificities, locations and functions.
Max Marks	6
Cognitive Level	U
Checking Hints	1 mark for writing about structural adaptation in each of the permanent tissues (any 3 required) 1 mark for writing about the function of each of the relevant permanent tissues (any 3 required)
Overall Performance	Most candidates attempted part 'a'. The candidates' performances on this question were generally average. Many students demonstrated a basic understanding of the structural adaptations of plant tissues. However, there were several areas where responses could be improved, such as connecting the structure of plant tissue with its function.
Description of Better Responses	<i>Better responses</i> provided an accurate structural and functional description of each tissue. For example, they wrote that epidermal cells are typically tightly packed with minimal intercellular spaces, forming a protective layer that helps to prevent pathogens from entering the plant and reduces the risk of mechanical damage. They further mentioned that epidermis contains small pores called stomata, which are surrounded by guard cells. Stomata facilitates gas exchange and transpiration, while the guard cells regulate the opening and closing of these pores to control water loss and gas exchange. Moreover, the better responses wrote that parenchyma cells have thin, flexible primary cell walls, allowing for easy expansion and contraction, making parenchyma tissue well-suited for functions such as storage and cellular respiration.
Image of Better Response	<p>The image shows a handwritten student response. It begins with 'There are two types of simple tissues; Meristematic & Permanent. Permanent are the ones which do not have the ability to divide. It has the following types:'. It then lists three types: 1. Epidermal tissues: cover the plant body with a thin layer of cells which protects it and provides supports. It has thin walls for the transpiration to occur easily through the stomata which are tiny holes present on it. 2. Ground tissues: are made up of parenchyma cells which are vital for plants in photosynthesis. Ground tissues form the opening of stomata. They have water inside them which maintains turgor pressure and opens at day time for transpiration. 3. Support tissues: provide flexibility and strength to plant. Consists of collenchyma cells which have unevenly thickened primary cell wall which provides flexibility to plant. It also consists of sclerenchyma cells which have rigid secondary cell wall which provides strength and support.</p>
Description of Weaker Responses	<i>Weaker responses</i> were vague and lacked specific details about the structural adaptations of plant tissues. For instance, they provided general descriptions of parenchyma cells without detailing their specific structural adaptations, such as the presence of large vacuoles or intercellular spaces. Furthermore, these responses failed to connect structural features of

parenchyma cells, like their thin walls and chloroplasts, to their functions in storage and photosynthesis.

Image of Weaker Response

a
 Permanent tissue which have not ability to divide but it classify in other tissue epidermal tissue this tissue cover the plant outside layer and function for absorption there are also type of epidermal tissue ground tissue of tissue which is made of parenchyma tissue Parenchyma tissue is most abundant in plant cells its function is give plant strength and work in flexibility of plant. Collenchyma tissue this tissue is find in cortex of plant petal of plant and also give the support to plant bcz it is part of support tissue which support the plant.

Suggestions for improvement (Highlight all that apply)

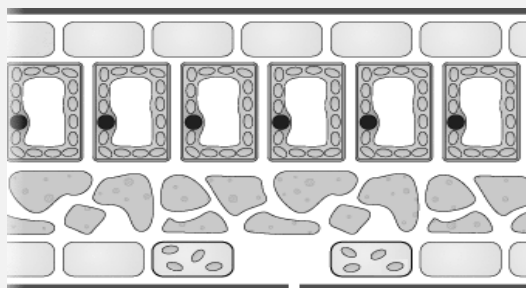
Maximising SLO Achievement	Preferred Pedagogy Used for this SLO	Assessment Strategies
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Any Additional Suggestion: Teachers should encourage a strong emphasis on the connection between the structure and function of each tissue and incorporate real-life examples to illustrate how structural adaptations are closely related to the specific roles of plant tissues.

Question No. 6(b)

Question Text

The given diagram shows the cross-section of a leaf.



Describe the structural adaptation and advantages of any THREE features present in the cross-section of the leaf shown in the given diagram.

SLO No.

7.2.6

SLO Text

Explain how the structure of a leaf is adapted for photosynthesis.

Max Marks

6

Cognitive Level

U

Checking Hints

1 mark for describing each structural adaptation (any 3 required)
1 mark for describing advantage of each mentioned adaptation (any 3 required)

Overall Performance

Overall, candidates demonstrated a good understanding of the structural adaptations in leaf tissues. Their ability to describe these features reflected a strong grasp of plant physiology.

Description of Better Responses

Better responses included a logical description of each structural adaptation observed in the leaf cross-section along with its advantages. For example, they explained that the upper layer of the mesophyll consists of tightly packed, columnar palisade parenchyma cells with numerous chloroplasts along with its advantage, which allows for maximum light absorption and optimal photosynthesis due to the high density of chloroplasts. The vertical alignment of palisade cells increases the leaf's surface area for capturing sunlight. Furthermore, they included that the lower part of the mesophyll contains loosely packed spongy parenchyma cells with large intercellular spaces which aids in efficient gas exchange.

Image of Better Response

1) The lower sides of leaf contain small pores which has opening called stomata. They are used for Gaseous exchange and for losing excessive water from leaf and creating Transpirational pull.

2) Palisade Mesophyll cells are closely packed with chloroplast to perform photosynthesis at high rate and Spongy Mesophyll cells are not tightly packed so that air can move or pass through easily.

3) Upper Epidermis have waxy layer known as Cuticle. It is shiny so it can prevent water loss from upper sides of leaf and plant don't lose it much water and don't get wilt.

Description of Weaker Responses

Weaker responses showed a misunderstanding of the leaf's overall structure by emphasising cellular organelles rather than the specific adaptations within the leaf's cross-sectional features. For instance, mentioning that the large vacuole in a cell stores water or that the thylakoid membrane in chloroplast helps in photosynthesis did not address the structural adaptations relevant to the leaf's cross-section. Additionally, key structural features and their advantages were missing from these responses, resulting in incomplete responses that did not cover the adaptations of the leaf's cross-section.

Image of Weaker Response


These is the structural adaptation of leaf where fruite was make and nutrients was store and also perform a evaproation.

(i) Stoma : in which CO_2 is reduced to make glucose in which the energy from high energy molecules ~~are~~ (ATP and NADPH) is utilized.

(ii) Thylakoid : in which ligh energy is capture to make high energy molecules (ATP and NADPH)

(iii) Vacule in cell : The vacule of cell absorbe the ~~o~~ water , and when plant need water they help . vacule is large size in cell of plant .

Suggestions for improvement (Highlight all that apply)

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Any Additional Suggestion: Teachers should consider creating exercises that prompt candidates to match structural features with their functions. Moreover, they can utilise diagrams, models and interactive tools to assist candidates in visualising the cross-section of a leaf.

Question No. 7(a)

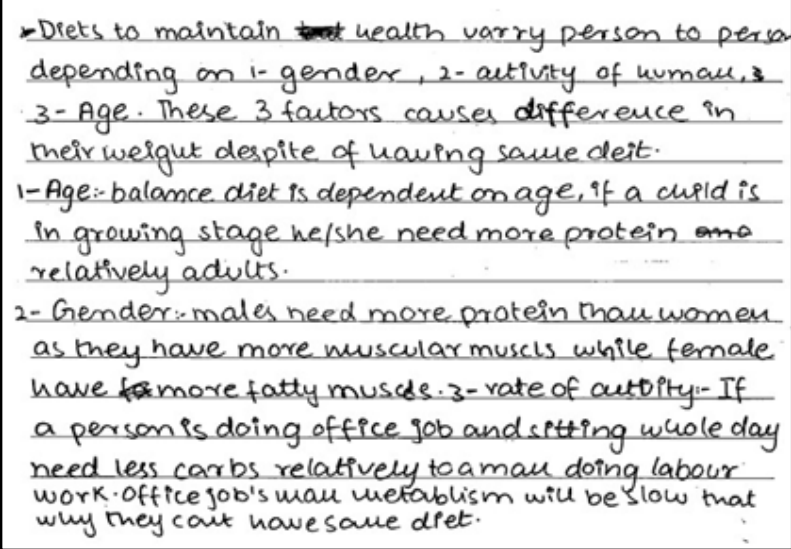

Question Text	<p>Sara is 25 years old and spends most of her time studying in a library. Her brother Zia is 15 years old and spends most of his time playing with friends. They consume the same quality and quantity of food. Zia is lean and Sara is overweight.</p> <p>With reference to the energy requirement and consumption of both Sara and Zia,</p> <ol style="list-style-type: none"> i. identify THREE factors that cause the difference in their weight. ii. describe each of the factors identified in part i.
SLO No.	8.3.2
SLO Text	Relate the need of balanced diet and energy requirements with age, gender and activity.
Max Marks	6
Cognitive Level	U
Checking Hints	<ol style="list-style-type: none"> i. 1 mark for identifying each factor (3 required) ii. 1 mark for describing each factor (3 required)
Overall Performance	<p>Only a limited number of candidates attempted this part. The overall performance on this question was poor. Many candidates struggled to address the specific factors contributing to the weight differences between Sara and Zia. Instead of identifying and describing relevant factors such as physical activity levels, basal metabolic rate (BMR), gender and age, many responses simply restated the scenario provided in the question without meaningful analysis.</p>
Description of Better Responses	<p><i>Better responses</i> correctly identified the three main factors affecting weight differences: physical activity level, gender and age. Moreover, they directly linked each factor to how it influences Sara and Zia's weight. For example, the candidates wrote that Sara, being 25 years old, experiences a natural decline in metabolism and is less active compared to Zia. This slower metabolism combined with lower physical activity contributes to her weight gain, while Zia's higher activity level and youthful metabolism help keep him lean. Furthermore, these responses used appropriate scientific terminology, such as 'basal metabolic rate (BMR)' and 'caloric expenditure,' to demonstrate a strong understanding of the concepts.</p>
Images of Better Responses	 <p>The image shows a handwritten student response. It starts with a statement: 'Diets to maintain health vary person to person depending on 1- gender, 2- activity of human, 3- Age. These 3 factors cause difference in their weight despite of having same diet.' It then lists three points: 1- Age: balance diet is dependent on age, if a child is in growing stage he/she need more protein and relatively adults. 2- Gender: males need more protein than women as they have more muscular muscles while female have more fatty muscle. 3- rate of activity: If a person is doing office job and sitting whole day need less carbs relatively to a man doing labour work. Office job's man metabolism will be slow that why they can't have same diet.</p>
Description of Weaker Responses	<p><i>Weaker responses</i> focused on reiterating the details of Sara and Zia's daily lives rather than analysing how specific factors impact their weight. This approach indicates a misunderstanding of the question's requirements. These responses often lacked sufficient details in explaining how each identified factor affects weight. The explanations were either too vague or entirely missing, demonstrating a need for more thorough understanding.</p>

Image of Weaker Response

① As Sara is older than Zia so it will there will be difference in there weight.
 ② Sara is just sitting at home but zia is doing physical activities, like she is playing so because of the physical activities zia fit.
 ③ Weight of human also matters with hieght if sara's hieght is more her weight will be more. Zia is involved in physical activities he runs more means he is more thirsty than Sara. so zia drinks more water than Sara which keeps her fit.

Suggestions for improvement (Highlight all that apply)

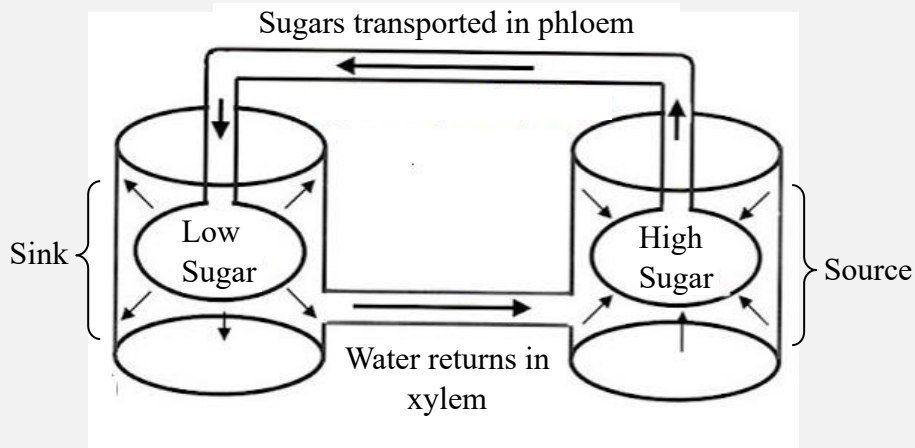
Maximising SLO Achievement	Preferred Pedagogy Used for this SLO	Assessment Strategies
<ul style="list-style-type: none"> • Identify the expectation of command words (use Command Word Guide) • Ensure the content is taught at the relevant cognitive level • Identify necessary content required (skills + concepts) • Review past paper questions on the concept • Utilise the resource guide for additional materials 	<ul style="list-style-type: none"> • Story Board • Cause and Effect • Fish and Bone • Concept Mapping • Audio Visual Resources • Think, Pair and Share • Knowledge Platform videos • Questioning Technique (Socratic approach) • Practical Demonstration 	<ul style="list-style-type: none"> • Past paper questions • Discussion on E-Marking Notes • AKU-EB Digital Learning Solution powered by Knowledge Platform <p>https://akueb.knowledgeplatform.com/login</p> 

Any Additional Suggestion: Teachers may incorporate exercises and practice questions that require candidates to break down complex scenarios and explain the relationships between different factors.

Question No. 7(b)

Question Text

The given schematic diagram represents one of the processes in plants.



- i. Identify the mechanism that is depicted in the given diagram. (1 Mark)
- ii. Describe the identified mechanism in FIVE points. (5 Marks)

SLO No.

9.3.9

SLO Text

Describe mechanism of food translocation in plants using the theory of Pressure Flow Mechanism.

Max Marks

6

Cognitive Level

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Checking Hints

- i. 1 mark for the correct identification
- ii. 1 mark for each point related to the identified mechanism (5 required)

Overall Performance

Majority of the candidates attempted this part. The overall structure of the responses was good, but more valid explanations were needed to fully capture the complexity of the pressure flow mechanism. While the responses followed a logical sequence, they lacked depth and specificity in each step of the mechanism.

Description of Better Responses


Better responses accurately described the pressure flow mechanism, including the active transport of sucrose into sieve tube elements at the source, which lowers water potential and causes water to enter the phloem from the xylem via osmosis. This results in increased turgor pressure, driving phloem sap toward lower pressure sinks. They also mentioned that sucrose unloading at the sink reduces osmotic pressure in the sink cells, causing water to return to the xylem.

<p>Images of Better Responses</p>	<p>1, The Mechanism that is depicted in the given diagram is "pressure-flow mechanism"; it is result of research of transport of food in Phloem.</p> <p>2, The plant produce glucose during photosynthesis, some of it is used in Respiration and most of it converted into sucrose because plants store ^{sucrose} in form of it.</p> <p>3, Source is a exporting organ through active transport food from source enter phloem sieve tube cells.</p> <p>3, The Concentration of sugar is higher in phloem, so, it causes an osmotic difference, water from xylem enter phloem through osmosis. & pressure in tube ^{increases}.</p> <p>4, As the pressure Increases food is transport to sink (storage organ) and food is unloaded at sink by active transport.</p> <p>5, Now xylem water from xylem goes back to xylem by diffusion and pressure in the phloem decreases.</p>
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<p>Description of Weaker Responses</p>	<p>Weaker responses wrongly identified the mechanism shown in the diagram. These responses provided insufficient description of sucrose loading and frequently misunderstood or ignored the role of water potential and osmosis in the process. Many responses did not explain how increased turgor pressure causes phloem sap to move towards lower pressure sinks. These responses often lacked clarity on how sucrose unloading reduces osmotic pressure and causes water to move back into the xylem.</p>
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<p>Image of Weaker Response</p>	<p>i) Transfer of food from Phloem</p> <p>ii) It is using active transport.</p> <p>2) It is against the concentration gradient means that it is moving from higher to lower concentration.</p> <p>3) It requires energy to performs active transport.</p> <p>4) The food from leaves is provide to all parts of the plant till the roots</p> <p>5) Roots are called sink (where the food is transferred) and the area where food have been made (leaves) are called the source</p>
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Suggestions for improvement (Highlight all that apply)

Maximising SLO Achievement	Preferred Pedagogy Used for this SLO	Assessment Strategies
<ul style="list-style-type: none"> Identify the expectation of command words (use Command Word Guide) Ensure the content is taught at the relevant cognitive level Identify necessary content required (skills + concepts) Review past paper questions on the concept Utilise the resource guide for additional materials 	<ul style="list-style-type: none"> Story Board Cause and Effect Fish and Bone Concept Mapping Audio Visual Resources Think, Pair and Share Knowledge Platform videos 	<ul style="list-style-type: none"> Past paper questions Discussion on E-Marking Notes AKU-EB Digital Learning Solution powered by Knowledge Platform <p>https://akueb.knowledgeplatform.com/login</p> 

- | | | |
|--|-------------------------------------------------------------------------------------------------------------------------------|--|
| | <ul style="list-style-type: none">• Questioning Technique (Socratic approach)• Practical Demonstration | |
|--|-------------------------------------------------------------------------------------------------------------------------------|--|

Any Additional Suggestion: Teachers could provide model answers and marking schemes to illustrate what a high-quality response looks like and can review these models in class, highlighting the key elements and details that make the responses effective.

Annexure A: Pedagogies Used for Teaching the SLOs

Pedagogy: Storyboard

Description: A visual pedagogy that uses a series of illustrated panels to present a narrative, encouraging creativity and critical thinking. It helps learners organise ideas, sequence events, and comprehend complex concepts through storytelling.

Example: In a Literature class, students are tasked with creating storyboards to visually retell a novel. They draw key scenes, write captions, and present their stories to the class, enhancing their reading comprehension and fostering their imagination.

Pedagogy: Cause and Effect

Description: This pedagogy explores the relationships between actions and consequences. By analysing cause-and-effect relationships, learners develop a deeper understanding of how events are interconnected and how one action can lead to various outcomes.

Example: In a History class, students study the causes and effects of the Industrial Revolution. They research and discuss how technological advancements in manufacturing led to significant societal changes, such as urbanisation and labour reform movements.

Pedagogy: Fish and Bone

Description: A method that breaks down complex topics into main ideas (the fish) and supporting details (the bones). This visual approach enhances comprehension by highlighting essential concepts and their relevant explanations.

Example: During a Biology class on human anatomy, the teacher uses the fish and bone technique to teach about the human skeletal system. The teacher presents the main components of the human skeleton (fish) and elaborates on each bone's structure and function (bones).

Pedagogy: Concept Mapping

Description: An effective way to visually represent relationships between ideas. Learners create diagrams connecting key concepts, aiding in understanding the overall structure of a subject and fostering retention.

Example: In a Psychology assignment, students use concept mapping to explore the various theories of personality. They interlink different theories, such as Freud's psychoanalysis, Jung's analytical psychology, and Bandura's social-cognitive theory, to see how they relate to each other.

Pedagogy: Audio Visual Resources

Description: Incorporating multimedia elements like videos, images, and audio into lessons. This approach caters to different learning styles, making educational content more engaging and memorable.

Example: In a General Science class, the teacher uses a documentary-style video to teach about the solar system. The video includes stunning visual animations of the planets, interviews with astronomers, and background music, enhancing students' interest and understanding of space.

Pedagogy: Think, Pair, and Share

Description: A collaborative learning technique where students ponder a question or problem individually, then discuss their thoughts in pairs or small groups before sharing with the entire class. It fosters active participation, communication skills, and diverse perspectives.

Example: In a Literature in English class, the teacher poses a thought-provoking question about a novel's moral dilemma. Students first reflect individually, then pair up to exchange their opinions, and finally participate in a lively class discussion to explore different viewpoints.

Pedagogy: Questioning Technique (Socratic Approach)

Description: Based on Socratic dialogue, this method stimulates critical thinking by posing thought-provoking questions. It encourages learners to explore ideas, justify their reasoning, and discover knowledge through a process of inquiry.

Example: In an Ethics class, the instructor uses the Socratic approach to lead a discussion on the meaning of justice. By asking a series of probing questions, the students engage in a deeper exploration of ethical principles and societal values.

Pedagogy: Practical Demonstration

Description: A hands-on approach where learners observe real-life applications of theories or skills. Practical demonstrations enhance comprehension, skill acquisition, and problem-solving abilities by bridging theoretical concepts with real-world scenarios.

Example: In a Food and Nutrition class, the instructor demonstrates the proper technique for filleting a fish. Students observe and then practice the skill themselves, learning the practical application of knife skills and culinary precision.

(**Note:** The examples provided in this annexure serve as illustrations of various pedagogies. It is important to understand that these pedagogies are versatile and can be applied across subjects in numerous ways. Feel free to adapt and explore these techniques creatively to enhance learning outcomes in your specific context.)

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