



آغا خان یونیورسٹی ایگزامینیشن بورڈ
AGA KHAN UNIVERSITY EXAMINATION BOARD

Notes from E-Marking Centre on SSC-I Biology Annual Examinations 2025

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 2025 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. It is imperative to refer to command word guide available on AKU-EB website for understanding the expectations of the command word.

General Observations

Most candidates demonstrated good performance at the understanding level but faced difficulties with higher-order cognitive tasks, such as making real-life connections, interpreting graphs, or comparing and relating concepts, such as classifying intracellular and extracellular enzymes, aerobic and anaerobic respiration, and the cardiac cycle. However, to further strengthen conceptual clarity, it is important for teachers to focus on providing more targeted practice in key areas, such as:

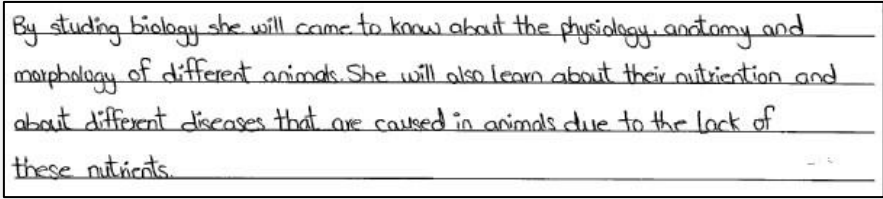
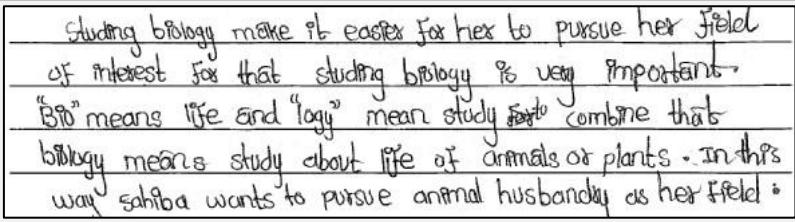
- Connecting study of biology to real-world practices such as in animal husbandry.
- Interpreting graphs related to factors affecting enzyme activity and respiratory responses to exercise.
- Comparing the two-kingdom and five-kingdom classification systems.
- Describing the structure and function of cell organelles related to their position within the cell.

- Linking the roles of cardiac and pyloric sphincters along with the symptoms caused by their malfunction.


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	Sahiba wants to pursue animal husbandry as her field of study. Describe how studying biology makes it easier for her to pursue her field of interest.
SLO No.	1.4.1
SLO Text	Recognise the contribution of biology in medicine and surgery, fisheries, agriculture, animal husbandry, biotechnology, horticulture, farming and forestry.
Max Marks	2
Cognitive Level	U*
Checking Hints	1 mark for describing each point (any 2 required) (Note: Award 1 mark for the definition of animal husbandry.)
Overall Performance	The overall performance on this question was below expectations. Many candidates failed to establish a clear connection between the study of biology and its relevance to animal husbandry.
Description of Better Responses	<i>Better responses</i> demonstrated a sound understanding by describing that biology provides foundational knowledge in areas such as animal physiology, nutrition, reproduction, genetics, and disease control. These candidates were able to articulate how understanding biological processes enables informed decision-making in breeding practices, animal care, and the prevention and treatment of illnesses, all of which are crucial in animal husbandry.
Image of Better Response	 By studying biology she will come to know about the physiology, anatomy and morphology of different animals. She will also learn about their nutrition and about different diseases that are caused in animals due to the lack of these nutrients.
Description of Weaker Responses	<i>Weaker responses</i> lacked clarity and failed to link biology to animal husbandry. Many candidates gave vague or generic answers like 'biology is about animals,' without explaining how biological knowledge applies to managing and caring for livestock or defined the term biology rather than its link with animal husbandry. Key concepts such as reproduction, genetics, nutrition, and disease control were often missing. These responses reflected a lack of applied understanding and showed limited ability to connect biology to real-world practices in animal husbandry.
Image of Weaker Response	 Studying biology make it easier for her to pursue her field of interest for that studying biology is very important. "Bio" means life and "logy" mean study for combine that biology means study about life of animals or plants. In this way sahiba wants to pursue animal husbandry as her field.

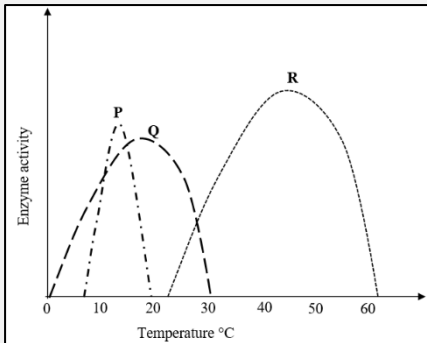
Suggestions for improvement (Highlight all that apply)

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 <p>** For description of each Pedagogy, refer to Annexure A</p>	<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: Encourage students to link theoretical knowledge with its practical applications in various professions. Support this by using real-life examples, such as breeding, nutrition, and disease prevention in farm animals, to help illustrate key biological concepts.


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

Question No. 2

Question Text	<p>The given graph represents the effect of temperature on the activity of three different enzymes.</p>  <p>a. Interpret the curve for enzyme Q at 20°C. b. Identify the enzyme that works best at temperature above 25°C. c. Why does the curve for enzyme R show a fall after 45°C?</p>
SLO No.	2.1.2
SLO Text	Solve a biological problem following the scientific method: e. organise data appropriately using techniques such as tables and graphs f. analyse data to make predictions, decisions or draw conclusions.
Max Marks	3
Cognitive Level	A*

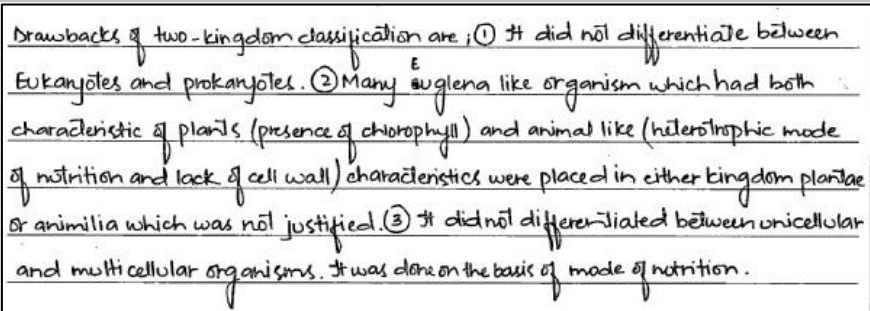
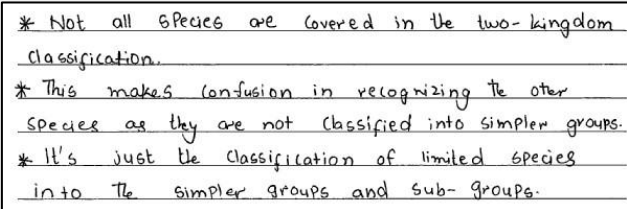
Checking Hints	a. 1 mark for the correct interpretation of enzyme Q b. 1 mark for the correct identification of enzyme R c. 1 mark for the correct reason
Overall Performance	The overall performance on this question was average, with many candidates showing only a basic understanding of enzyme activity and temperature. Some struggled to interpret specific data points and lacked scientific reasoning. Targeted practice in graph analysis and enzyme-related concepts is recommended to strengthen these skills.
Description of Better Responses	<i>Better responses</i> showed a strong grasp of graph interpretation and enzyme activity. Candidates correctly explained that enzyme Q shows optimum activity at 20°C and identified enzyme R as most effective above 25°C. They accurately reasoned that enzyme R's activity declines with rising temperature due to denaturation. Responses were clear, well-organised, and backed with appropriate evidence from the graph, demonstrating both analytical and conceptual understanding.
Images of Better Responses	<p>The curve for enzyme Q at 20°C shows that the ^{optimum} temperature for its activity is almost equal to 20°C and increasing temperature ^{above 20°C} cause denaturation of enzyme.</p> <p>Enzyme R works best at temperature above 25°C.</p> <p>It shows fall because above 45°C the kinetic energy of molecules and collisions between them are so strong that they denature the enzyme.</p>
Description of Weaker Responses	<i>Weaker responses</i> revealed misconceptions about enzyme activity and lacked the ability to interpret information accurately from the graph. Some candidates incorrectly linked the enzyme activity trends to activation energy, showing confusion between related concepts. Their answers were often vague, lacked scientific reasoning, and did not reference specific features of the graph.
Images of Weaker Responses	<p>End of activation energy -</p> <p>amylaze - a peltoglycan.</p> <p>Because the activation energy is low and now enzyme can work without activation energy -</p>

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: Use graph-based questions in guided discussions to develop students' analytical and reasoning skills. Offer targeted practice in interpreting scientific graphs, particularly those related to different factors affecting enzyme activity.

Question No. 3

Question Text	Mention any THREE drawbacks of the two-kingdom classification system.
SLO No.	3.3.3
SLO Text	Compare two-kingdom and five-kingdom classification systems.
Max Marks	3
Cognitive Level	U
Checking Hints	1 mark for each drawback (any 3 required)
Overall Performance	The overall performance on this question was average. While most candidates were able to mention at least one valid drawback of the two-kingdom classification system, many failed to provide all three. Some responses lacked clarity or included vague or incorrect points, such as confusing structural differences with functional ones.
Description of Better Responses	<i>Better responses</i> demonstrated a thorough understanding of the limitations of the two-kingdom classification system. Candidates accurately identified key drawbacks, such as the failure to distinguish between prokaryotes and eukaryotes, the grouping of fungi with plants despite major differences, and the exclusion of organisms like <i>Euglena</i> that don't fit clearly into either kingdom. Some also noted the lack of consideration for cellular organisation and evolutionary relationships. These responses were well-structured, used correct terminology, and reflected deeper conceptual understanding beyond surface-level memorisation.
Image of Better Response	 <p>Drawbacks of two-kingdom classification are ; ① It did not differentiate between Eukaryotes and prokaryotes. ② Many ^E Euglena like organism which had both characteristic of plants (presence of chlorophyll) and animal like (heterotrophic mode of nutrition and lack of cell wall) characteristics were placed in either kingdom plantae or animalia which was not justified. ③ It did not differentiate between unicellular and multicellular organisms. It was done on the basis of mode of nutrition.</p>
Description of Weaker Responses	<i>Weaker responses</i> showed limited understanding and included common misconceptions. Many candidates incorrectly stated that the exclusion of viruses was a major drawback, despite viruses not being classified as living organisms in the same sense. Others failed to mention key issues such as the grouping of prokaryotes with eukaryotes or the misclassification of fungi. Some gave unrelated facts or focused only on plant and animal traits without addressing classification problems. These responses lacked depth and did not reflect a clear grasp of the limitations of the two-kingdom system.
Image of Weaker Response	 <p>* Not all species are covered in the two-kingdom classification. * This makes confusion in recognizing the other species as they are not classified into simpler groups. * It's just the classification of limited species into the simpler groups and sub-groups.</p>

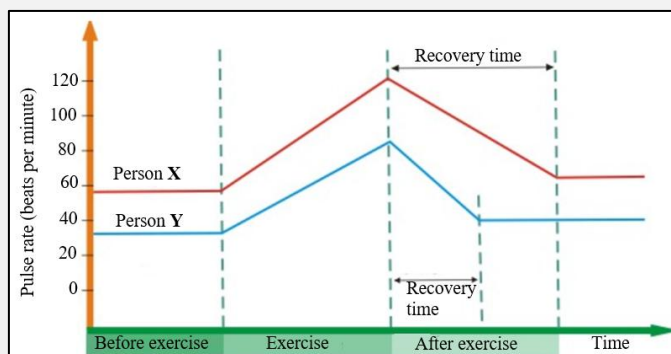
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Any Additional Suggestion: Highlight the foundations and drawbacks of the two-kingdom classification by comparing it with modern systems. Use visual aids to show how structurally and functionally different organisms such as prokaryotes and fungi were inaccurately grouped, and address common misconceptions, including the exclusion of viruses.

Question No. 4

Question Text The given graph shows the effect of exercise on the breathing rates of persons X and Y. The breathing rate of both individuals has significantly increased.




- With reference to the given graph, identify the unfit person with a valid reason.
- Why is the increased breathing rate important for both persons, X and Y?

SLO No.	5.3.5
SLO Text	Determine the effect of exercise on the rate of breathing.
Max Marks	3
Cognitive Level	A
Checking Hints	a. 1 mark for the correct identification of person X 1 mark for the reason (any 1 required) b. 1 mark for writing the importance
Overall Performance	The candidates could not do well in this question. They struggled mainly in part a where they could not identify the unfit person. In addition, part b was also not attempted well either but was better performed than part a. Many candidates gave vague justifications without referencing the graph.
Description of Better Responses	<i>Better responses</i> correctly identified person X as the unfit individual by noting the longer recovery period, indicating a slower return to resting breathing rate. These candidates supported their answers with valid reasoning, such as poor respiratory efficiency or higher

	<p>pulse rate. In part 'b', they clearly explained the importance of increased breathing during exercise, including oxygen intake, carbon dioxide removal, lactic acid clearance, restoring ATP levels, and maintaining acid-base balance. Answers were well-structured, used appropriate biological terms, and reflected a strong understanding of both graph interpretation and physiological responses to exercise.</p>
Image of Better Response	<p>The unfit person is person X as his pulse rate increase more than person Y and person X take more recovery time as compared to person Y.</p> <p>Increased breathing rate is important for both person X and Y as this shows that both X and Y lacks oxygen. They breathe heavier to gain the oxygen, and Carbon dioxide concentration also increase which stimulate the brain which stimulate the organs to work faster but ultimately a limit is reached which ends up by anaerobic respiration.</p>
Description of Weaker Responses	<p>Weaker responses showed poor graph interpretation and lacked valid reasoning in part 'a'. Many failed to identify the unfit person or based their answers on assumptions unrelated to the data, such as body weight or age. In part 'b', some responses were too vague or listed general benefits of exercise without linking them to increased breathing rate. A few candidates confused breathing with heart rate or did not mention key processes like oxygen debt, removal of carbon dioxide, or lactic acid. These responses reflected limited understanding of respiratory responses to exercise and weak analytical skills.</p>
Image of Weaker Response	<p>Person Y is the unfit person, hence he is not used to exercise oftenly and couldn't bare the sudden exercise.</p> <p>It's important because it will let us know the inner immunity of a person and the strength combining the will of that particular person.</p>

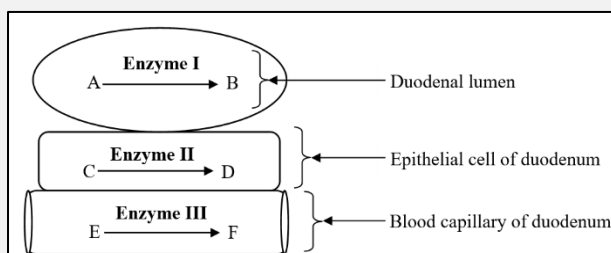
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Any Additional Suggestion: Provide guided practice in interpreting graphs showing physiological changes during exercise, with a focus on understanding recovery time as a measure of fitness. Reinforce key concepts such as the role of increased breathing rate in oxygen intake, carbon dioxide removal, and lactic acid clearance.

Question No. 5

Question Text The given diagram illustrates the activity of three enzymes in the duodenum of human beings.



Classify the enzymes, **I**, **II** and **III**, as intracellular or extracellular.

Intracellular Enzyme	Extracellular Enzyme

SLO No. 6.1.8

SLO Text Differentiate between intracellular and extracellular enzymes with examples.

Max Marks 2

Cognitive Level U

Checking Hints 1 mark for identifying one intracellular enzyme
1 mark for identifying one extracellular enzyme

Overall Performance Overall, candidates demonstrated good performance on this question. The majority successfully classified enzymes as extracellular or intracellular based on the given location in the stimulus, indicating clear understanding of the concept.

Description of Better Responses *Better responses* accurately classified 'Enzyme **II**' as an intracellular enzyme located in the epithelial cell of the duodenum, and 'Enzymes **I** and **III**' as extracellular enzymes found in the duodenal lumen and blood capillary, respectively. These candidates demonstrated a clear understanding of intracellular and extracellular enzymes and interpreted the stimulus effectively. Their answers reflected both conceptual clarity and careful attention to detail.

Image of Better Response


Intracellular Enzyme	Extracellular Enzyme
Enzyme II	Enzyme I
	Enzyme III

Description of Weaker Responses *Weaker responses* often listed the location of the enzymes (e.g., epithelial cell, duodenal lumen, blood capillary) instead of identifying them by Enzyme **I**, **II**, or **III** as required. Some candidates incorrectly sorted enzymes into the table columns, while others ignored the stimulus and question altogether, randomly writing enzyme names like amylase, protease, or lipase. These responses reflected a lack of attention to detail, misunderstanding of instructions, and weak interpretation of the given information.

Image of Weaker Response

Intracellular Enzyme	Extracellular Enzyme
① Duodena lumen.	① Epithelial cell of duodenum
② Blood cappillary of, duodenum.	

Suggestions for improvement (Highlight all that apply)

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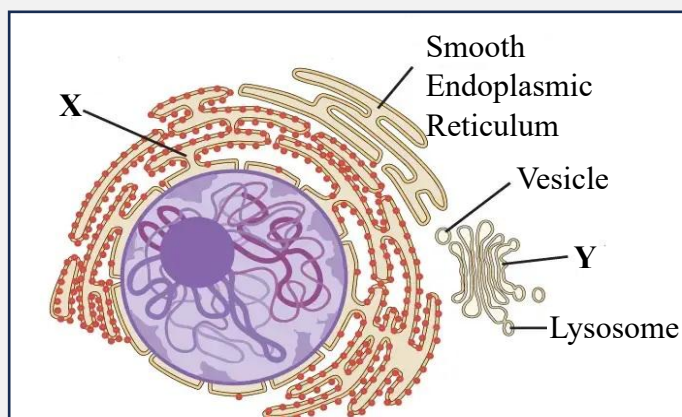
Any Additional Suggestion: Reinforce the difference between intracellular and extracellular enzymes using diagrams and real-life examples and emphasise the importance of following instructions carefully and presenting answers accurately in structured formats such as tables.

Extended Response Questions (ERQs)

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

Question No. 6a

Question Text The given diagram shows some organelles of animal cell.



- Identify the labelled organelles, X and Y.
- Describe any ONE structural feature of each labelled organelle (X and Y).
- Describe the arrangement of the organelles X and Y within the cell with reference to their proximity to the nucleus and their functional interrelationship.


SLO No. 4.2.2

SLO Text Describe structure, composition and function of the components of an animal cell (cell membrane, nucleus, cytoplasm, Golgi bodies, mitochondria, lysosomes, vacuole, ribosomes, endoplasmic reticulum and centrioles).

Max Marks 6

Cognitive Level	U														
Checking Hints	i. 1 mark for identification of organelle X 1 mark for identification of organelle Y ii. 1 mark for each structural feature of X (any 1 required) 1 mark for each structural feature of Y (any 1 required) iii. 1 mark for describing the arrangement/ function of X 1 mark for describing the arrangement/ function of Y														
Overall Performance	This part of the question was attempted by fewer candidates compared to part 'b', and the overall performance was average. Many responses lacked depth and completeness, indicating limited understanding or uncertainty in interpreting cell structure and function. More focused practice is needed to improve performance in such diagram-based questions.														
Description of Better Responses	<i>Better responses</i> correctly identified organelle X as rough endoplasmic reticulum and Y as Golgi apparatus. These candidates accurately described structural features such as cisternae, ribosomes on the rough endoplasmic reticulum, and the stacked, polar structure of the Golgi apparatus. They also clearly described the spatial arrangement and functional relationship of both organelles near the nucleus, highlighting roles in protein synthesis, modification, and transport. Their answers were well-structured, used appropriate terminology, and demonstrated a solid understanding of cell organelle structure and function.														
Image of Better Response	<table border="1"> <tr> <td>i) Organelles</td> <td>Identification</td> </tr> <tr> <td>X</td> <td>Rough Endoplasmic Reticulum</td> </tr> <tr> <td>Y</td> <td>Golgi bodies</td> </tr> <tr> <td colspan="2">ii) a) X - Rough endoplasmic reticulum's structural feature is, it has ribosomes which helps in production of proteins.</td> </tr> <tr> <td colspan="2">b) Y - Golgi bodies's structural feature is, it has two faces cis-face through which</td> </tr> </table>	i) Organelles	Identification	X	Rough Endoplasmic Reticulum	Y	Golgi bodies	ii) a) X - Rough endoplasmic reticulum's structural feature is, it has ribosomes which helps in production of proteins.		b) Y - Golgi bodies's structural feature is, it has two faces cis-face through which		<table border="1"> <tr> <td>materials enters the golgi body and trans-face long through which material packs and modified inside it & leaves - the golgi body</td> </tr> <tr> <td>ii) a) Golgi bodies helps in packaging and modification of materials which is present near E.R and it also releases lysosomes into cytoplasm.</td> </tr> <tr> <td>b) Endoplasmic reticulum present near the nucleus helps in production of proteins. Rough E.R. present near nucleus to transy transfer the proteins produced by ribosomes present on it.</td> </tr> </table>	materials enters the golgi body and trans-face long through which material packs and modified inside it & leaves - the golgi body	ii) a) Golgi bodies helps in packaging and modification of materials which is present near E.R and it also releases lysosomes into cytoplasm.	b) Endoplasmic reticulum present near the nucleus helps in production of proteins. Rough E.R. present near nucleus to transy transfer the proteins produced by ribosomes present on it.
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Description of Weaker Responses	<i>Weaker responses</i> often misidentified organelles X and Y as ribosomes, nucleus, or mitochondria, showing confusion in basic cell structure recognition. Many struggled to describe structural features accurately and lacked the use of correct biological terms like 'cisternae' or 'polarity.' A majority failed to describe the arrangement and functional relationship of these organelles with the nucleus, often writing vague statements such as 'they help the cell work' or 'they are used for transport' without context. Common misconceptions included thinking the Golgi apparatus produces proteins or that ribosomes are separate organelles rather than part of the RER.														
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Suggestions for improvement (Highlight all that apply)

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Any Additional Suggestion: Use models or animations to illustrate the spatial arrangement and functional connections between organelles, particularly the rough endoplasmic reticulum, Golgi apparatus, and nucleus, and provide targeted practice on interpreting cell diagrams and relating structure to function.

Question No. 6b

Question Text	Compare aerobic and anaerobic respiration by mentioning any i. THREE similarities. ii. THREE differences.
SLO No.	7.4.7
SLO Text	Compare aerobic and anaerobic respiration.
Max Marks	6
Cognitive Level	U
Checking Hints	1 mark for writing EACH similarity (any 3 required) 1 mark for writing EACH difference (any 3 required)
Overall Performance	Most candidates attempted this part of the question. Their performance was excellent, with most candidates showing a strong understanding of both aerobic and anaerobic respiration. Overall, this strong performance reflects good conceptual understanding, effective exam preparation, and the ability to structure comparative answers clearly.
Description of Better Responses	<i>Better responses</i> showed a clear understanding of both aerobic and anaerobic respiration. Candidates correctly identified three similarities, such as glucose breakdown, ATP production, and the initiation of both processes through glycolysis in the cytoplasm. They accurately highlighted differences, including oxygen requirement, ATP yield, and end products like carbon dioxide and water in aerobic respiration, and lactic acid or ethanol in anaerobic respiration. Many presented their answers in a well-organised table and used appropriate scientific terms. Overall, these answers reflected strong conceptual clarity, logical structure, and precise expression.

Image of Better Response

b. (i) **THREE SIMILARITIES:-**

- Both are energy releasing process and generate ATP.
- Both are catabolic processes as they both are types of respiration.
- The first step of both respiration is same. (Both convert glucose; a 6C carb compound into 2 pyruvic acid; 3-C compounds). It is the process of glycolysis and oxygen is not required in this process.

(ii) **THREE DIFFERENCES:-**

Aerobic respiration	Anaerobic respiration
• It occurs in presence of oxygen.	• It occurs in absence of oxygen.
• It occurs in all organisms except bacteria and fungi.	• It occurs in bacteria and some fungi (yeast) and skeletal muscles.
• The products of this reaction involved in this respiration are carbon-dioxide, water and energy.	• The products of reactions involved in this respiration are ethyl-alcohol or lactic acid and carbon dioxide.

Description of Weaker Responses

Weaker responses often lacked depth and specificity. Many candidates with weaker responses wrote answers such as both the respiration happen in living things and are types of respiration, though they are correct yet the expectation was to use biological processes to compare them. Thus, they could not attain maximum score. In describing differences, some responses were vague or incorrect, with confusion over oxygen use, energy yield, and end products. These candidates also struggled to use appropriate scientific terminology and often failed to structure their answers clearly.

Image of Weaker Response

SIMILARITIES:-

Aerobic	Anaerobic
i) It is a process of respiration	i) Process of respiration
ii) Breakdown of glucose	ii) Breakdown of glucose
iii) Takes place in living organisms	iii) Takes place in living organisms.

DIFFERENCES:-


Aerobic	Anaerobic
i) Involves oxygen	i) Doesn't involve oxygen
ii) Breathing rate is high	ii) Breathing rate is low
iii) Doesn't involve carbon dioxide	iii) Presence of carbon dioxide

Chemical equation of:- (Given by equations)

Aerobic : $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{Energy}$

Anaerobic : Pyruvic Acid \rightarrow Ethyl Alcohol + Carbon dioxide.

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: Providing model answers, teaching scientific vocabulary, and giving frequent practice with exam-style questions help students develop clarity, precision, and confidence in using appropriate terminologies.

Question No. 7a


Question Text	The ultrasound report of a patient's stomach indicates the failure of closure of both the esophageal sphincter (cardiac sphincter) and pyloric sphincter. i. Describe the effect of the given medical condition on the flow of food digestion. ii. Write ONE symptom each associated with the malfunctioning of both the sphincters. iii. Describe the process of peristalsis in moving the bolus through the esophagus.
SLO No.	8.5.2
SLO Text	Relate the structures of parts of alimentary canal with their functions.
Max Marks	6
Cognitive Level	U
Checking Hints	i. 1 mark for describing the effect of failure of cardiac sphincter 1 mark for describing the effect of failure of pyloric sphincter ii. 1 mark for writing each symptom of failure of cardiac sphincter (1 required) 1 mark for writing each symptom of failure of pyloric sphincter (1 required) iii. 1 mark for defining peristalsis 1 mark for describing the contraction/ relaxation of longitudinal and circular muscles
Overall Performance	This part of the question was attempted by fewer candidates compared to part 'b', and the overall performance was moderate. While some candidates demonstrated a basic understanding of the role of sphincters in digestion, many responses lacked detail and accuracy. Candidates were expected to relate the structural features of cardiac sphincter and pyloric sphincter to its specific function not just describing what it looks like but explaining why it is like that in relation to its role in the alimentary canal. More targeted practice on real-life medical scenarios could help improve performance.
Description of Better Responses	<i>Better responses</i> demonstrated a sound understanding of the role of sphincters in digestion. These candidates clearly described that a malfunctioning cardiac sphincter leads to acid reflux, while a faulty pyloric sphincter allows undigested food to pass too quickly into the small intestine or delayed gastric emptying. They accurately identified symptoms such as heartburn and abdominal discomfort. In describing peristalsis, they not only referred to the wave-like muscular contractions that move the bolus through the esophagus but also mentioned the coordination of circular and longitudinal muscles in the gut wall.
Image of Better Response	<p>Handwritten response: ↳ Cardiac and pyloric sphincter have an important role in the digestion of food. Cardiac sphincter does not allow the entry of the strong digestive enzymes from stomach into esophagus. Same as, the pyloric sphincter also do not allow the entry of the strong digestive enzymes in small intestine. Pyloric sphincter also helps chyme to enter in duodenum in small quantity at a time so that the enzymes in duodenum will work on it properly. If these sphincter will lose their ability of closure, so a person will face many problems. For example, if the cardiac sphincter is not close so the strong digestive enzymes will enter the esophagus, as HCl is very strong so it will burn the esophageal wall, and the digestive enzyme will digest the esophageal muscle (prokin). If the pyloric sphincter will not close, so again the HCl will enter in the duodenum and it will change the pH. as enzymes in duodenum do not work best at acidic condition so food will remain undigested. Such person will have symptoms like burning of esophagus, weakness because of the undigestion of food in duodenum and will not have enough energy. peristalsis - The circular and longitudinal muscles in esophagus contracts and relax. If circular relax, longitudinal contracts & this pushes bolus forward. & via versa</p>
Description of Weaker Responses	<i>Weaker responses</i> reflected limited understanding of the role of sphincters and the process of digestion. Many candidates gave overgeneralised answers such as 'food will not digest properly' or 'there will be stomach pain,' without specifying how sphincter malfunction

affects the movement and breakdown of food. A common misconception was confusing the direction of food flow, with some stating that food would move back into the mouth instead of the esophagus. Others incorrectly described peristalsis as a single movement or failed to mention the role of circular and longitudinal muscles. Scientific terminology was often missing or misused, and explanations lacked depth and clarity.

Image of Weaker Response

①the flow of food digestion is digest slowly because the closure of both esophageal sphincter and the food is stopped most of the time or stucked which cause cough
 ②the food were gently moves from the both sphincters without any stoping or stuck

Suggestions for improvement (Highlight all that apply)

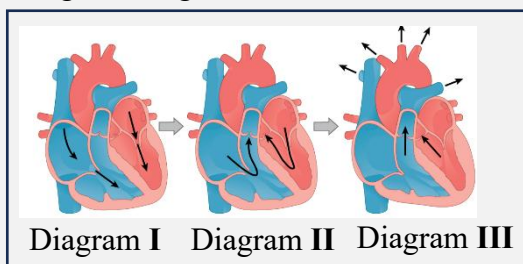
Maximising SLO Achievement	Pedagogy Used for that SLO	Assessment Strategies
<ul style="list-style-type: none"> Identify the expectation of command words (use Command Word Guide) Ensure the content is taught at the relevant cognitive level Identify necessary content required (skills + concepts) Review 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: Provide real-life medical scenarios related to the digestive system to help students apply their knowledge and improve critical thinking and explanation skills.

Question No. 7b

Question Text

The given diagrams show the flow of blood in different chambers of the human heart.



Describe each diagram with reference to the state of chambers and the flow of blood.

SLO No.

9.5.2 and 9.5.3

SLO Text

Relate the structure of heart with its function.
 Describe the circulation of blood through atria and ventricles of the heart, explaining the role of the bicuspid, tricuspid and semilunar valves.

Max Marks

6

Cognitive Level

U

Checking Hints	2 marks for describing each diagram (3 required) 1 mark for writing about state of chambers 1 mark for writing about the flow of blood/ state of valves
Overall Performance	This part of the question was attempted by most candidates, with overall performance being above average. Many responses reflected a sound understanding of heart structure and the direction of blood flow through its chambers. In general, candidates showed growing proficiency in interpreting heart diagrams and describing the flow of blood within the circulatory system.
Description of Better Responses	<i>Better responses</i> demonstrated a clear and accurate understanding of the heart's anatomy and the sequence of blood flow through its chambers. These candidates correctly described the state of each chamber, whether in systole (contraction) or diastole (relaxation), and accurately traced the movement of blood from the vena cava to the right atrium, then to the right ventricle, lungs, left atrium, and left ventricle, and finally out through the aorta. They used appropriate terminology, including names of valves and major blood vessels, and correctly distinguished between oxygenated and deoxygenated blood. Diagrams were interpreted logically, and responses were well-organised and scientifically precise.
Images of Better Responses	<p>b. Diagram I: "this diagram shows the cardiac diastole of the heart, which happens for about 0.4 seconds in every heart beat. In cardiac diastole, the heart receives deoxygenated blood from the body in the right atrium and oxygenated blood from the lungs in the left atrium, through the venae cavae and the pulmonary vein respectively. The atria of the heart are relaxed, the ventricles contract, and bloods fills up in each atria."</p> <p>Diagram II: "this diagram shows the atrial systole, which happens for about 0.1 second in every heart beat. In atrial systole, both the atria contract and the blood that it received earlier squeezes into each respective ventricle. The tricuspid and mitral valves both close, producing the "lub" sound of the heart beat. And the pulmonary and aortic valves open up to send the blood for pulmonary and systemic circulation. The atria contract and ventricles relax in this process."</p> <p>Diagram III: "this diagram shows the ventricular systole, which happens for about 0.3 seconds in every heart beat. In ventricular systole, the ventricles contract and the atria return to their relaxed position. And as the ventricles contract, the aortic and pulmonary valves open up and send the blood to the body and lungs, respectively. To prevent backflow of this blood the aortic and pulmonary valves close, producing the "dub" sound of the heart beat." Cardiac diastole, atrial systole, and ventricular systole all combine to make one cardiac cycle, which produces one heart beat.</p>
Description of Weaker Responses	<i>Weaker responses</i> often lacked clarity and accuracy in describing the flow of blood through the heart. Many candidates gave vague or generalised statements such as 'blood moves through the heart' without specifying the direction, chambers involved, or the role of valves. A common misconception observed was the confusion between oxygenated and deoxygenated blood, with some candidates incorrectly stating that all chambers carry oxygen-rich blood. Others mixed up the left and right sides of the heart or misunderstood the roles of the pulmonary artery and vein. Additionally, several responses failed to identify the state of the chambers (systole or diastole), showing limited understanding of the cardiac cycle.


Image of Weaker Response

i) Diagram I shows the flow of deoxygenated blood from right and left atrium to right and left ventricle.

ii) Diagram II shows the flow of deoxygenated blood from ventricles to pulmonary trunk.

iii) Diagram III shows the flow of an oxygenated blood from ventricles to vena cava and all the parts of body.

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 should explain the cardiac cycle step by step, highlighting chamber contractions and valve actions. Regular practice with heart diagrams and use of correct scientific terms will help students accurately describe blood flow and improve diagram interpretation skills.

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 fish and bone technique to teach about the human skeletal system. 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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