آغا خان یونیورسٹی ایگزامینیشن بورڈ

AGA KHAN UNIVERSITY EXAMINATION BOARD

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

Introduction

This document has been produced for the teachers and candidates of Secondary School Certificate (SSC) Part II Biology. It contains comments on candidates' responses to the 2025 SSC-II 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 words.

General Observations

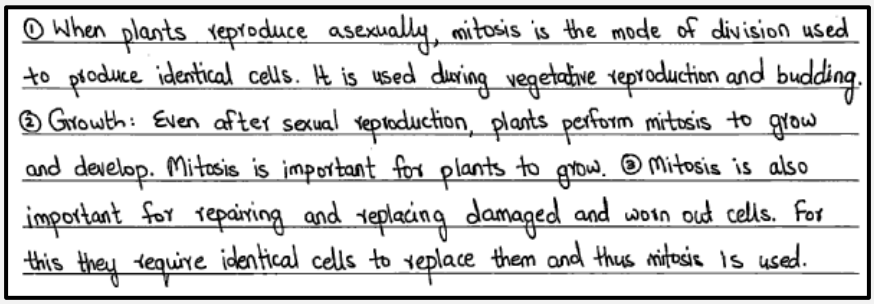
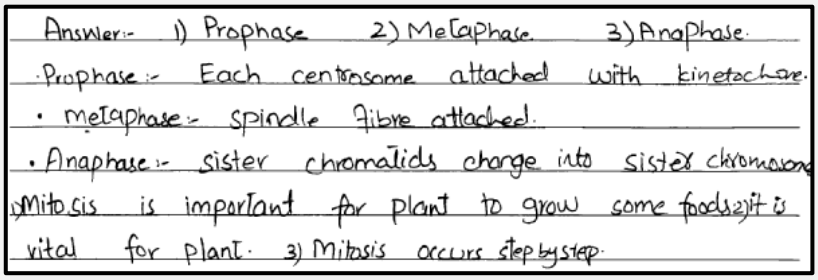
Most candidates performed well, particularly in areas such as the significance of mitosis in plants, understanding the processes of secretion and reabsorption in the nephron, the identification of labelled types of joints, the features of a reflex action,. However, to further strengthen conceptual clarity, it is important for teachers to focus on providing more targeted practice in key areas, such as:

- The adaptive features of human skin.
- Solving problems related to dihybrid crosses and the principle of independent assortment.
- The structural adaptations of the wind-pollinated flowers.
- Focusing on the causes of genetic variation (mutation, gene flow, random assortment of homologous chromosomes) in a population.

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

DETAILED COMMENTS

Constructed Response Questions (CRQs)

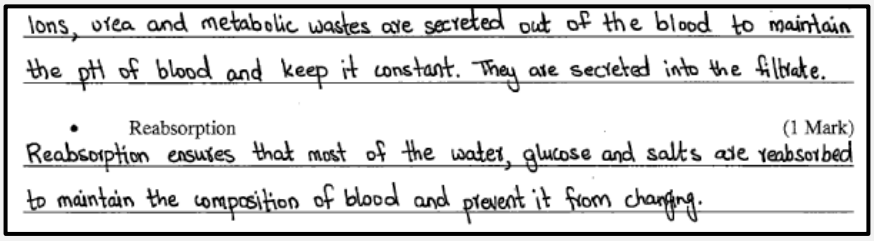
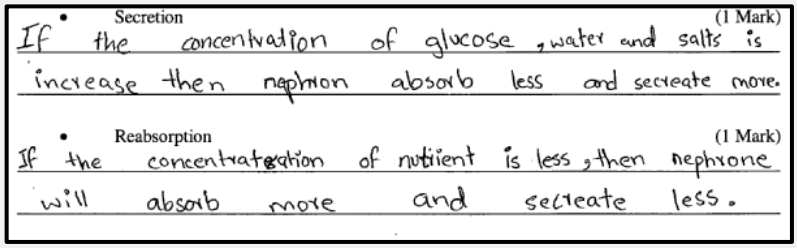
Question No. 1	
Question Text	Mention the significance of mitosis in plants in any THREE points.
SLO No.	10.2.7
SLO Text	Recognise significance of mitosis as giving rise to genetically identical cells and in growth, repair of damaged tissues, replacement of worn out cells and asexual reproduction.
Max Marks	3
Cognitive Level	K*
Checking Hints	1 mark for mentioning each significance (any 3 required)
Overall Performance	Overall, candidates demonstrated a solid grasp of the importance of mitosis in plants. However, some responses reflected a misinterpretation of the question. A few candidates confused mitosis with meiosis, while others failed to articulate the significance of mitosis in the context of plant growth and repair.
Description of Better Responses	*Better responses* demonstrated a clear and comprehensive understanding of the significance of mitosis in plants. Candidates effectively highlighted the key points, such as growth through new cell production in roots, stems, and leaves, replacement of damaged or worn-out cells, and asexual reproduction via vegetative propagation. Their answers were concise, accurate, and often supported by relevant examples, showing strong command over the topic. Such responses reflected both depth and clarity.
Image of Better Response	 ① When plants reproduce asexually, mitosis is the mode of division used to produce identical cells. It is used during vegetative reproduction and budding. ② Growth: Even after sexual reproduction, plants perform mitosis to grow and develop. Mitosis is important for plants to grow. ③ Mitosis is also important for repairing and replacing damaged and worn out cells. For this they require identical cells to replace them and thus mitosis is used.
Description of Weaker Responses	*Weaker responses* demonstrated a limited grasp of the significance of mitosis in plants, often offering incomplete or imprecise explanations. Several candidates confused mitosis with meiosis and failed to clearly articulate the role of mitosis in growth, tissue repair, or asexual reproduction. Crucial concepts such as tissue maintenance, genetic stability, and the development of specialised tissues were frequently overlooked. Moreover, few responses addressed the stages of mitosis, meiosis, and the cell cycle, which showed the misinterpretation of the question.
Image of Weaker Response	 Answer:- 1) Prophase 2) Metaphase. 3) Anaphase. Prophase :- Each centrosome attached with kinetochore. • Metaphase :- spindle fibre attached. • Anaphase :- sister chromatids change into sister chromosome Mitosis is important for plant to grow some foods it is vital for plant. 3) Mitosis occurs step by step.

Suggestions for improvement (Highlight all that apply)

Maximising SLO Achievement	Preferred Pedagogy** Used for this SLO	Assessment Strategies
• 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	• 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 ** For description of each Pedagogy, refer to Annexure A	• Past paper questions • Discussion on E-Marking Notes • AKU-EB Digital Learning Solution powered by Knowledge Platform https://akueb.knowledgeplatform.com/login
Any Additional Suggestion: Give targeted feedback on written responses to help candidates use correct biological terms and structure their answers logically.		

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

Question No. 2a	
Question Text	How is the composition of blood maintained by the following functions of nephron in the human kidney? • Secretion • Reabsorption
SLO No.	11.3.4
SLO Text	Describe role of kidneys in keeping the blood composition constant.
Max Marks	2
Cognitive Level	U*
Checking Hints	1 mark for describing each point of secretion (any 1 required) 1 mark for describing reabsorption (any 1 required)
Overall Performance	The overall performance of candidates was satisfactory, which showed basic understanding of the concept. Many candidates were able to differentiate between the processes of secretion and reabsorption in the nephron, while some candidates provided responses that lacked depth or clarity, indicating room for improvement in understanding these processes.
Description of Better Responses	*Better responses* demonstrated a clear and accurate understanding of the processes of secretion and reabsorption of substances in the nephron to maintain blood composition. Candidates explained how secretion actively removes excess ions (H^+, K^+, and NH_4^+) and harmful substances (creatinine, certain drugs, and toxins) to regulate blood pH and electrolyte balance, while reabsorption recovers essential nutrients, salts, and water to maintain blood volume and osmotic balance. The inclusion of specific examples, such as hydrogen ions and toxic substances in secretion, and glucose and amino acids in reabsorption, enhanced the clarity of explanations. Overall, these responses were comprehensive, well-structured, and demonstrated sound physiological knowledge.

Image of Better Responses	
Description of Weaker Responses	*Weaker responses* revealed a superficial understanding of the processes of secretion and reabsorption in the nephron. Many candidates demonstrated confusion between secretion and reabsorption and provided vague or inaccurate answers. Some responses failed to mention specific substances that are secreted and reabsorbed by the nephron, such as hydrogen ions, glucose, or bicarbonate, and lacked detail on the physiological significance.
Image 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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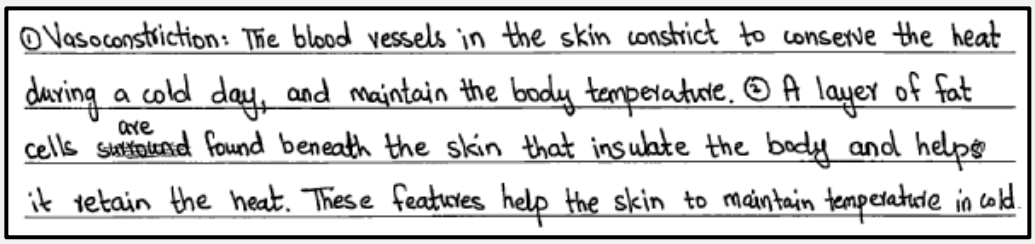
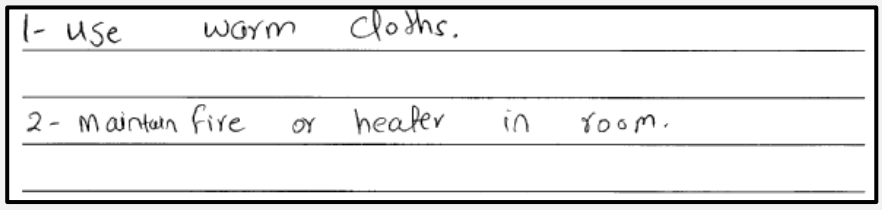
Any Additional Suggestion: Utilise clearly labelled diagrams of the nephron to illustrate the specific sites where secretion and reabsorption take place. Use separate colour-codes for labelling the substances that are secreted and reabsorbed by the nephrons (e.g., red arrows for secretion, blue for reabsorption). Additionally, guide candidates in making comparison tables of secretion versus reabsorption.

Question No. 2b	
Question Text	Describe any TWO adaptive features of human skin to maintain body temperature during a cold day.
SLO No.	11.3.1
SLO Text	Identify major organs involved in homeostasis (skin, lungs and kidneys).
Max Marks	2
Cognitive Level	U

Checking Hints	1 mark for describing each adaptive feature of skin (any TWO required) (**Note**: 1 mark will be awarded if candidates state any two features of skin without providing its adaptation)
Overall Performance	Many candidates revealed a good understanding of the adaptive features of human skin in cold conditions. Several candidates appropriately used biological terms to relate the structural features of human skin with their respective physiological functions. However, some candidates merely listed the structural features without specifying their adaptative significance, while a few mentioned adaptations that were not specific to the skin.
Description of Better Responses	*Better responses* accurately described vasoconstriction, where blood vessels near the skin constrict to reduce blood flow and minimise heat loss. They also mentioned the contraction of erector pili muscles, causing hairs to stand upright and trap a layer of warm air, and explained how shivering produces heat through rapid muscle contractions. The best answers used correct biological terminology and avoided unnecessary details by limiting to the requirement of describing only two features.
Image of Better Response	
Description of Weaker Responses	*Weaker responses* showed a limited understanding of the adaptive features of human skin in cold conditions. Many candidates failed to describe physiological adaptations accurately, often providing vague or irrelevant information. A common error was confusing behavioural responses, such as wearing gloves, caps, warm clothes, or using skin care products like vaseline and cold creams, with biological adaptations of the skin. In some cases, terminology such as 'vasodilation' was used instead of 'vasoconstriction'. Overall, these responses lacked clarity, scientific accuracy, and depth, indicating a need for better conceptual understanding and targeted revision.
Image of Weaker Response	

Suggestions for improvement (Highlight all that apply)

Maximising SLO Achievement	Preferred Pedagogy Used for this SLO	Assessment Strategies
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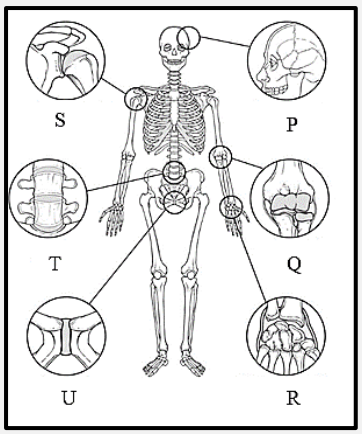
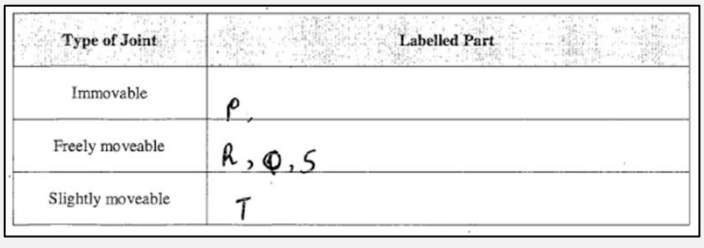
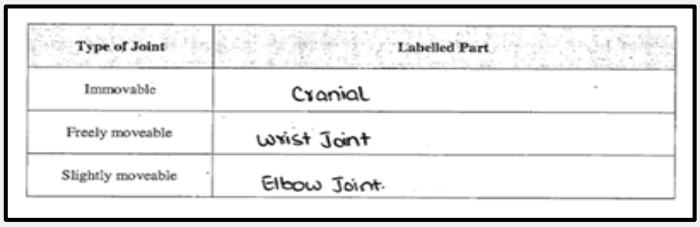
Any Additional Suggestion: Include real-life scenarios in the lessons, such as how the body reacts when a person steps outside on a cold winter morning. This approach makes the topic more relatable and engaging for candidates. Then, connect these observations to broader biological concepts like homeostasis, emphasising how the skin's responses, such as vasoconstriction, shivering, and the contraction of erector pili muscles, help maintain a stable internal temperature.

<table>
<tr><th colspan="2">Question No. 3</th></tr>
<tr><td>Question Text</td><td>Based on the given diagram of the human skeleton, identify any ONE labelled part from each type of joint in the table.

(Note: You do NOT need to write the actual name of the joint.)

<table>
<tr><th>Type of joint</th><th>Labelled Part</th></tr>
<tr><td>Immovable</td><td></td></tr>
<tr><td>Freely moveable</td><td></td></tr>
<tr><td>Slightly moveable</td><td></td></tr>
</table></td></tr>
<tr><td>SLO No.</td><td>13.2.3</td></tr>
<tr><td>SLO Text</td><td>Differentiate among different types of joints (immoveable, slightly moveable and freely moveable.</td></tr>
<tr><td>Max Marks</td><td>3</td></tr>
<tr><td>Cognitive Level</td><td>U</td></tr>
<tr><td>Checking Hints</td><td>1 mark for each correct identification (any 3 required)</td></tr>
<tr><td>Overall Performance</td><td>Overall, performance of candidates was excellent/ very good. Most candidates were able to correctly identify the labelled parts along with the appropriate types of joints. However, some candidates struggled to correctly identify slightly moveable joints, often confusing them with either freely moveable or immovable types.</td></tr>
<tr><td>Description of Better Responses</td><td>Better responses revealed a clear understanding of joint types and accurately identified the labelled parts with their correct categories. Most candidates correctly identified P as an immovable joint and selected any of Q, R, or S for freely moveable joints. Many also correctly recognised T or U as slightly moveable joints, showing good interpretation of skeletal diagrams. These candidates effectively used visual clues and applied their anatomical knowledge appropriately. Their answers were concise, accurate, and well-aligned with the question's requirements.</td></tr>
<tr><td>Image of Better Response</td><td> 
<table>
<tr><th>Type of Joint</th><th>Labelled Part</th></tr>
<tr><td>Immovable</td><td>P</td></tr>
<tr><td>Freely moveable</td><td>R, Q, S</td></tr>
<tr><td>Slightly moveable</td><td>T</td></tr>
</table></td></tr>
<tr><td>Description of Weaker Responses</td><td>Weaker responses showed that some candidates did not carefully follow the instructions in the question. Instead of identifying the labelled parts (e.g., P, Q, R, S, T, and U), they wrote the names of body parts such as cranial, leg, shoulder, elbow, and wrist. This indicates a</td></tr>
</table>

	lack of attention to detail and a misunderstanding of the question format. Moreover, some candidates incorrectly identified the brain instead of the skull as an example of an immovable joint, reflecting a weaker understanding of the concept. Confusion between slightly moveable and freely moveable joints was also common.
Image of Weaker Response	

Type of Joint	Labelled Part
Immovable	Cranial
Freely moveable	Wrist Joint
Slightly moveable	Elbow Joint.

Suggestions for improvement (Highlight all that apply)

Maximising SLO Achievement	Pedagogy Used for that SLO	Assessment Strategies
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Any Additional Suggestion: Use practical demonstrations with a human skeleton model to help candidates identify different types of joints and understand their degrees of movement. This hands-on approach reinforces correct concepts and helps prevent common misconceptions.		

Question No. 4	
Question Text	In pea plants, allele (R) for round seed shape is dominant over allele (r) for wrinkled and allele (Y) for yellow seed colour is dominant over allele (y) for green seed colour. A cross between a homozygous round and yellow seeded plant and a homozygous wrinkled and green seeded plant produces 100% heterozygous round and yellow seeds in its F1 generation. Illustrate the genetic cross between the offspring produced in F1 generation in the given box. **Space for genetic cross**
SLO No.	15.3.6
SLO Text	Determine that 9:3:3:1 dihybrid F2 phenotypic ratio is an evidence of independent assortment.

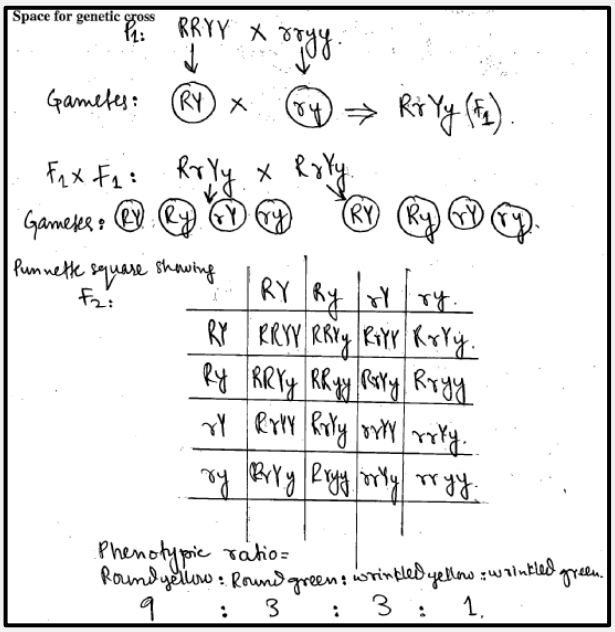
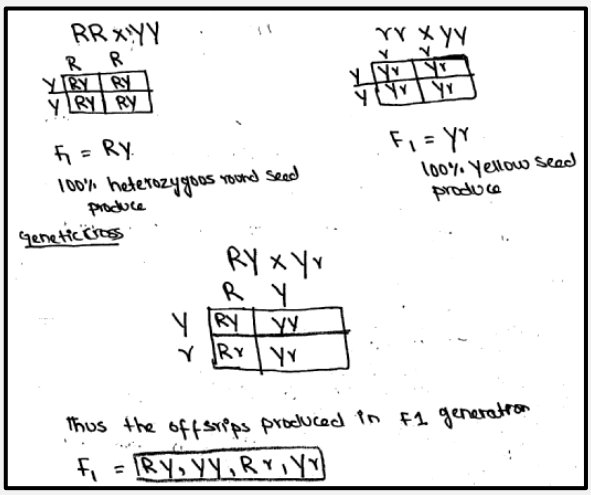
Max Marks	3
Cognitive Level	A*
Checking Hints	1 mark for determining correct genotypes of F2 generation parents 1 mark for determining correct genotypes of gametes 1 mark for determining correct genotype of offspring
Overall Performance	Overall, candidates' performance was unsatisfactory. Some responses showed confusion between genotype and phenotype, reflecting a lack of clarity and scientific accuracy. These responses demonstrated a weak understanding of dihybrid inheritance and Punnett square analysis.
Description of Better Responses	*Better responses* showed a clear understanding of dihybrid inheritance. Candidates correctly identified the F2 generation parents as RrYy × RrYy and accurately determined the four possible gametes (RY, Ry, rY, and ry). Their Punnett squares were neatly drawn and correctly filled with the appropriate genotypic combinations of the offspring. These candidates effectively distinguished between genotype and phenotype, with many correctly calculating the expected phenotypic ratios. Their answers were well-organised and scientifically accurate, and reflected a solid grasp of Mendelian genetics, likely supported by consistent practice and familiarity with Punnett square construction.
Image of Better Response	
Description of Weaker Responses	*Weaker responses* showed a lack of understanding of dihybrid crosses. Many candidates incorrectly constructed Punnett squares for only one trait (monohybrid cross) instead of considering both seed shape and colour simultaneously. As a result, they failed to generate the correct combinations of gametes (RY, Ry, rY, and ry) and did not complete the required Punnett square for a dihybrid cross. Some responses also showed confusion between genotype and phenotype. This indicates limited practice and weak conceptual understanding of Mendelian genetics.

Image of Weaker Response	

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: Assign multiple dihybrid cross problems for practice and provide step-by-step guidance on identifying genotypes, determining possible gametes, and accurately constructing the Punnett square. This structured approach will help reinforce understanding and improve candidates' confidence in solving genetic problems.		

Extended Response Questions (ERQs)

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

Question No. 5a	
Question Text	i. Describe ONE function of each of the five components of reflex action. ii. Mention any ONE feature of a reflex action that differentiates it from a voluntary action.
SLO No.	12.3.8
SLO Text	Trace the path of a nervous impulse in case of a reflex action with examples from daily life.
Max Marks	6
Cognitive Level	U
Checking Hints	i. 1 mark for describing the function of each component (any 5 required) ii. 1 mark for mentioning each difference (any 1 required)

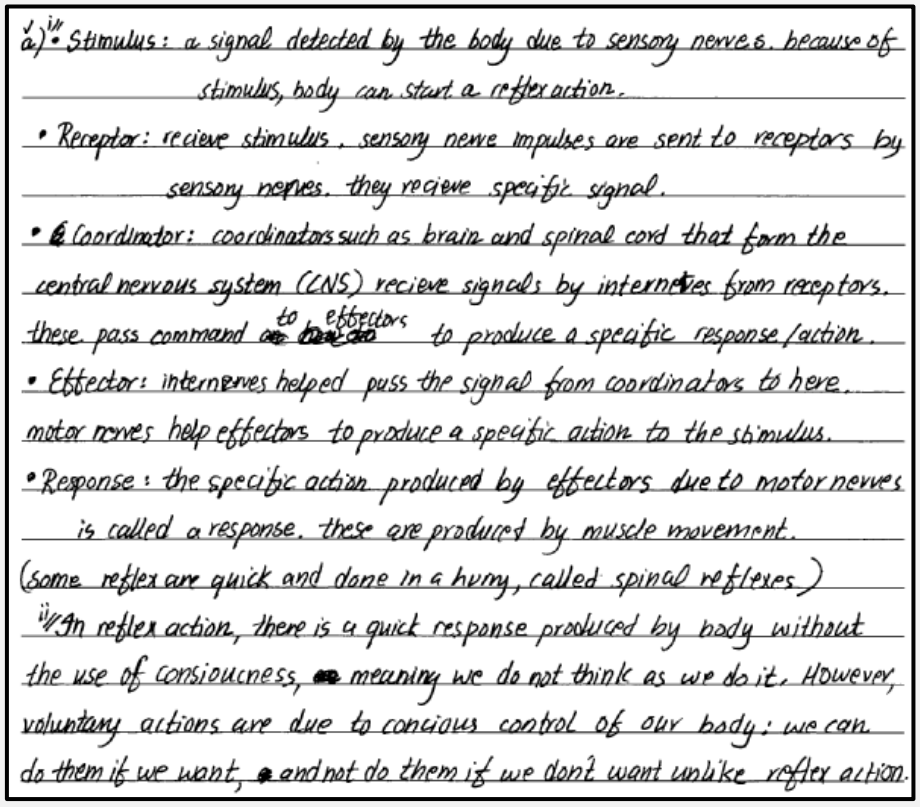
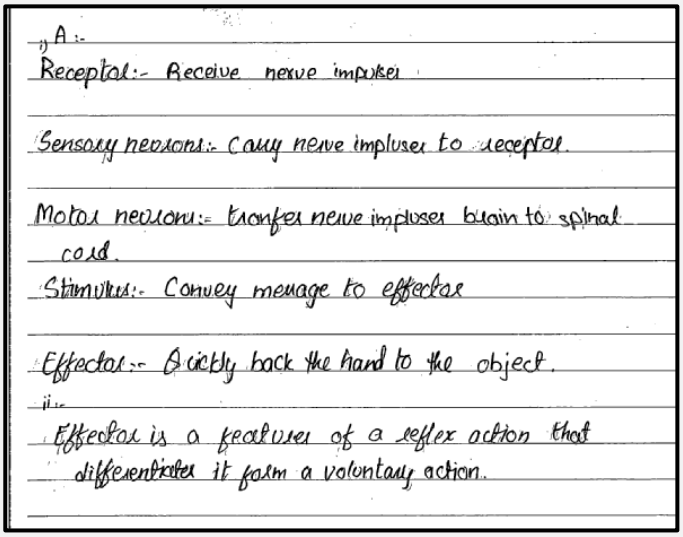
Overall Performance	This part of the question was attempted less frequently than part (b). However, among those who did attempt it, performance was generally commendable and satisfactory. Overall, candidates demonstrated a good understanding of reflex actions.
Description of Better Responses	*Better responses* demonstrated a solid understanding of the components involved in a reflex action. In part 'i', candidates accurately described the roles of the five key components in sequence: receptors detect the stimulus, sensory neurons transmit impulses to the spinal cord, interneurons process the information, motor neurons carry the response signal, and effectors (such as muscles) carry out the action. In part 'ii', many candidates correctly identified a distinguishing feature of reflex actions, such as lack of brain involvement or faster response in reflex actions. Responses were generally clear, well-structured and demonstrated good understanding.
Image of Better Response	
Description of Weaker Responses	*Weaker responses* failed to clearly describe the five key components of a reflex action in a logical, step-by-step manner. Some responses lacked structure, while others confused the roles of components, for example, stating that 'receptors transfer impulse to effectors', 'neurons transfer impulses to receptors'. Several candidates included incorrect or irrelevant information, indicating limited understanding of the reflex arc. Additionally, many did not correctly identify the key feature that differentiates reflex actions from voluntary actions.

Image of Weaker Response	

A :-
Receptal :- Receive nerve impulse
Sensory neurons :- Carry nerve impluses to receptal.
Motor neurons :- tranfer nerve impluses brain to spinal cord.
Stimulus :- Convey menage to effector
Effector :- Quickly back the hand to the object.
ii :-
Effector is a feature of a reflex action that differentiates it form a voluntary action.

Suggestions for improvement (Highlight all that apply)

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Any Additional Suggestion: Encourage candidates to create flowcharts or concept maps showing the sequence and roles of each component involved in a reflex action. Follow this with structured and application-based practice questions to reinforce understanding and address common misconceptions.		

Question No. 5b	
Question Text	i. Describe the structural adaptations of the following parts of a wind-pollinated flower. • Pollen • Stamen • Stigma ii. Mention the importance of each structural adaptation described in part i.
SLO No.	14.3.4
SLO Text	Differentiate between adaptations in the structures of wind-pollinated and insect-pollinated flowers.
Max Marks	6
Cognitive Level	U
Checking Hints	1 mark for mentioning each adaptation (any 3 required) 1 mark for mentioning each importance (any 3 required)

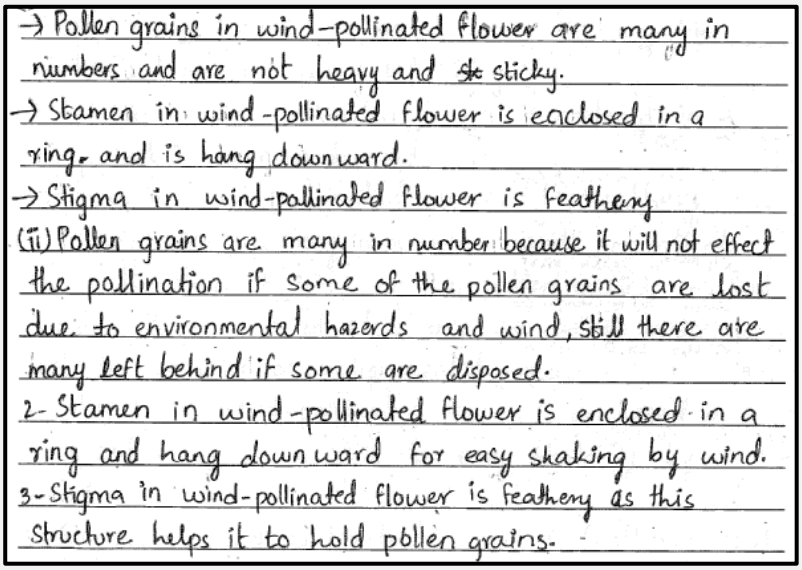
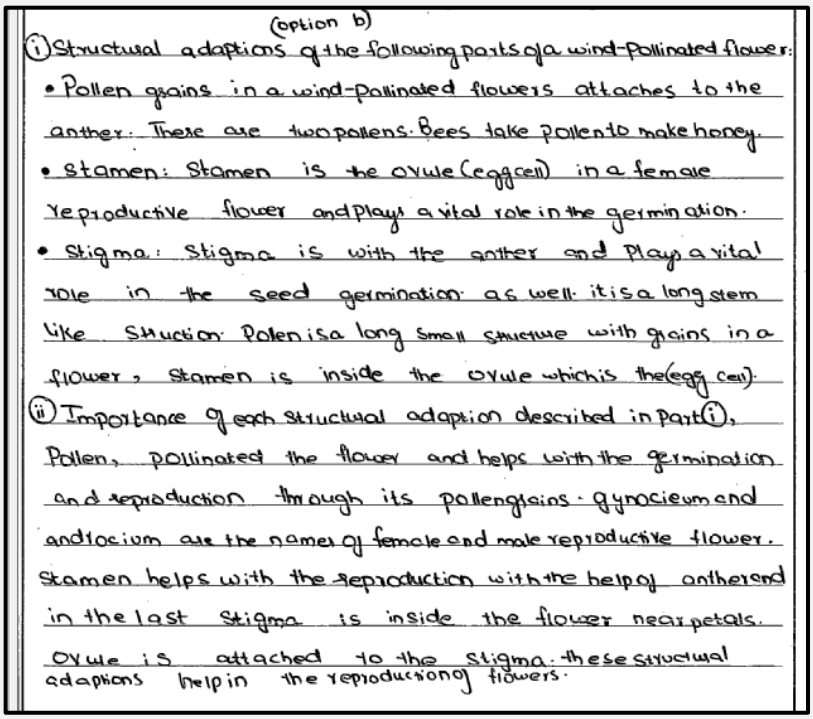
Overall Performance	Most candidates attempted this part of the question and showed an average understanding of the structural adaptations of wind-pollinated flowers. However, few candidates confused the features of insect-pollinated flowers with those of wind-pollinated ones, indicating some misunderstanding of the differences between the two pollination strategies.
Description of Better Responses	In part 'i', *better responses* clearly explained the structural adaptations of wind-pollinated flowers. Most responses correctly identified key features such as lightweight pollen, exposed anthers, and large, feathery stigmas. In part 'ii', the majority were able to clearly link these adaptations to their functions, such as the dispersal of pollen by wind and the increased surface area of the stigma for efficient pollen capture. In many cases, the connection between structures and their importance was well explained, showing a solid grasp of the topic.
Image of Better Response	
Description of Weaker Responses	*Weaker responses* revealed that many candidates confused the characteristics of wind-pollinated flowers with those of insect-pollinated flowers. Features such as bright petals, scent, and nectar, which are associated with insect pollination, were wrongly included. Some candidates also mixed up the roles of floral parts, for example, attributing stigma adaptations to the stamen. Additionally, several responses did not clearly explain the significance of each structural adaptation in relation to wind pollination. Instead of focusing on specific relevant structures, some candidates gave general descriptions of flower parts such as the calyx, corolla, androecium, and gynoecium, which did not address the question effectively.

Image of Weaker Response	

(option b)

(i) Structural adaptions of the following parts of a wind-pollinated flower:

- Pollen grains in a wind-pollinated flowers attaches to the anther. There are two pollens. Bees take pollen to make honey.
- Stamen: Stamen is the ovule (eggcell) in a female reproductive flower and plays a vital role in the germination.
- Stigma: Stigma is with the anther and plays a vital role in the seed germination as well. it is a long stem like structure. Pollen is a long small structure with grains in a flower, Stamen is inside the ovule which is the (egg cell).

(ii) Importance of each structural adaption described in part (i),

Pollen, pollinated the flower and helps with the germination and reproduction through its pollengrains. gynoecium and androcium are the names of female and male reproductive flower. Stamen helps with the reproduction with the help of antherand in the last Stigma is inside the flower near petals. Ovule is attached to the stigma. these structural adaptions help in the reproductionof flowers.

Suggestions for improvement (Highlight all that apply)

Maximising SLO Achievement	Pedagogy Used for that SLO	Assessment Strategies
• 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	• 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	• Past paper questions • Discussion on E-Marking Notes • AKU-EB Digital Learning Solution powered by Knowledge Platform https://akueb.knowledgeplatform.com/login

Any Additional Suggestion: Adopt a comparative approach by presenting the features of wind- and insect-pollinated flowers side by side to highlight key differences. Use real flower specimens in the classroom to allow candidates to observe structural features directly, reinforcing understanding through hands-on experience and making abstract concepts more concrete.

Question No. 6a	
Question Text	Describe in TWO points each of the following causes of genetic variation in a population. • Mutation • Gene flow between populations • Random assortment of homologous chromosomes
SLO No.	15.4.4, 15.4.1
SLO Text	Explain how variation can lead to organic evolution. Describe sources of variation (genetic and environmental).

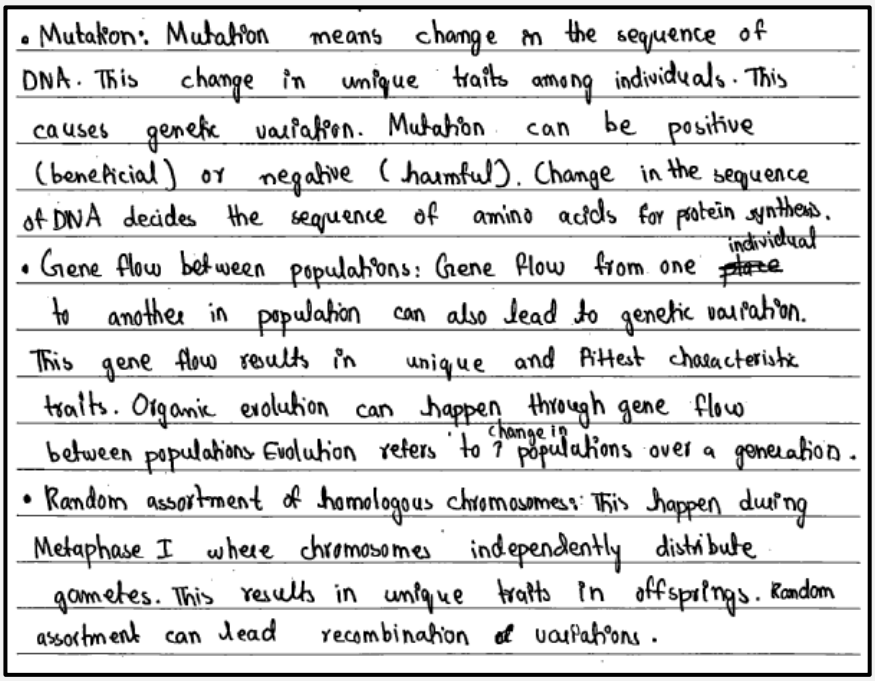
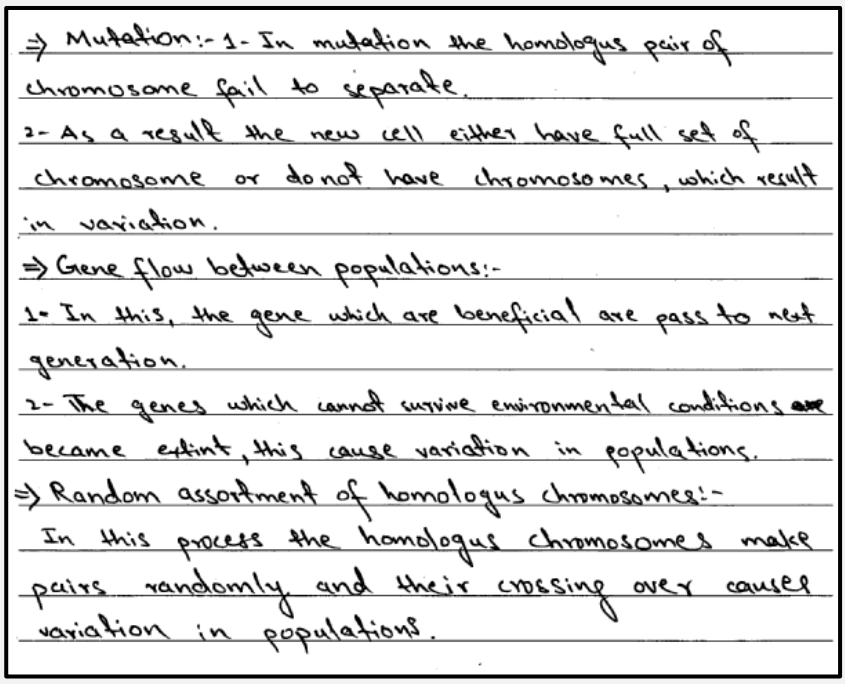
Max Marks	6
Cognitive Level	U
Checking Hints	1 mark for describing each point of mutation (any 2 required) 1 mark for describing each point of gene flow (any 2 required) 1 mark for describing each point of random assortment of homologous chromosomes (any 2 required)
Overall Performance	This part of the question was attempted by fewer candidates compared to part (b). However, those who did attempt it also did not performed up to the mark. Many responses lacked precision and failed to clearly describe the causes of genetic variation. Several responses included irrelevant or overly detailed information that did not directly address the question, indicating a lack of focus and conceptual clarity.
Description of Better Responses	*Better responses* demonstrated a clear understanding of the three main causes of genetic variation. These candidates accurately described mutation as a change in DNA that can introduce new alleles, often highlighting its potential to be inherited. Gene flow was well explained as the movement of alleles between populations through migration or reproduction, emphasising its role in increasing genetic diversity. The concept of random assortment was clearly outlined; candidates correctly stated that it occurs during meiosis (metaphase I) and results in unique genetic combinations. These responses were concise, well-structured and used appropriate biological terminologies.
Image of Better Responses	
Description of Weaker Responses	*Weaker responses* showed limited understanding of the causes of genetic variation. For 'mutation', some candidates confused it with physical injury or disease rather than recognising it as a change in the DNA sequence. In the case of 'gene flow', many incorrectly defined it as internal movement of genes within an individual instead of the transfer of alleles between populations through migration. For 'random assortment', several responses failed to relate it to meiosis and wrote vague statements about gene mixing without mentioning homologous chromosomes or gamete formation. These misconceptions highlight the need for clearer instruction and reinforcement of core genetic concepts.

Image of Weaker Response	

⇒ Mutation:- 1- In mutation the homologus pair of chromosome fail to separate.
2- As a result the new cell either have full set of chromosome or do not have chromosomes, which result in variation.
⇒ Gene flow between populations:-
1- In this, the gene which are beneficial are pass to next generation.
2- The genes which cannot survive environmental conditions are became extint, this cause variation in populations.
⇒ Random assortment of homologus chromosomes:-
In this process the homologus chromosomes make pairs randomly and their crossing over causes variation in populations.

Suggestions for improvement (Highlight all that apply)

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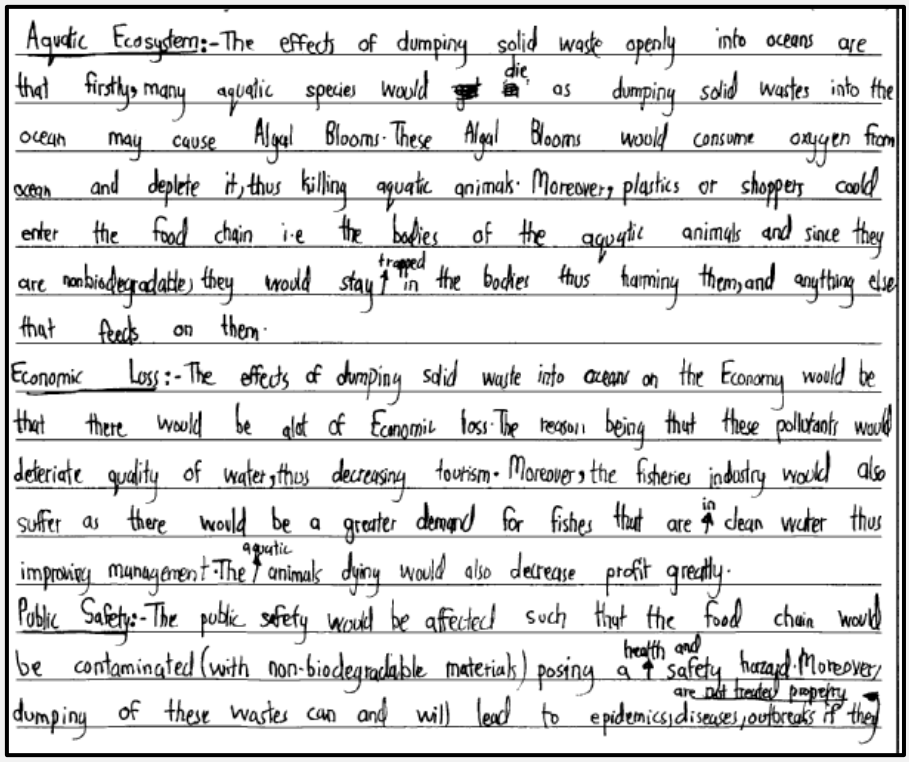
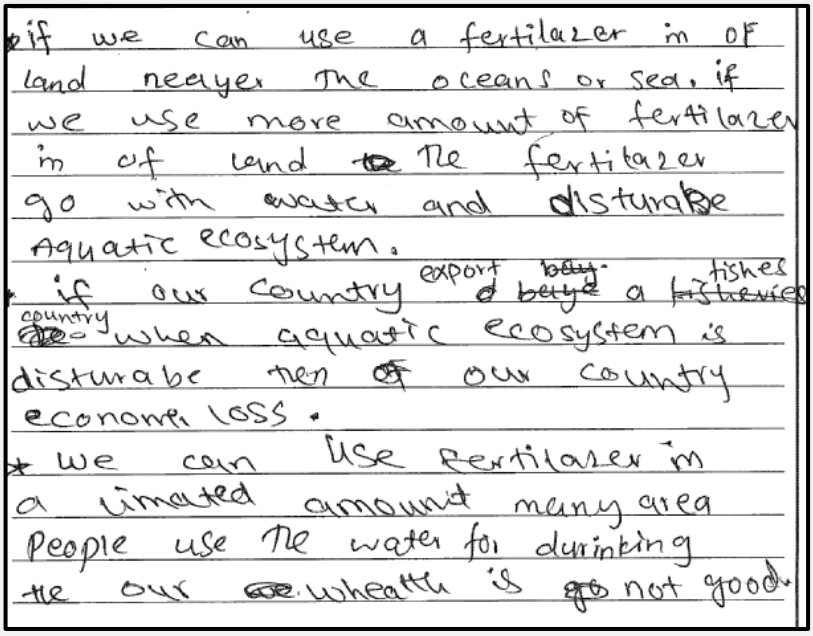
Any Additional Suggestion: Use real-world examples to reinforce understanding; for instance, the sickle cell mutation providing resistance to malaria illustrates the impact of mutation, while pollen transfer between plant populations demonstrates gene flow. To explain random assortment, highlight genetic differences between siblings, which result from the independent assortment of homologous chromosomes during meiosis. These relatable examples help make abstract genetic concepts more concrete and memorable.

Question No. 6b	
Question Text	Describe the effect of open dumping of solid wastes into oceans on the following. • Aquatic ecosystem • Economic loss and fisheries management cost • Public safety
SLO No.	16.6.2
SLO Text	Describe effects of each kind of pollution on plants, animals and human beings.
Max Marks	6
Cognitive Level	U
Checking Hints	1 mark for describing each effect on aquatic ecosystem (any 2 required) 1 mark for describing each effect on economic loss and fisheries management cost (any 2 required) 1 mark for describing each effect on public safety (any 2 required)
Overall Performance	The majority of candidates attempted this part of the question, showing below average performance. While many responses included appropriate examples and effectively used scientific terminology, fewer candidates were able to clearly distinguish between the three areas required or provided at least two valid points for each. This reflects that preparation and grasp of environmental science concepts were limited.
Description of Better Responses	*Better responses* demonstrated an excellent understanding of the impacts of open dumping of solid wastes into oceans. Most responses accurately described the effects on aquatic ecosystems, including pollution from plastics, metals, and toxic substances, eutrophication, and habitat destruction. Many also clearly explained the economic consequences, such as loss of income for fishing communities and increased waste management costs. Public safety concerns, including contaminated seafood and recreational hazards, were also clearly addressed. Candidates used relevant examples and scientific terminologies appropriately. The answers were well-structured, concise, and focused on the key points required.
Image of Better Responses	

Aquatic Ecosystem:- The effects of dumping solid waste openly into oceans are that firstly, many aquatic species would die as dumping solid wastes into the ocean may cause Algal Blooms. These Algal Blooms would consume oxygen from ocean and deplete it, thus killing aquatic animals. Moreover, plastics or shoppers could enter the food chain i.e the bodies of the aquatic animals and since they are non biodegradable, they would stay trapped in the bodies thus harming them, and anything else that feeds on them.

Economic Loss:- The effects of dumping solid waste into oceans on the Economy would be that there would be alot of Economic loss. The reason being that these pollutants would deteriate quality of water, thus decreasing tourism. Moreover, the fisheries industry would also suffer as there would be a greater demand for fishes that are in clean water thus improving management. The aquatic animals dying would also decrease profit greatly.

Public Safety:- The public safety would be affected such that the food chain would be contaminated (with non-biodegradable materials) posing a health and safety hazard. Moreover, dumping of these wastes can and will lead to epidemics, diseases, outbreaks if they are not treated properly

Description of Weaker Responses	*Weaker responses* showed limited understanding of the specific effects of open dumping of solid waste into oceans. Some candidates failed to clearly distinguish between the three categories, often repeating similar points across sections such as 'the use of fertilisers on land' and 'the release of harmful gases' under impacts on aquatic ecosystems and public safety, where they were not directly relevant. A common misconception was linking ocean pollution directly to drinking seawater, which is not a typical human practice. Additionally, vague statements without explanation or relevant examples weakened the overall quality of these responses.
Image of Weaker Response	

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: Show short videos or documentaries to visually demonstrate the impact of ocean dumping, helping students connect theoretical knowledge with real-world environmental consequences.

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. 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.)

Acknowledgements

The Aga Khan University Examination Board (AKU-EB) acknowledges with gratitude the invaluable contributions of all the dedicated individuals who have played a pivotal role in the development of the Biology SSC-II E-Marking Notes.

We extend our sincere appreciation to Ms Sajida Mohammed Afzal and Dr. Nazish George, Specialists in Biology at AKU-EB, for taking subject lead during the entire process of e-marking.

Additionally, we express our gratitude to the esteemed team of reviewers for their constructive feedback on overall performance, better and weaker responses, and validating teaching pedagogies along with suggestions for improvement.

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