Aga Khan University Examination Board

Notes from E-Marking Centre on SSC-II Physics Annual Examination 2023

Introduction

This document has been produced for the teachers and candidates of Secondary School Certificate (SSC) Part II Physics. It contains comments on candidates' responses to the 2023 SSC Part 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 which 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 Students 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

This year, candidates performed well on questions related to refraction light through different media, current electricity, information handling, sound and word problems related to the simple harmonic motion. Whereas low-scoring candidates struggled in questions based on magnetism, nuclear physics and Simple Harmonic Motion.

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

Detailed Comments

Constructed Response Questions (CRQs)

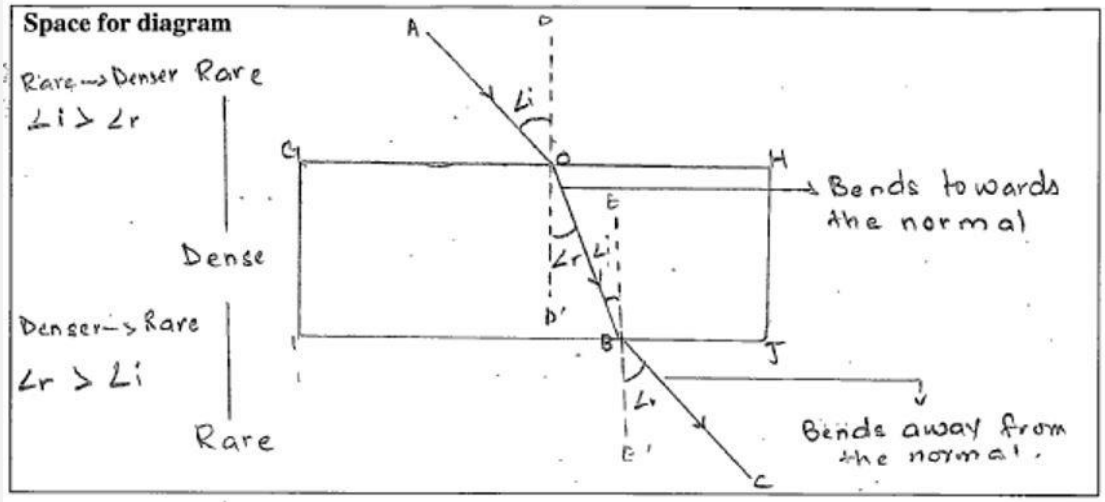
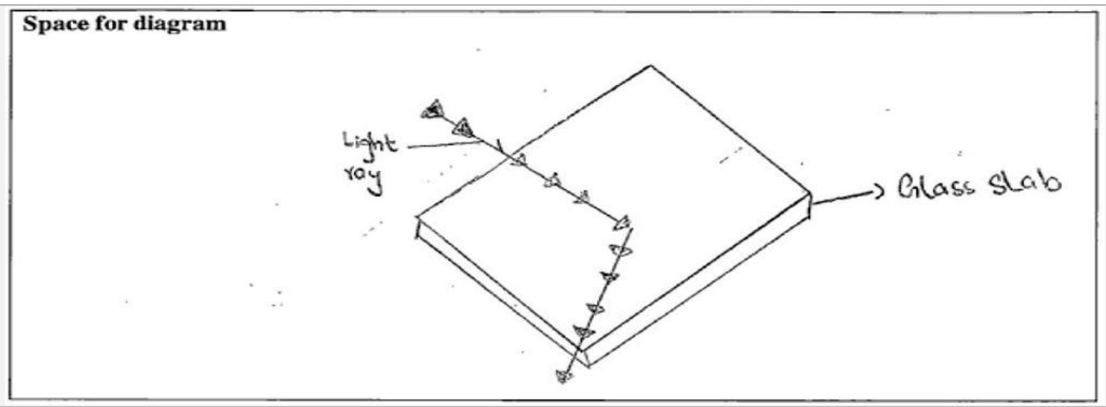
Question No. 1	
Question Text	Draw a labelled diagram that demonstrates the passage of a light ray passing through a glass slab from air.
SLO No.	12.3.3
SLO Text	Demonstrate the passage of light ray through parallel-sided transparent material (Glass slab).
Max Marks	3
Cognitive Level	*A
Checking Hints	1 mark for making glass slab and mentioning 'air' and 'glass'/ drawing 'normal'. 1 mark for drawing and labelling (or putting correct arrows) the incident ray and refracted ray. 1 mark for drawing and labelling (or putting correct arrows) the emergent ray.
Overall Performance	The majority of the candidates demonstrated a strong understanding of the question's requirements, resulting in excellent performance. The use of arrows to indicate the path of light rays in the ray diagram was essential for gaining full marks. To achieve higher scores, candidates are encouraged to thoroughly comprehend question prompts and consistently apply all necessary components, ensuring clear and accurate visual representation in their responses.
Description of Better Responses	It was observed in better responses that candidates accurately depicted the deviation of light rays when transitioning from a rarer medium to a denser medium (bending towards the normal) and vice versa (bending away from the normal). These responses demonstrated proficiency in labelling key elements within the diagram, such as arrowheads, air, the glass slab, the normal, incidence ray, refracted ray, and emergent ray, leading to high scores. The cohort's collective understanding of these concepts is praiseworthy, reflecting their grasp of the topic.
Image of Better Response	
Description of Weaker Responses	It was observed in weaker responses that the candidates struggled to comprehend the question's requirements and omitted the essential arrows on the rays. Consequently, these candidates received lower marks, ranging from zero to one, for their labelling. Furthermore, several candidates used inappropriate diagrams, such as mirrors, prisms, convex lenses, or drinking water glasses, instead of the designated glass slab.

Image of Weaker Response	

Suggestions for improvement (Tick all that apply)

How to Approach SLO	Pedagogy** Used for that SLO	Assessment Strategies
• Understand the expectations of the command words • Look at the cognitive level • Identify the content that is required to answer that question (both in terms of understanding of concepts and any skills that may be required like analysing or evaluating) • Go through the past paper questions on that particular concept • Refer to the resource guide for extra resources	• Story Board • Cause and Effect • Fish and Bone • Concept Mapping • Audio Visual resources • Think, Pair and Share • 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:
Candidates are encouraged to develop a habit of marking the arrows on the rays of light in all ray diagrams during the teaching and learning process. There must be an appropriate and clear bending in ray of light when it enters from one medium to another.

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

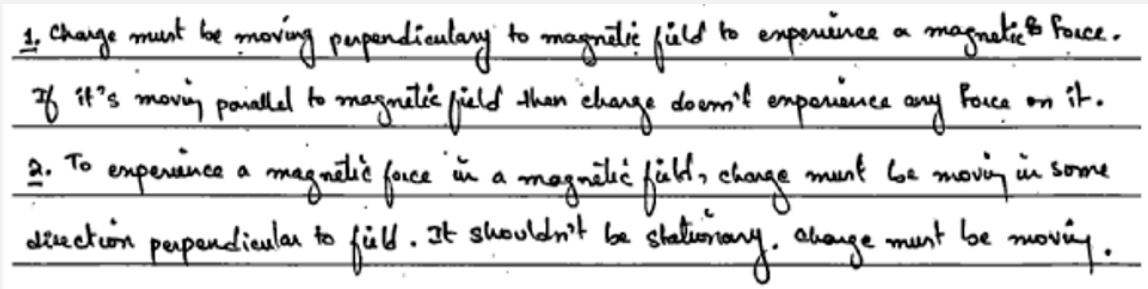
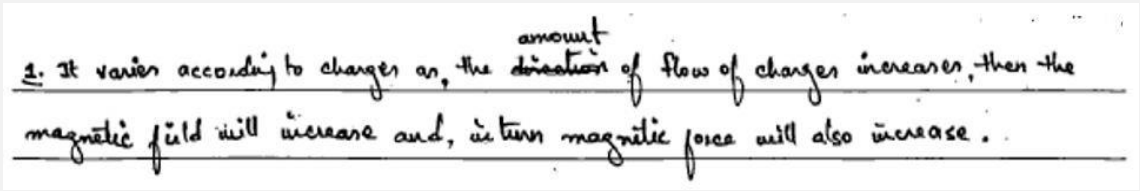
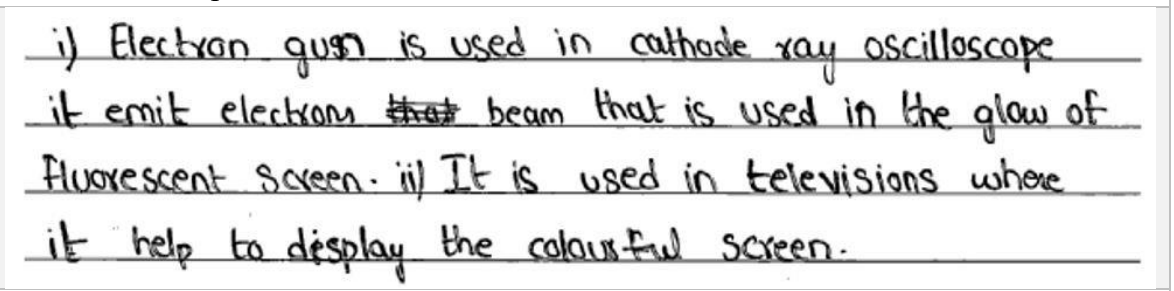
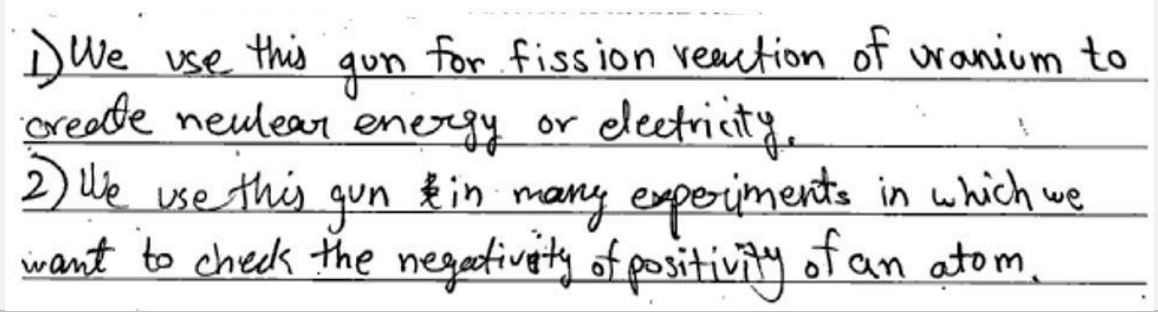
Question No. 2	
Question Text	a. State TWO conditions that must be fulfilled for a charge to experience magnetic force when it is placed in a magnetic field. b. State any ONE factor which causes the magnetic force to vary in terms of a charge particle.
SLO No.	15.2.1
SLO Text	Describe that a force acts on a current carrying conductor placed in a magnetic field as long as the conductor is not parallel to the magnetic field.
Max Marks	03
Cognitive Level	*K
Checking Hints	1 mark for EACH condition. (3 required)
Overall Performance	The overall performance of the cohort on the question was average, reflecting moderate difficulty. While some candidates demonstrated accurate understanding of the conditions and factors, resulting in full marks, others exhibited partial comprehension. Notably, certain candidates correctly identified the conditions, but failed to accurately articulate the corresponding factors, while others correctly identified the factors but struggled with specifying the associated conditions. Encouraging further clarity and precision in connecting conditions and factors would assist candidates in achieving full marks in future assessments.
Description of Better Responses	Candidates who obtained full marks demonstrated a clear understanding of the topic by accurately identifying the two essential conditions. They skilfully used "perpendicular" or "90 degrees" to indicate the magnetic field's orientation and recognised the necessity of the charge being in motion rather than stationary. Furthermore, they recognised the significance of the interaction between the charge's magnetic field and an external magnetic field. To enhance performance, encouraging students to further refine their explanations and emphasise the relationship between the identified conditions and factors would be beneficial.
Image of Better Response	a.  1. Charge must be moving perpendicularly to magnetic field to experience a magnetic force. If it's moving parallel to magnetic field then charge doesn't experience any force on it. 2. To experience a magnetic force in a magnetic field, charge must be moving in some direction perpendicular to field. It shouldn't be stationary. charge must be moving. b.  1. It varies according to charges as, the amount direction of flow of charges increases, then the magnetic field will increase and, in turn magnetic force will also increase.
Description of Weaker Responses	Some responses displayed irrelevant wording and phrasing, indicating a need for better understanding of the question's requirements. It is important to note that the question specifically addressed the force on a charge, not a conductor. Consequently, factors mentioned such as the number of turns in a coil, distance, and area were unrelated and did not contribute to the marks. Encouraging students to focus on the specific factors relevant to the force on a charge would enhance their comprehension and accuracy in future assessments.

Image of Weaker Response	a. 1) The charge must have to be in a magnetic field and it is flow positive to negative terminal. 2) The charge in which the magnetic field, magnetic field must be rotating anti-clock wise. b. Ability of ~~so~~ object:- means if the object's ability is to gain electron or lose electron the variation will change.

Suggestions for improvement (Tick all that apply)

How to Approach SLO	Pedagogy Used for that SLO	Assessment Strategies
• Understand the expectations of the command words • Look at the cognitive level • Identify the content that is required to answer that question (both in terms of understanding of concepts and any skills that may be required like analysing or evaluating) • Go through the past paper questions on that particular concept • Refer to the resource guide for extra resources	• Story Board • Cause and Effect • Fish and Bone • Concept Mapping • Audio Visual resources • Think, Pair and Share • 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:
Teachers can use the formula of force on a charge in a magnetic field ($F = q\ v\ B \sin\theta$) so that candidates can easily understand the factors affecting the force on a charge.

Question No. 3	
Question Text	Explain any TWO uses of electron gun as a source of electron beam.
SLO No.	16.2.1
SLO Text	Describe the simple construction and use of an electron gun as a source of electron beam.
Max Marks	02
Cognitive Level	*U
Checking Hints	1 mark for each use of electron gun. (2 required)
Overall Performance	The performance of the cohort on the question was generally commendable. The majority of candidates demonstrated a strong understanding of the question and provided correct explanations, earning full marks. Some candidates mistakenly applied principles of electrostatics, which led to inaccurate responses. To enhance performance, it is recommended to emphasise the distinction between these two concepts and reinforce the specific context of electromagnetism, enabling candidates to provide more precise and accurate explanations in future assessments.
Description of Better Responses	The cohort demonstrated strong performance on the question, which was categorisd as easy. Most candidates effectively utilised the concept of the electron gun by writing the correct uses like used in computer and television monitors, used to ionise particles by adding electrons to, or removing electrons from an atom, used for welding, metal coating, 3D metal printers, metal powder production and vacuum furnaces and used in medical applications to produce X-rays using a linear accelerator earning full marks. This indicates a good understanding of the topic among most candidates. Overall, the cohort displayed commendable competence in addressing the question's requirements. Encouraging further engagement and exploration of related concepts would allow for even more comprehensive and nuanced responses in future assessments.
Image of Better Response	 i) Electron gun is used in cathode ray oscilloscope it emit electrons ~~that~~ beam that is used in the glow of fluorescent screen. ii) It is used in televisions where it help to display the colourful screen.
Description of Weaker Responses	Weaker responses stated irrelevant uses and made references to fission or fusion reactions, which were not applicable. Furthermore, some candidates merely restated the question without providing substantive content. Additionally, including unnecessary information about the construction of the electron gun resulted in lost marks. Encouraging students to focus on relevant concepts and provide concise, accurate responses directly addressing the question's requirements will enhance their performance. Constructive feedback can help students refine their understanding and approach to similar questions.
Image of Weaker Response	 1) We use this gun for fission reaction of uranium to create nuclear energy or electricity. 2) We use this gun in many experiments in which we want to check the negativity of positivity of an atom.

Suggestions for improvement (Tick all that apply)

How to Approach SLO	Pedagogy Used for that SLO	Assessment Strategies
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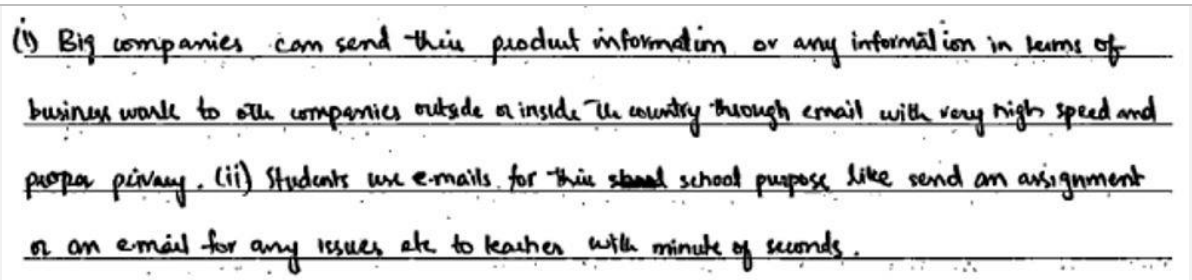
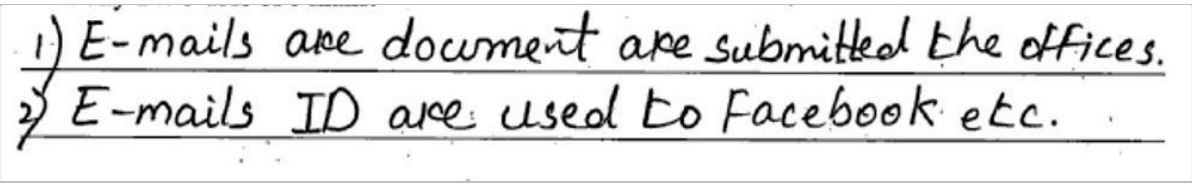
Any Additional Suggestion:
Candidates are advised to make sure they fully grasp the question and then respond in a way that directly addresses what is being asked.

Question No. 4	
Question Text	Write any TWO uses of e-mails.
SLO No.	17.3.2
SLO Text	State the purpose of using e-mails and internet.
Max Marks	02
Cognitive Level	K
Checking Hints	1 mark for writing each purpose. (Any 2 required)
Overall Performance	The question's overall performance was exemplary as most candidates successfully obtained full marks by accurately providing two correct uses. However, it is important to note that candidates who repeated the same use in both points received one mark, as their response was treated as a single use. To further enhance performance, candidates could be encouraged to provide distinct and diverse uses, showcasing a deeper understanding of the topic and expanding their range of knowledge. Constructive feedback can guide students towards more comprehensive responses in future assessments.

Description of Better Responses	Most of the candidates easily secured full marks by providing two correct uses like sending source of documented evidence, cost effective mode of communication, fast delivery of messages anywhere in the world, pictures or other files can also be sent through email, used to disseminate information to large audience at a time and communicate with our friends and institutions with more ease. Their understanding of the topic was evident in their ability to accurately identify and articulate the uses. This demonstrates a strong grasp of the subject matter. The cohort's overall performance on this question reflects their proficiency and aptitude in addressing the requirements effectively.
Image of Better Response	 (i) Big companies can send their product information or any information in terms of business world to other companies outside or inside the country through email with very high speed and proper privacy. (ii) Students use e-mails for their school purpose like send an assignment or an email for any issues etc to teacher with minute of seconds.
Description of Weaker Responses	Weaker responses were observed when candidates repeated similar concepts in both points. Encouraging candidates to utilise accurate terminology, such as email address, and emphasising the importance of providing distinct uses or ideas would enhance their responses. To improve their performance in future assessments, candidates should focus on clarifying these specific points.
Image of Weaker Response	 1) E-mails are document are submitted the offices. 2) E-mails ID are used to Facebook etc.

Suggestions for improvement (Tick all that apply)

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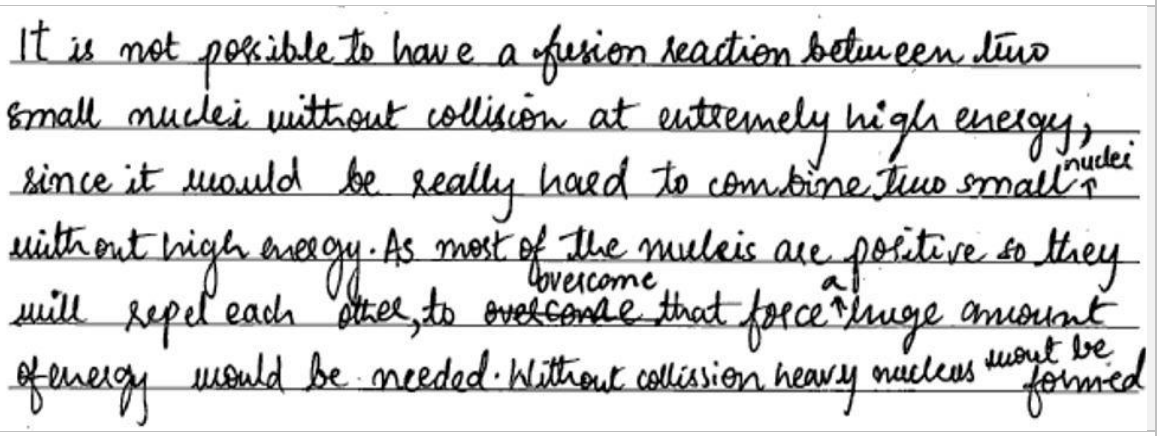
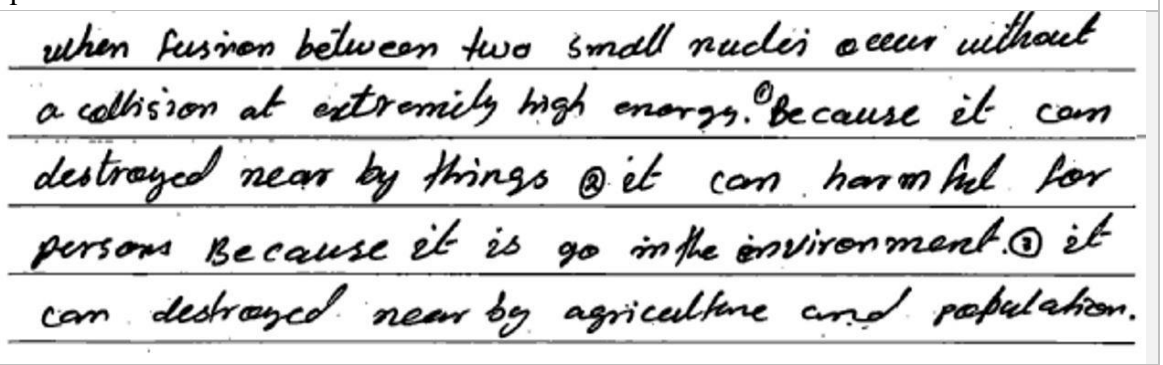
Any Additional Suggestion:
Teachers are kindly asked to emphasis this topic more. While it is related to computer science, some aspects are fundamental and were covered in earlier grades.

Question No. 5	
Question Text	Is it possible that fusion between two small nuclei occur without a collision at extremely high energy? Justify your answer in THREE points.
SLO No.	18.7.1
SLO Text	Describe the processes and practical applications of fission and fusion.
Max Marks	03
Cognitive Level	U
Checking Hints	1 mark for each point. (3 required)
Overall Performance	The overall performance of the cohort can be characterised as average, considering the higher difficulty level of the question. Given the challenging nature of the question, it is understandable that candidates encountered some difficulty in providing accurate responses. They felt difficulty in comprehending the concept of fission and fusion of two nuclei of an element and the energy required to undergo these two nuclear processes.
Description of Better Responses	The better responses effectively explained that an increase in the strength or magnitude of the force between nuclei requires a higher energy input to overcome the resulting repulsive force. These candidates displayed clarity and coherence in their explanations, showcasing their comprehensive understanding. Encouraging further exploration and critical thinking would further enhance their ability to provide insightful responses in future assessments.
Image of Better Response	
Description of Weaker Responses	Weaker responses displayed irrelevance by discussing unrelated topics such as radiation, its protection, and definitions of fission and fusion. Some weaker responses were awarded one mark if they stated "No" but failed to provide the correct reason. To enhance performance, it is recommended to guide candidates towards focusing on relevant concepts and providing accurate reasoning, enabling them to effectively address similar questions in future assessments.
Image of Weaker Response	

Suggestions for improvement (Tick all that apply)

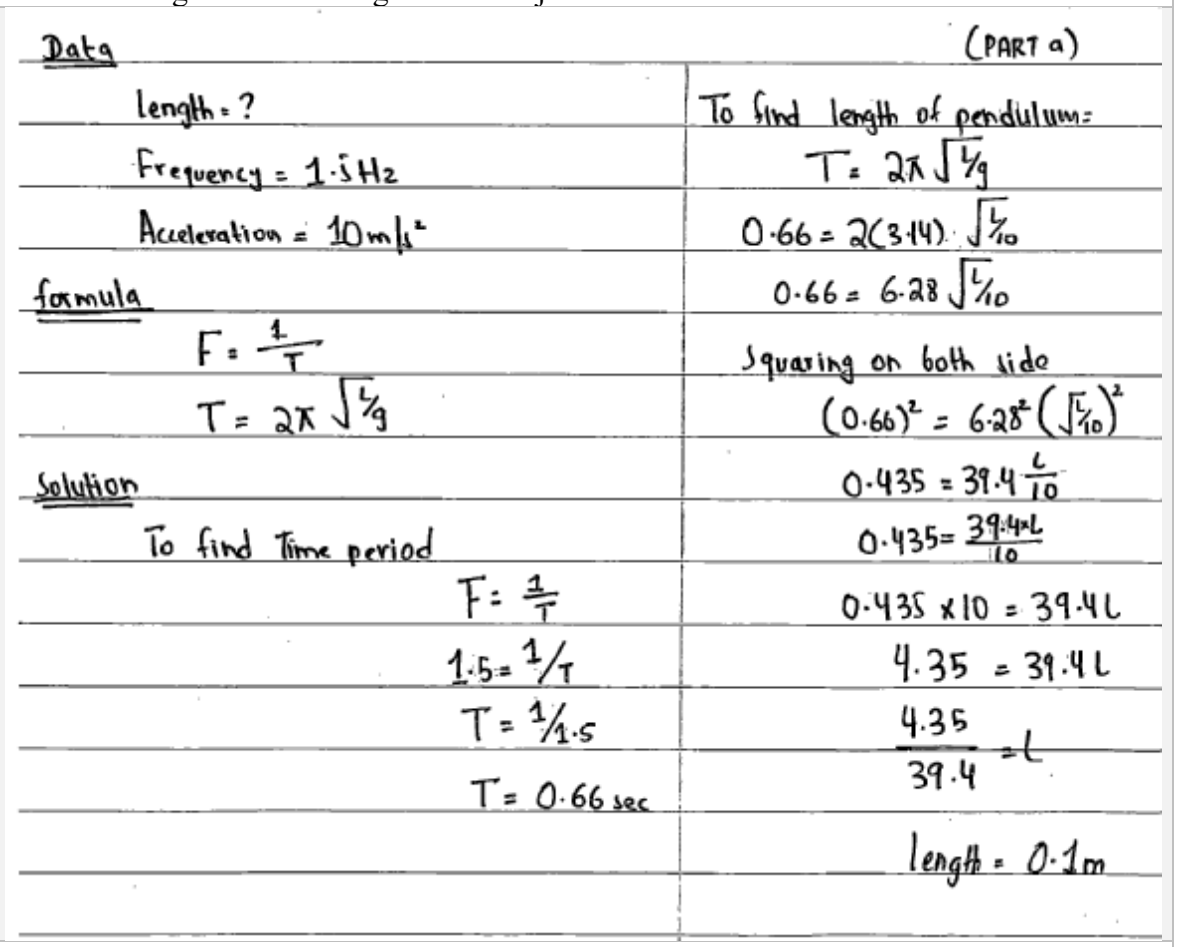
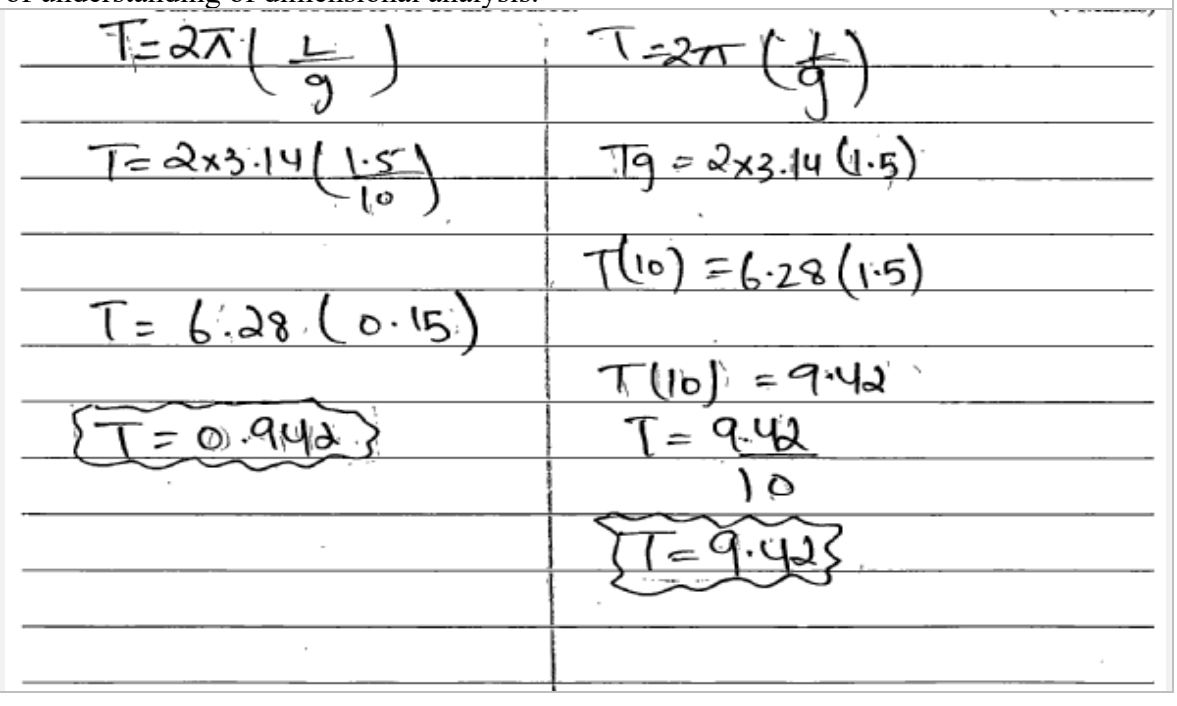
How to Approach SLO	Pedagogy Used for that SLO	Assessment Strategies
• Understand the expectations of the command words • Look at the cognitive level • Identify the content that is required to answer that question (both in terms of understanding of concepts and any skills that may be required like analysing or evaluating) • Go through the past paper questions on that particular concept • Refer to the resource guide for extra resources	• Story Board • Cause and Effect • Fish and Bone • Concept Mapping • Audio Visual resources • Think, Pair and Share • 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:
Subject teachers may encourage their students to become familiar with the idea of attractive and repulsive forces between similar and dissimilar nuclei so that they can easily explain the reason why huge or high energy is required for the mentioned nuclear process.

Extended Response Questions (ERQs)

These questions offered a choice between part **a** and **b**.

Question No. 6a	
Question Text	Calculate the length of a simple pendulum if its frequency is 1.5 Hz. (**Note**: Take the acceleration due to gravity as 10 m/s^2.)
SLO No.	10.1.5
SLO Text	Solve word problems related to time period of a simple pendulum.
Max Marks	06
Cognitive Level	A
Checking Hints	1 mark for each mathematical step. (6 required)
Overall Performance	Majority of the candidates attempted this part of the questions and several candidates attained full marks by demonstrating a sound understanding of the reciprocal relationship between frequency and time period. Well-responded answers showcased proficiency in presenting all necessary steps for numerical-based questions, encompassing data, accurate formulas, appropriate substitutions, and SI units. However, candidates lacking comprehension of the frequency-time period relationship employed incorrect formulas or substitutions, leading to zero marks. Some candidates lost one or two marks for not mentioning the formula. Encouraging a deeper understanding of the concepts and emphasising meticulous step presentation will enhance performance in subsequent assessments.

Description of Better Responses	The better responses accurately presented the given data, employed relevant formulas, and performed correct calculations, resulting in accurate answers. Furthermore, these responses included the appropriate units for the required quantities, showcasing a comprehensive understanding of dimensional analysis. As a result, these candidates easily obtained full marks by effectively addressing all aspects of the question. Their thoroughness and attention to detail were evident in their well-structured and precise responses, reflecting a strong grasp of the topic. Overall, the cohort excelled in numerical-based problem-solving, demonstrating their knowledge of the subject matter.
Image of Better Response	
Description of Weaker Responses	The weaker responses inaccurately presented the given data, employed irrelevant formulas, and performed incorrect calculations, resulting in loss of marks. Furthermore, these responses included the inappropriate units for the required quantities, showcasing their lack of understanding of dimensional analysis.
Image of Weaker Response	

Suggestions for improvement (Tick all that apply)

How to Approach SLO	Pedagogy Used for that SLO	Assessment Strategies
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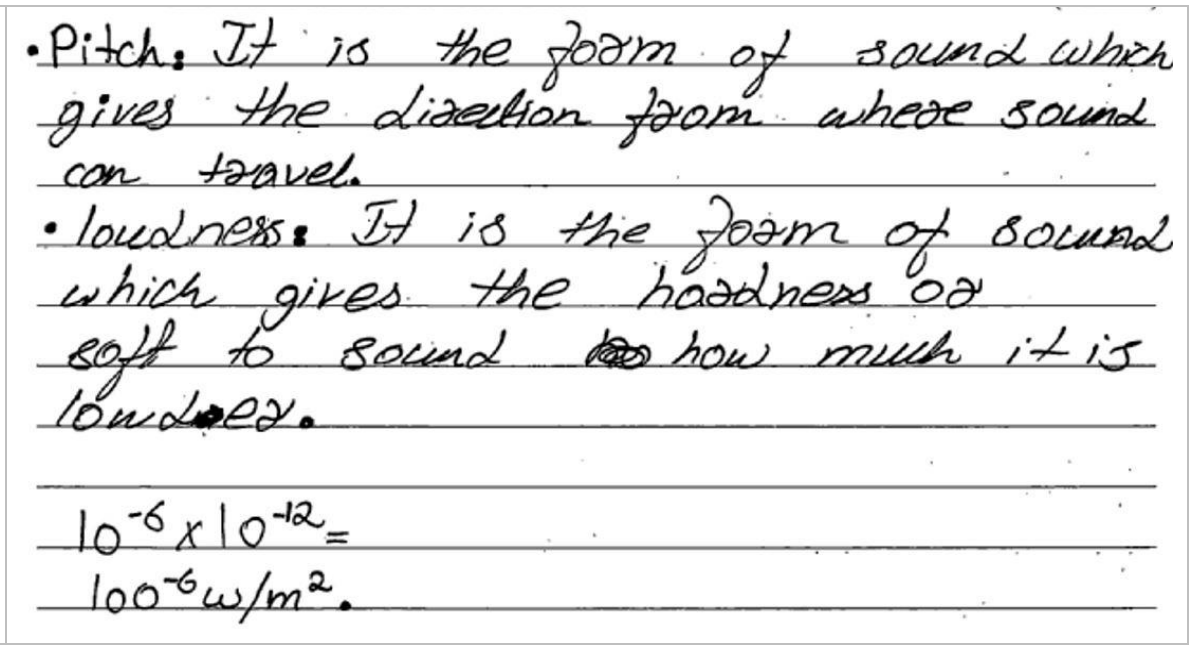
Any Additional Suggestion:

- Candidates must be careful when taking square on both sides and at the time of division and multiplication.
- Candidates must be well versed in writing the correct and most suitable formula and SI unit(s) of quantities as well.

Question No. 6b	
Question Text	i. Define the terms, 'pitch' and 'loudness' of sound. ii. The intensity of a source of sound is 10^{-6} W/m^2 and the intensity of faintest audible sound is 10^{-12} W/m^2. Calculate the sound level of the source.
SLO No.	11.2.1, 11.2.5
SLO Text	Define the terms pitch, loudness, and quality of sound. Solve word problems related to the intensity level of sound.
Max Marks	06
Cognitive Level	A
Checking Hints	1 mark for each definition (2 required). 1 mark for writing the correct formula. 1 mark for writing the correct substitution. 1 mark for taking the correct logarithm. 1 mark for writing the correct answer.

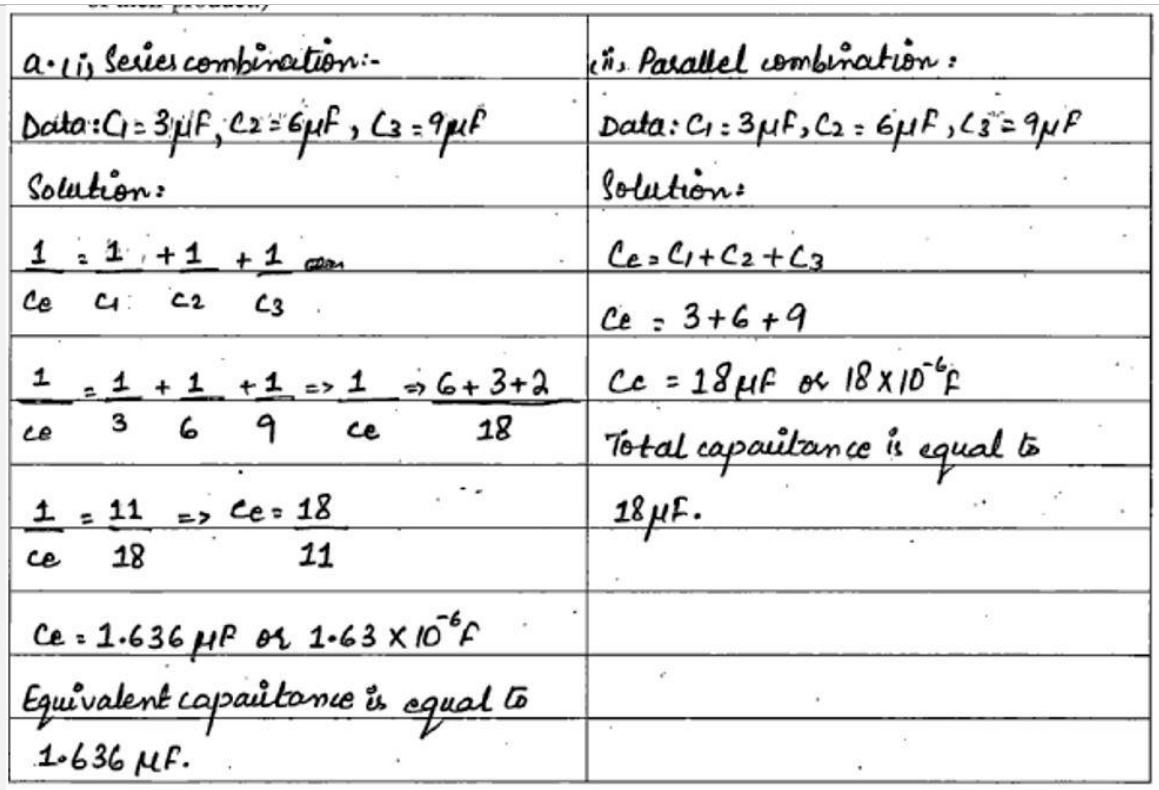
Overall Performance	The question proved to be challenging for the candidates, for instance, while calculating sound level of the source, they were unable to take logarithm and anti-logarithm of the values. However, many candidates demonstrated a strong performance on the question by providing accurate definitions and correct calculations, resulting in full marks. Conversely, candidates with weaker understanding of exponents and logarithm rules, coupled with unfamiliarity with the correct formula, did not score any marks. To enhance overall performance, reinforcing the concepts of exponents and logarithms and emphasising the application of appropriate formulas would be beneficial. Constructive feedback is essential for their continued progress.
Description of Better Responses	Better responses showcased a strong understanding, providing accurate definitions for both terms and correct calculations regarding the sound level of the source, supported by appropriate data. Well-responded responses demonstrated proficiency in solving the logarithmic term using the power law of logarithms, resulting in precise outcomes and earning full marks. The cohort's ability to exhibit clarity and accuracy in explanations reflects their comprehensive grasp of concepts and adept application of relevant mathematical principles. Encouraging continued practice and understanding of logarithmic principles will further enhance their performance in similar assessments.
Image of Better Response	**PITCH:** Pitch is a characteristic of sound through which we can distinguish between grave and shrill sound. Pitch is dependent upon frequency; higher the frequency higher the pitch shriller the sound & vice versa. **LOUDNESS:** Loudness is a characteristic of sound through which we can distinguish between loud and faint sound. It is dependent upon amplitude, area of the vibrating body and distance from the vibrating body. ii. $L - L_0 = K \log \frac{I}{I_0}$ $\therefore K = 10$ $I = 10^{-6}$ $I_0 = 10^{-12}$ $L - L_0 = 10 \log \frac{10^{-6}}{10^{-12}}$ $L - L_0 = 10 \log 10^{-6+12}$ $L - L_0 = 10(6) \log 10$ $\because \log 10 = 1$ $L - L_0 = 60(1)$ $L - L_0 = 60 W/m^2$
Description of Weaker Responses	Weaker responses highlighted inaccurate definitions, with some candidates interchanging the definitions of pitch and loudness. Others omitted the definitions altogether, resulting in lost marks. Additionally, some candidates incorrectly applied the formula and performed logarithmic calculations, leading to zero marks. To enhance overall performance, candidates should focus on understanding and accurately defining the terms. Emphasising the correct application of formulas and providing more practice opportunities will aid in their comprehension and lead to improved performance in similar assessments.

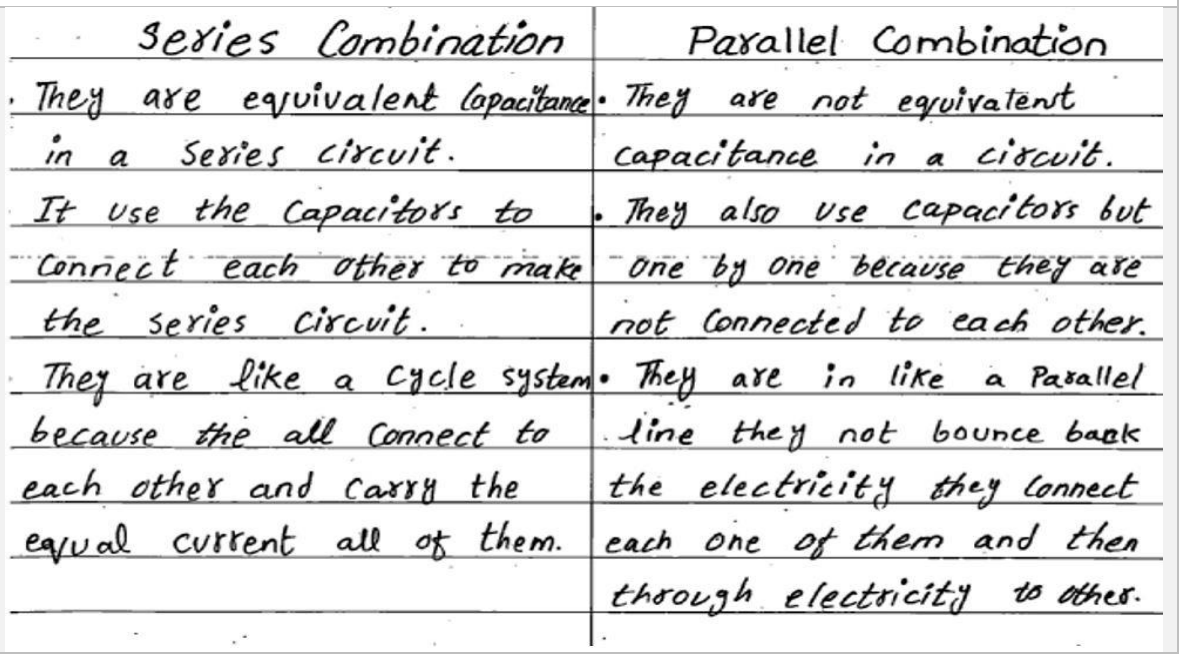
Image of Weaker Response	

Suggestions for improvement (Tick all that apply)

How to Approach SLO	Pedagogy Used for that SLO	Assessment Strategies
• Understand the expectations of the command words • Look at the cognitive level • Identify the content that is required to answer that question (both in terms of understanding of concepts and any skills that may be required like analysing or evaluating) • Go through the past paper questions on that particular concept • Refer to the resource guide for extra resources	• Story Board • Cause and Effect • Fish and Bone • Concept Mapping • Audio Visual resources • Think, Pair and Share • 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:
To help students gain a good understanding of exponent and logarithm rules that are useful in this type of question, a teacher can provide a clear and simple explanation of what exponents and logarithms are, use real-life examples to make the concepts more relatable, visual aids like diagrams, charts, and graphs can help illustrate the principles of exponents and logarithms and give students plenty of practice problems that start with basic concepts and gradually become more complex. This helps reinforce their understanding.

Question No. 7a	
Question Text	Calculate the equivalent capacitance of three capacitors 3 μF, 6 μF and 9 μF in a circuit if they are connected in i. series combination. ii. parallel combination.
SLO No.	13.8.4
SLO Text	Apply the concept of the effective/ equivalent capacitance of a number of capacitors connected in series and in parallel to solve related word problems.
Max Marks	06
Cognitive Level	A
Checking Hints	1 mark for each mathematical step used in the calculation (5 required). 1 mark for writing the correct SI unit.
Overall Performance	It was observed that several candidates attempted 7A instead of 7B, securing full marks. During series combination, some candidates failed to complete the final step of finding Ce, stopping their calculation at 1/Ce and resulting in a one-mark deduction. Encouraging candidates to thoroughly execute all steps in their calculations will enhance performance. The majority performed well, but providing extra guidance on the entire process will assist those who overlooked the final step, leading to better performance on the concept of capacitance. Constructive feedback will aid their progress and understanding.
Description of Better Responses	Better responses accurately provided the formulas for series and parallel combinations, effectively substituted values, and obtained precise answers, while also mentioning the appropriate SI units. Some candidates who omitted writing the formula but performed accurate substitutions received good marks, though not full. To further enhance performance, encouraging all candidates to include relevant formulas in their responses will reinforce their understanding and presentation skills. Acknowledging their adept substitution skills while emphasizing the significance of presenting complete solutions will contribute to improved scores in similar assessments. Constructive feedback will support their continued progress.
Image of Better Response	

Description of Weaker Responses	Weaker responses lacked relevant information about series or parallel combination properties, and some included irrelevant wording, resulting in zero marks. To improve, candidates should focus on accurately presenting the properties of series and parallel combinations while avoiding unrelated content. Providing clearer instructions and examples will enhance their understanding and enable more effective responses in future assessments. Constructive feedback can guide candidates towards more relevant and coherent answers, supporting their progress and demonstrating their knowledge more effectively.
Image of Weaker Response	

Suggestions for improvement (Tick all that apply)

How to Approach SLO	Pedagogy Used for that SLO	Assessment Strategies
• Understand the expectations of the command words • Look at the cognitive level • Identify the content that is required to answer that question (both in terms of understanding of concepts and any skills that may be required like analysing or evaluating) • Go through the past paper questions on that particular concept • Refer to the resource guide for extra resources	• Story Board • Cause and Effect • Fish and Bone • Concept Mapping • Audio Visual resources • Think, Pair and Share • 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:
Subject teachers may effectively teach the differences between series and parallel combinations of capacitors and resistances by providing a straightforward explanation of what series and parallel combinations are in the context of capacitors and resistances, use diagrams, schematics, or interactive simulations to illustrate the concepts of series and parallel combinations. If possible, conduct hands-on demonstrations in the classroom to physically show how series and parallel combinations work. This can include setting up circuits with real capacitors and resistors and assign homework and practice problems that require students to apply their knowledge of series and parallel combinations. Provide feedback and review solutions in class.

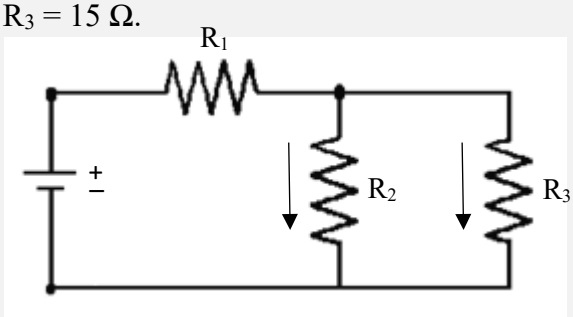
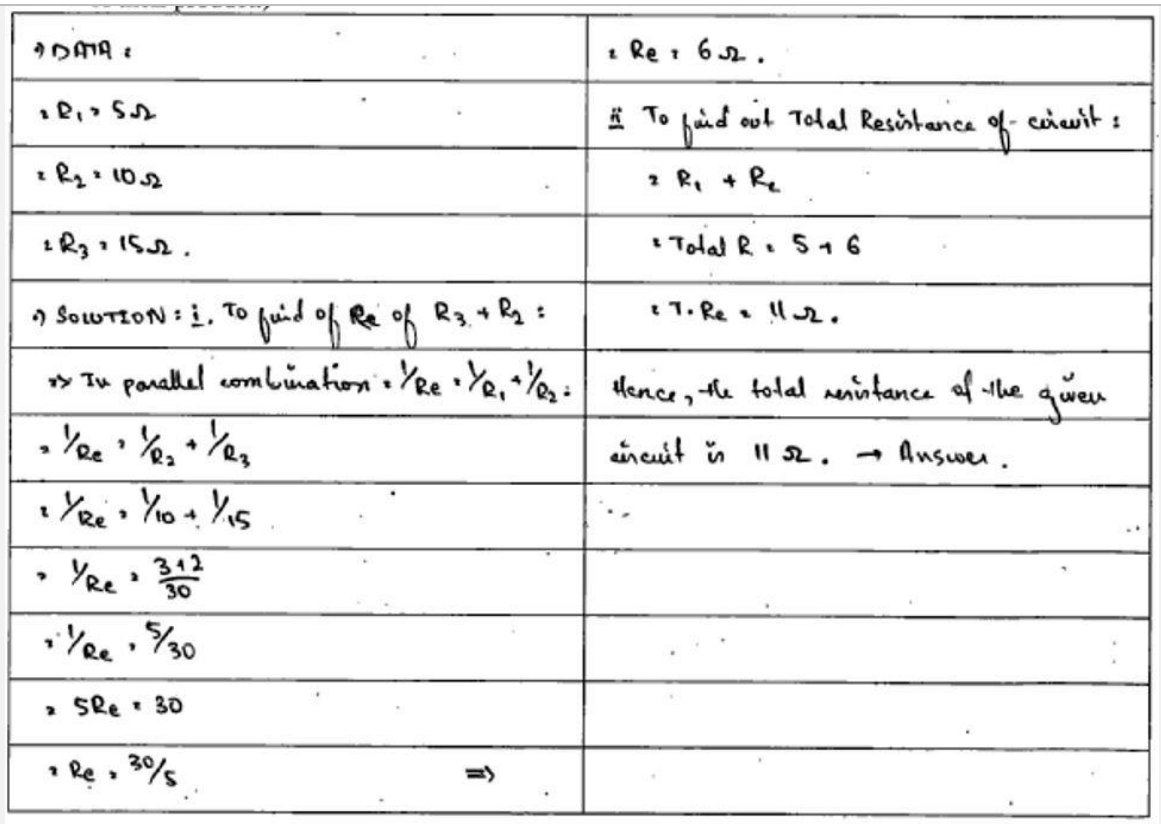
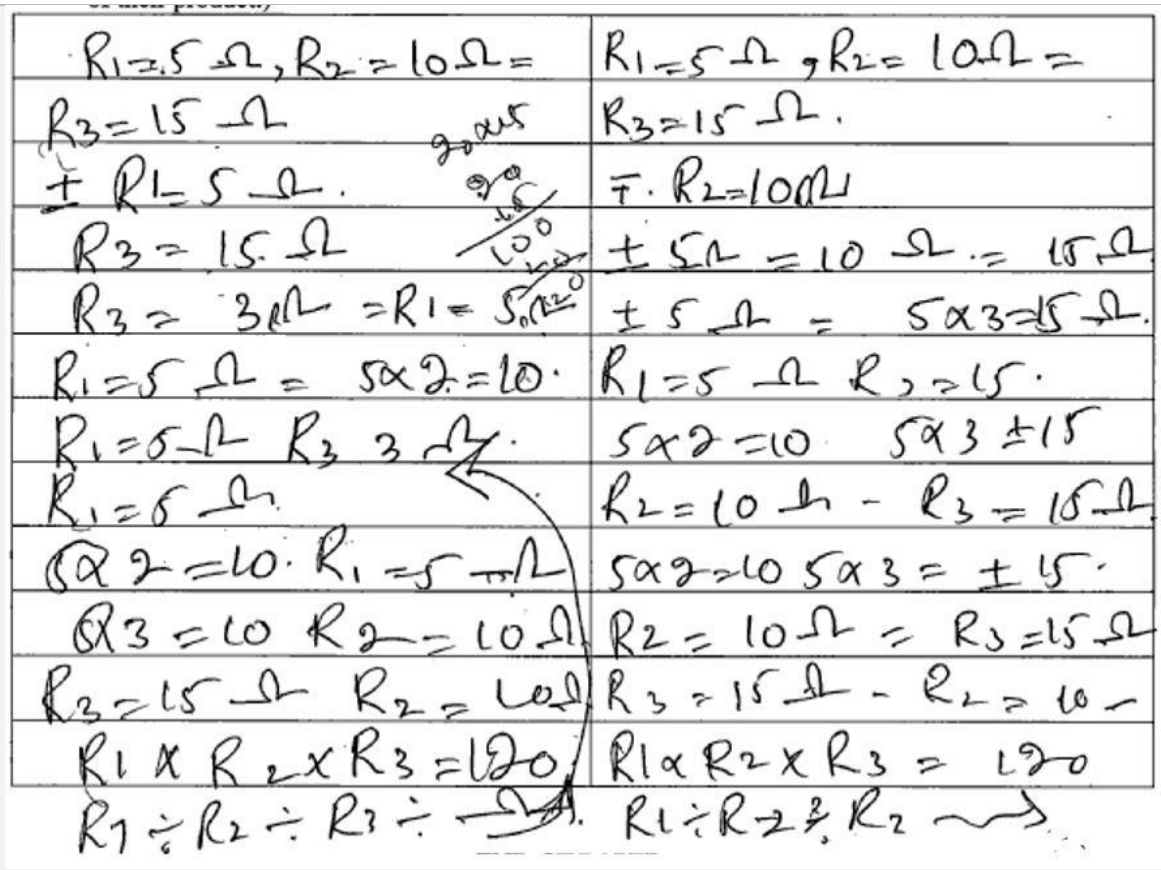
Question No. 7b	
Question Text	Calculate the total resistance in the given circuit, where R_1 = 5 Ω, R_2 = 10 Ω and R_3 = 15 Ω.  (**Note**: Please remember that R_2 and R_3 are in parallel combination and R_1 is in series combination of their product.)
SLO No.	14.4.4
SLO Text	Solve word problems related to simple series and parallel combinations of resistors.
Max Marks	06
Cognitive Level:	A
Checking Hints	1 mark for each mathematical step. (5 required) 1 mark for writing the correct SI unit.
Overall Performance	In this part of the question, candidates accurately provided the formulas for series and parallel combinations, effectively substituted values, and obtained precise answers, while also mentioning the appropriate SI units. Some candidates who omitted writing the formula but performed accurate substitutions received good marks, though not full. To further enhance performance, encouraging all candidates to include relevant formulas in their responses will reinforce their understanding and presentation skills. Acknowledging their adept substitution skills while emphasising the significance of presenting complete solutions will contribute to improved scores in similar assessments. Constructive feedback will support their continued progress.
Description of Better Responses	Better responses showcased a clear understanding by effectively utilising the formulas for parallel and series combinations, accompanied by accurate calculations and appropriate SI units, earning full marks. Some candidates who did not explicitly mention the formulas but demonstrated adept substitution skills and obtained accurate answers received good marks, though not full. Encouraging all candidates to include relevant formulas in their responses will further enhance their understanding of the concept. Emphasizing the importance of providing complete solutions will lead to improved scores in similar assessments.

Image of Better Response	
Description of Weaker Responses	In weaker responses, candidates attempted to derive the formulas for series and parallel combinations, which resulted in errors and incorrect results. Some candidates used improper mathematical operations or made calculation mistakes, leading to inaccurate answers. Additionally, a few responses lacked seriousness or provided irrelevant content, leading to a zero score. To improve, candidates should focus on applying the correct formulas directly rather than deriving them. Practicing problem-solving techniques and conducting careful calculations will help avoid errors and secure higher marks in future assessments. Encouraging them to approach questions seriously will also enhance their performance.
Image of Weaker Response	

Suggestions for improvement (Tick all that apply)

How to Approach SLO	Pedagogy Used for that SLO	Assessment Strategies
• Understand the expectations of the command words • Look at the cognitive level • Identify the content that is required to answer that question (both in terms of understanding of concepts and any skills that may be required like analysing or evaluating) • Go through the past paper questions on that particular concept • Refer to the resource guide for extra resources	• Story Board • Cause and Effect • Fish and Bone • Concept Mapping • Audio Visual resources • Think, Pair and Share • 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:

Teachers can guide their students to effectively extract the correct data, use the right formula, and include SI units when solving word problems by explaining the problem-solving process step by step, emphasising the importance of identifying given data and required information, provide plenty of example problems, both in class and as homework, where students practice identifying relevant data and applying the appropriate formula, teach students how to read and analyse word problems carefully, encourage them to underline or highlight key information and clearly state what is given and what is needed, ensure students are familiar with the relevant formulas and equations, encourage critical thinking by asking follow-up questions that require students to justify their choices of data, formulas, and units.

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.)

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These contributors include:

• Dr Sumera Anjum, Lead Specialist, Curriculum and Examination Development, AKU-EB

• Rabia Nisar, Specialist, Assessment, AKU-EB

• Sania Iqbal Siddiqui, Specialist, Curriculum and Examination Development, AKU-EB

• Dur Nasab, Associate, Curriculum Development, AKU-EB

• Munira Muhammad, Lead Specialist, Assessment, AKU-EB

• Zain Muluk, Manager, Examination Development, AKU-EB

• Raabia Hirani, Manager, Curriculum Development, AKU-EB

• Ali Aslam Bijani, Manager, Teacher Support, AKU-EB

• Dr Shehzad Jeeva, CEO, AKU-EB