آغا خان یونیورسٹی ایگزامینیشن بورڈ

AGA KHAN UNIVERSITY EXAMINATION BOARD

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

Introduction

This document has been produced for the teachers and candidates of the Secondary School Certificate (SSC) Part I Physics examination. It contains comments on candidates' responses to the 2025 SSC Part I Examination, indicating the quality of the responses and highlighting their relative

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 study. Candidates are advised to read and comprehend each question carefully before writing the response to fulfill 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. It is imperative to refer to the command word guide available on the AKU-EB website for understanding the expectations of the command word.

General Observations

Generally, candidates did not perform very well in terms of clarity, accuracy and demonstrating a solid understanding of the concepts. They used command words effectively, answering the questions as required (e.g., explaining, calculating, or comparing). Candidates performed comparatively well in questions related to significant figures, Earth and space, and evaporation. However, certain areas require improvement, such as questions based on stability, the process of heat transfer, motion due to gravity, momentum, power, and pressure in liquids. Responses in these topics may have been incomplete or lacked sufficient detail, suggesting that candidates were less confident or less knowledgeable in these topics. There may have been issues with the correct interpretation and application of command words, resulting in responses that did not fully meet the requirements of the questions.

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	i. How many significant figures are there in 0.0102030? ii. List the rules of significant figures applied on the number given part (i).
SLO No.	1.7.3
SLO Text	Apply the rules for rounding a number to the given number of significant figures to solve problems.
Max Marks	02
Cognitive Level	U*
Checking Hints	1 mark for writing the correct number of significant figures 1 mark for writing any ONE rule
Overall Performance	Many candidates demonstrated a clear understanding of key concepts, such as the significance of trailing zeros in decimals and the exclusion of placeholder zeros before the first non-zero digit.
Description of Better Responses	*Better responses* correctly identified 6 significant figures in the given number and mentioned any ONE of the rules of significant figures that includes: precisely listing all relevant rules, counting non-zero digits, recognising significant middle and trailing zeros and excluding non-significant leading zeros. The responses stood out for their clear, error-free presentation and logical organisation of concepts. These responses served as an excellent example of how to systematically approach significant figures, demonstrating both knowledge and attention to detail.
Image of Better Response	6 significant Figures List the rules of significant figures applied on the number given part (i). 1) All number From 1 to 9 are significant Figures. 2) In decimal, ending zeros are also significant Figures. 3) Zero between numbers ~~ats~~ are also significant Figure 4) Starting zeros of decimal are not significant Figures.
Description of Weaker Responses	*Weak responses* demonstrated a fundamental misunderstanding of the task, presenting answers in a disorganised table format with irrelevant terms (Like 10 or 20) instead of clearly stating the number of significant figures. The responses incorrectly suggested "three significant figures" without proper justification. These indicated either a lack of attention to the question or severe confusion about significant figures. Some candidates made errors, either omitting the trailing zero (resulting in 5 significant figures) or mistakenly including leading zeros.
Image of Weaker Response	There are three significant figures in 0.0102030 Like 10 20 30 in it. List the rules of significant figures applied on the number given part (i). significant figures applied on the number is 0.0102030 . 00.102030 . 001.02030 they are applied on the numbers

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 Suggestions:

- To improve, the candidates must focus on learning the basic rules (e.g., non-zero digits, trailing/ leading zeros). Such responses require targeted remediation, including worked examples and step-by-step guidance, to address both conceptual gaps and exam technique.

- Teachers are encouraged to teach their students to identify significant figures by focusing on three key cases: leading zeros (never count), captive zeros (always count), and trailing zeros in decimals (always count). Use examples like 0.001 (1 sig fig), 202 (3 sig figs), and 3.00 (3 sig figs) to demonstrate these rules in action, ensuring students can apply them consistently. This builds confidence in handling edge cases and ensures students can apply significant figure rules accurately in experiments, calculations, and tests.

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

Question No. 2	
Question Text	Describe the THREE states of equilibrium on the basis of the centre of gravity.
SLO No.	4.6.1
SLO Text	Explain the effects of the position of the centre of gravity on the stability of simple objects.
Max Marks	03
Cognitive Level	U
Checking Hints	1 mark for describing each state of equilibrium (3 required) **Note**: No mark will be awarded for mentioning the name only.
Overall Performance	A few candidates correctly defined all three states and effectively used the concept of centre of gravity (CoG) against each case. The responses clearly distinguished between the states based on CoG movement. Overall, the performance was unsatisfactory, unable to demonstrate a solid conceptual understanding, and attention to detail in descriptions also required improvement.

Description of Better Responses	*Better responses* demonstrated understanding of the three equilibrium states by correctly naming them and linking each to the centre of gravity. These responses described stable equilibrium as returning to the original position, unstable as toppling and neutral as maintaining position, core concepts that show conceptual grasp.
Images of Better Responses	Stable equilibrium: An object slightly tilted from its original position and comes back to its mean position due to the rise of centre of gravity. Unstable equilibrium: Object falls down (change its position) due to change in centre of gravity. Nuetral equilibrium: An object rolling down at a particular position due to constant C.G
Description of Weaker Responses	*Weaker responses* failed to address the question's requirements, providing answers that are entirely unrelated to the three states of equilibrium based on the centre of gravity. These responses listed vague statements such as "It is vertically downwards" and "The change in position of a body", which do not define stable, unstable or neutral equilibrium. Additionally, the repetition of "vertically downwards" without context or explanation showed a fundamental misunderstanding of the topic.
Images of Weaker Responses	1) It is vertically downwards. 2) The change in Position of a body. 3) Centre of gravity has vertically downwards position.

Suggestions for improvement (Highlight all that apply)

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Any Additional Suggestions:

- To improve, the candidates must first learn the basic definitions of each equilibrium state and practice connecting them to the behaviour of the centre of gravity when objects are displaced. Structured revision with clear examples (e.g., a book for stable equilibrium, a pencil for unstable) would help bridge this gap.

- Use diagrams showing how the centre of gravity affects equilibrium (e.g., stable is low CoG, unstable is high CoG). Visual aids help students grasp abstract ideas like "restoring force" in stable equilibrium.

Question No. 3	
Question Text	The orbits of comets are large and elliptical as compared to the orbits of planets which are smaller and circular. Describe the difference in the shapes of orbits with the help of TWO reasons.
SLO No.	5.5.4
SLO Text	Explain that the orbit of a comet differs from that of a planet.
Max Marks	02
Cognitive Level	U
Checking Hints	1 mark for describing each reason (Any 2 required)
Overall Performance	Candidates struggled to accurately describe the difference between comets' and elliptical orbits are circular. Some responses correctly mentioned gravitational influence and distance from the Sun as key factors.
Description of Better Responses	*Better responses* correctly identified the key differences between cometary and planetary orbits by stating that comets have elliptical shapes while planets have circular ones. These responses provided two relevant points: (1) the distinct shapes of orbits (elliptical vs. circular) and (2) the difference in orbital distances (comets "revive with nearest distance", likely referring to their highly eccentric paths).
Image of Better Response	① Comets have elliptical shapes and planets have circular shape. ② Because comets revolve with nearest distance and planets revolve far away so that's why there is a shape difference one have elliptical and second have circular.
Description of Weaker Responses	*Weaker responses* demonstrated a basic understanding of orbital differences but included several inaccuracies. The first reason incorrectly attributed the orbit size solely to distance from the Sun, overlooking factors like orbital velocity and angular momentum. The second reason inaccurately linked magnetic fields to orbit shape, which is determined by gravitational forces and initial momentum, not magnetic properties.
Image of Weaker Response	1. Asteroids are farther away from the sun than planets so the sun's gravitional pull isn't aiting strongly making their orbits larger. 2. Asteroids do not have their own magnetic field and planets do so the shape of their orbit is not defined and is elliptical.

Suggestions for improvement (Highlight all that apply)

Maximising SLO Achievement	Preferred Pedagogy Used for this SLO	Assessment Strategies
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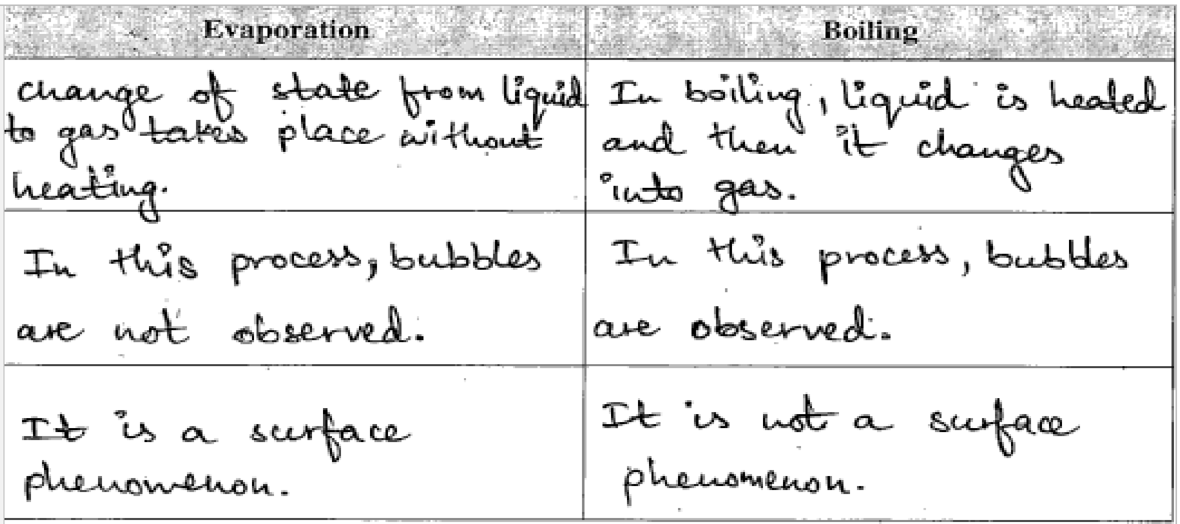
Any Additional Suggestions:

- To improve, candidates should use precise scientific terms (e.g., "eccentric" for elliptical orbits) and clarify the role of gravitational forces in shaping these paths.

- These responses would be strengthened by focusing on key astronomical concepts, such as how gravitational pull decreases with distance (inverse-square law) and how elliptical orbits result from specific velocity and position conditions.

Question No. 4	
Question Text	Write any THREE differences between evaporation and boiling.
SLO No.	8.6.2
SLO Text	Differentiate between boiling and evaporation.
Max Marks	03
Cognitive Level	U
Checking Hints	1 mark for EACH difference (Any 3 required)
Overall Performance	Some candidates accurately distinguished evaporation and boiling, highlighting temperature requirements, bubble formation and energy sources. The responses used clear comparisons (e.g., surface vs. bulk process) and correct terminology.
Description of Better Responses	*Better responses* clearly and accurately distinguished between evaporation and boiling by highlighting three key scientific differences: (1) the requirement of heating (boiling requires heat while evaporation does not), (2) bubble formation (absent in evaporation but present in boiling), and (3) the nature of the process (surface phenomenon vs. bulk phenomenon). These responses used precise terminology and maintained a logical structure, making it easy to understand.

Image of Better Response

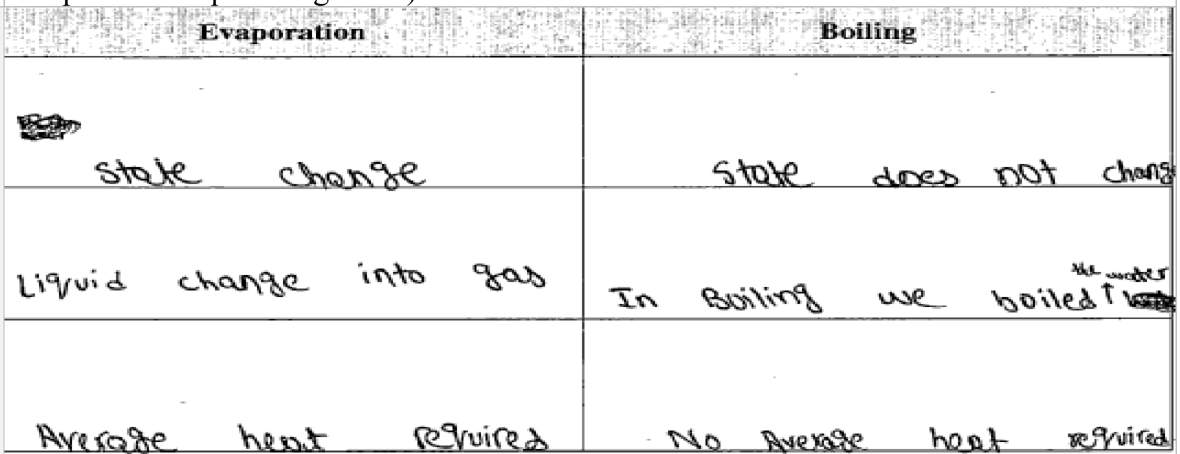


Evaporation	Boiling
change of state from liquid to gas takes place without heating.	In boiling, liquid is heated and then it changes into gas.
In this process, bubbles are not observed.	In this process, bubbles are observed.
It is a surface phenomenon.	It is not a surface phenomenon.

Description of Weaker Responses

Weaker responses failed to address the question meaningfully, providing answers that are entirely unrelated to the scientific concepts of evaporation and boiling. These responses included unusual statements like “State change” and “State does not change”, or “state change solid to liquid”, which demonstrate no understanding of the topic. Additionally, phrases such as “Average heat flowing” and “In boiling we boiled water" were vague and scientifically incorrect, offering no valid comparison between the two processes. Such answers suggest either severe misunderstanding or a lack of effort.
Weaker answers also contained errors like confusing states (boiling is converting solid into liquid) or irrelevant points (snake change). Some mixed-up concepts (e.g., claiming evaporation requires high heat).

Image of Weaker Response



Evaporation	Boiling
State change	State does not chang
Liquid change into gas	In Boiling we boiled the water
Average heat required	No Average heat required

Suggestions for improvement (Highlight all that apply)

Maximising SLO Achievement	Pedagogy Used for that SLO	Assessment Strategies
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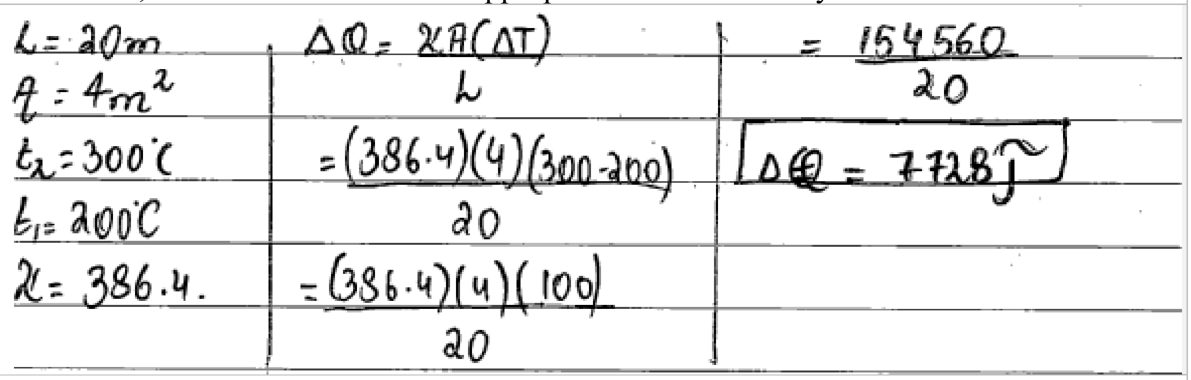
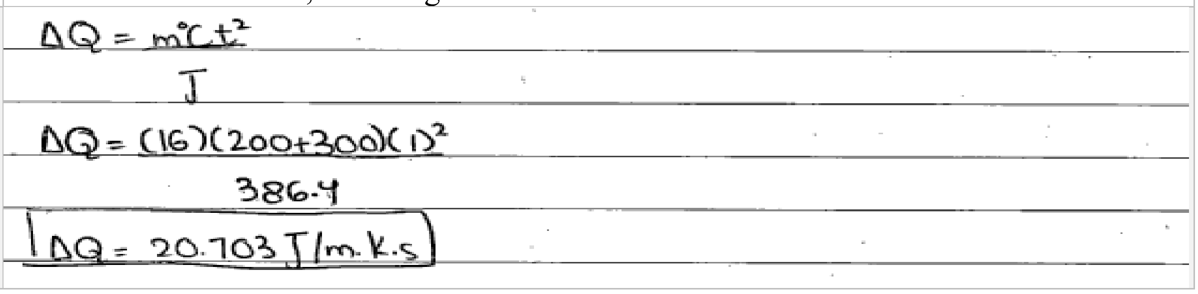
Any Additional Suggestions:

- Ensure students understand the fundamental differences (e.g., temperature dependence, bubble formation, surface vs. bulk process) using real-life examples (e.g., drying clothes vs. boiling water).

- Teachers are encouraged to teach students to present differences in a table format with clear, parallel points (e.g., “Evaporation: Occurs at any temperature, while Boiling: Only at the boiling point”).

Question No. 5	
Question Text	A copper rod is 20 m long with a cross-sectional area of 4 m^2. If its two ends are kept at temperatures 200ºC and 300ºC respectively, calculate the amount of heat flowing across the rod in one second. (**Note**: Take the co-efficient of thermal conductivity as 386.4 J/m.K.s.)
SLO No.	9.1.5
SLO Text	Solve word problems based on the thermal conductivity of solid conductors.
Max Marks	03
Cognitive Level	A
Checking Hints	1 mark for using the correct formula 1 mark for the correct substitution 1 mark for writing the correct answer with the SI unit
Overall Performance	The candidates’ responses revealed a range of understanding, with a few demonstrating strong problem-solving skills while others struggled with key concepts. These responses correctly applied the heat conduction formula with accurate substitutions.
Description of Better Responses	*Better responses* demonstrated a clear understanding of the heat conduction problem by correctly applying the formula Q = kAΔT / L or Q/t=kAΔT / L and arrived at the accurate result of 7728 J with clear, logical steps. For instance, they properly identified the given values of thermal conductivity, cross-sectional area, temperature difference and rod length and systematically calculated the heat flow accurately. Their solutions were logically structured, with minimal errors and appropriate unit consistency.
Image of Better Response	
Description of Weaker Responses	*Weaker responses* misunderstood the thermal conduction problem. The candidates used an entirely incorrect formula (ΔQ = m²t²/J) that bears no relation to heat transfer principles, leading to a nonsensical calculation and result (20.103 J/ m.k.s). Critical errors included squaring irrelevant quantities and failing to use the given conductivity value meaningfully. Such responses showed no grasp of the relationship between temperature difference, material properties, and heat flow. Moreover, units were mishandled, revealing a lack of basic dimensional awareness.
Image of Weaker Response	

Suggestions for improvement (Highlight all that apply)

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Any Additional Suggestions:

- Ensure students understand and correctly apply the heat conduction formula:
  Highlight each variable's meaning (k = conductivity, A = area, ΔT = temp difference, L = length).
- Emphasise using consistent units (e.g., metres for length, Kelvin/Celsius for temperature). Many errors arose from mixing units (e.g., "cm" or incorrect Kelvin conversions).
- To further improve, candidates should ensure all work is neatly presented and double-check arithmetic for precision.

Extended Response Questions (ERQs)

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

Question No. 6a	
Question Text	Zohan dropped a ball from a certain height. Its final velocity becomes 25 m/s when it reaches the ground. Now from the same height, if he throws the ball vertically downward with an initial velocity of 25 m/s, then calculate its final velocity. (**Note**: Take the value of acceleration due to gravity as 9.8 m/s^2.)
SLO No.	2.10.1
SLO Text	Solve word problems related to freely falling bodies.
Max Marks	06
Cognitive Level	A
Checking Hints	1 mark for extracting the correct data 1 mark for writing the correct formula 1 mark for substituting the correct value in the formula 1 mark for finding the correct value of height 1 mark for substituting the correct value in the formula 1 mark for calculating the correct value of the final velocity
Overall Performance	Most of the candidates attempted part B. However, the candidates who attempted this revealed a wide range of understanding, with a few demonstrating clear application of kinematic equations.

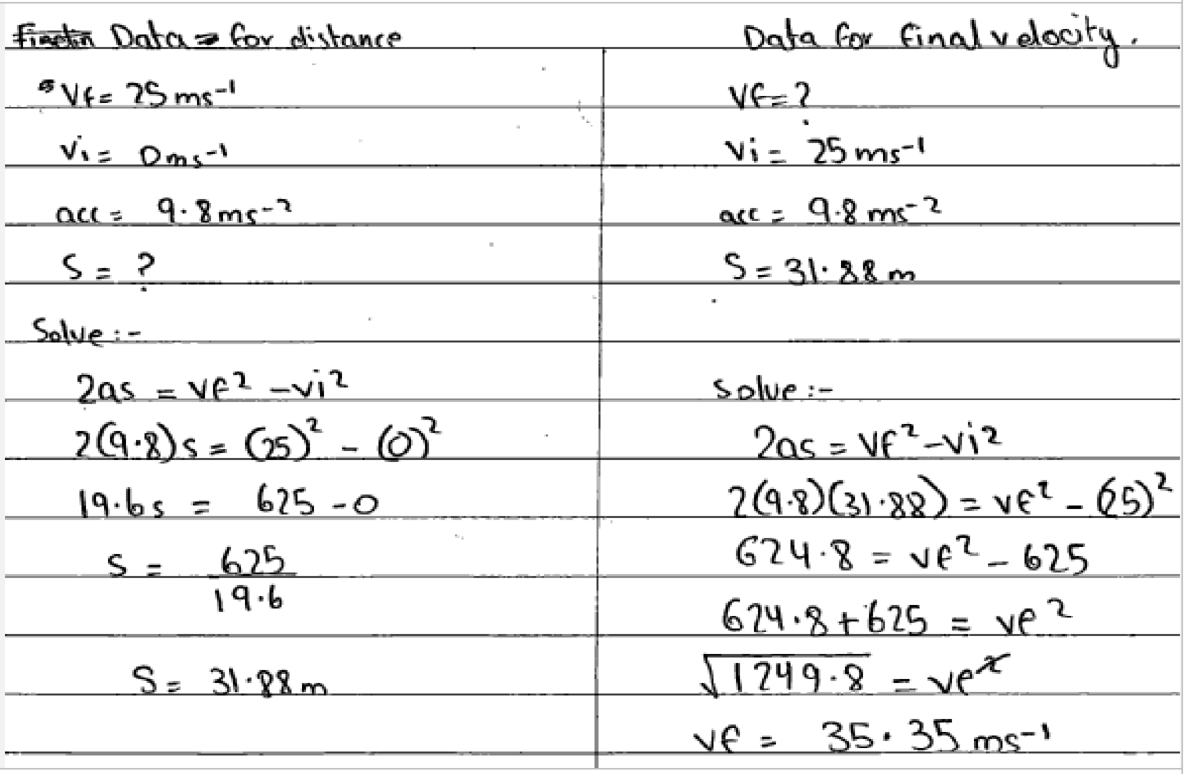
Description of Better Responses	*Better responses* demonstrated a strong understanding of kinematic principles by correctly identifying and applying the relevant equations of motion. They systematically substituted the given values (initial velocity $v_i = 0$ m/s, acceleration $a = 9.8$ m/s^2 and final velocity $v_f = 25$ m/s) into the formula $2as = v_f^2 - v_i^2$ to solve for distance and final velocity. The calculations were precise, and units were consistently maintained, leading to plausible physical results.
Image of Better Response	 ~~Finction~~ Data for distance $V_f = 25\ ms^{-1}$ $V_i = 0\ ms^{-1}$ $acc = 9.8\ ms^{-2}$ $S = ?$ Solve :- $2as = vf^2 - vi^2$ $2(9.8)s = (25)^2 - (0)^2$ $19.6s = 625 - 0$ $s = \frac{625}{19.6}$ $S = 31.88\ m$ Data for final velocity. $V_f = ?$ $V_i = 25\ ms^{-1}$ $acc = 9.8\ ms^{-2}$ $S = 31.88\ m$ Solve :- $2as = vf^2 - vi^2$ $2(9.8)(31.88) = vf^2 - (25)^2$ $624.8 = vf^2 - 625$ $624.8 + 625 = vf^2$ $\sqrt{1249.8} = vf^2$ $vf = 35.35\ ms^{-1}$
Description of Weaker Responses	*Weaker responses* demonstrated fundamental misunderstandings of physics principles. These candidates incorrectly added velocity and acceleration units directly (25 m/s + 9.8 m/s^2), resulting in an absurd final velocity of 245 m/s, which violates basic kinematic rules. The explanation (Zohan throws the ball vertically, that's why its velocity is 245 m/s) is incoherent and lacks logical or mathematical justification. Such errors reflected a failure to grasp the relationship between velocity, acceleration and time, as well as the proper application of kinematic equations. Weaker responses also misinterpreted the scenario by conflating dropped and thrown motions without addressing the physics of either. To improve, candidates must focus on understanding units, dimensional analysis, and the foundational equations of motion.

Image of Weaker Response	(EITHER) Part: A Now from same height and it initial velocity of 25m/s. when Zohan dropped a ball and it reaches the ground it's velocity is 25 m/s And If he throws ball vertically downward. Sol:- . 25 m/s × 9.8 m/s² = 245 m/s it's final velocity was 245 m/s² because in first zohan dropped the ball and in second zohan throws the ball vertically that's why it's velocity is 245 m/s².

Suggestions for improvement (Highlight all that apply)

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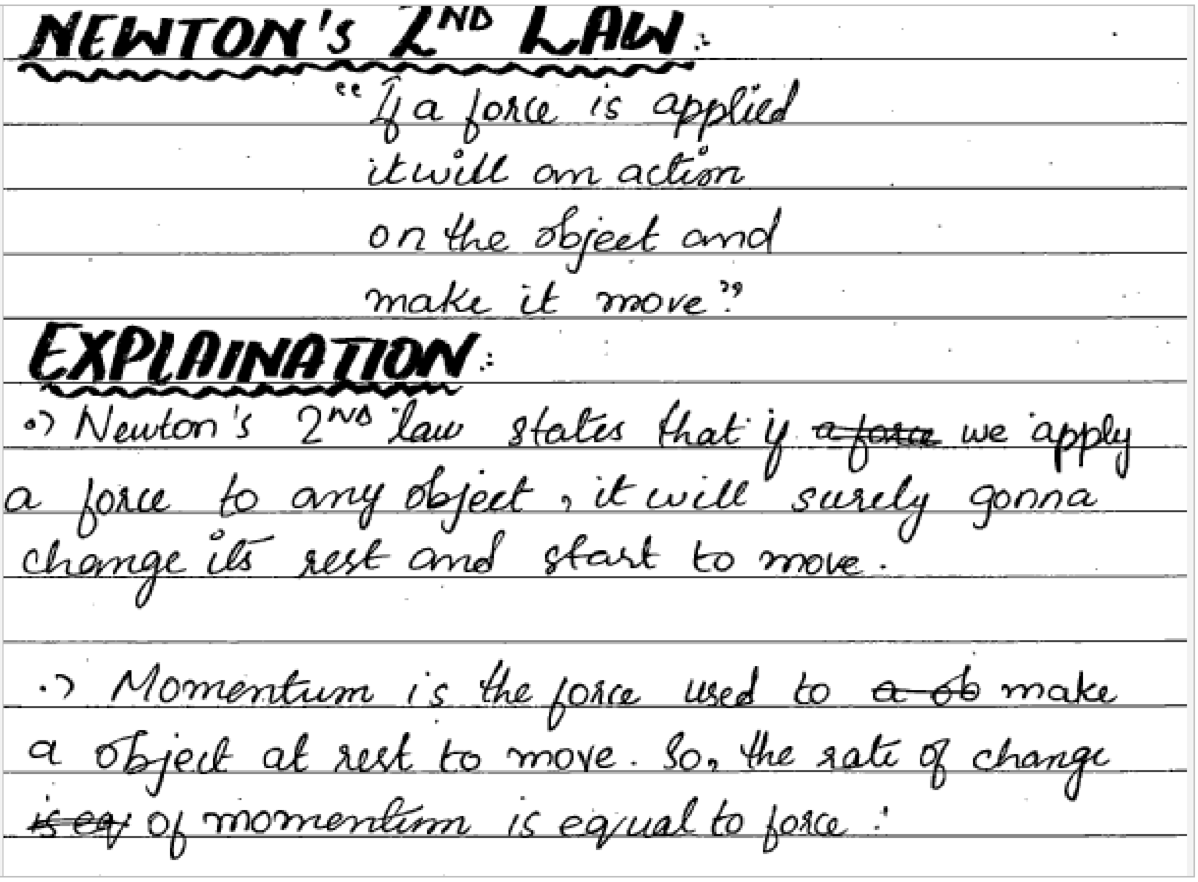
Any Additional Suggestions:

- Teachers must ensure students understand and correctly apply the key equations. Use labelled diagrams to map variables to real-world scenarios (e.g., dropped vs. thrown objects).
- Emphasise using consistent units (e.g., metres and seconds) and dimensional analysis to verify answers. Many errors arose from mixing units (e.g., mls instead of m/s).
- To improve, candidates should focus on mastering kinematic equations, dimensional analysis, and systematic problem-solving. Targeted practice with guided feedback would help bridge these gaps.

Question No. 6b	
Question Text	State and explain Newton's 2nd law of motion and prove that the rate of change of momentum is equal to force.
SLO No.	3.2.2
SLO Text	Explain the relationship between force and momentum.
Max Marks	06
Cognitive Level	U
Checking Hints	1 mark for each mathematical step. (6 required)
Overall Performance	The majority of the candidates attempted this part. The candidates' responses reveal a wide range of understanding, with a few demonstrating clear comprehension of Newton's second law. These candidates-maintained consistency in units and formulas, showcasing a solid grasp of the physics principles.
Description of Better Responses	*Better responses* demonstrated a thorough understanding of Newton's second law by clearly stating the principle (F = ma) and logically deriving its connection to momentum (F = Δp / Δt). These responses systematically showed the steps from initial and final momentum ($P_i = mv_i$, $Pf = mv_f$) to the rate of change of momentum ($\Delta P = m(v_f - v_i)$) and finally to the force equation (F = ΔP / t). The use of a structured table format enhanced readability, while proper notation and unit consistency reinforced the mathematical rigor.
Image of Better Response	•Newton's second law states that when a net force acts on an object, acceleration is produced in that object. This acceleration is directly propotional to Force applied on the object and inversely propotional to the mass of the object. ∴ F=ma. •The rate of change of momentum is also related to Newton's second law:- Pi = vi x m Pf = vf x m ΔP = Pf − Pi ΔP = (vf x m) − (vi x m) ∴ taking, m = mass, common:- ΔP = m (vf − vi) ∴ Since we've to found rate of change of momentum, so divide both sides by t: $\frac{\Delta P}{t} = \frac{m\,(vf - vi)}{t}$ ∴ $a = \frac{vf - vi}{t}$ $\frac{\Delta P}{t} = ma$ ∴ According to Newton's second law of motion ∴ F = ma $\frac{\Delta P}{t} = F$ $F = \frac{\Delta P}{t}$ Hence, the above derived equation proves that the rate of change of momentum is equa to the force.
Description of Weaker Responses	*Weaker responses* demonstrated significant misunderstandings of Newton's second law, as exemplified. These responses incorrectly rephrased the law and described momentum as "the force used to make an object move", showing no grasp of the relationship between force, mass, and acceleration. The explanation lacked any mathematical formulation or logical derivation. Such responses reflected a fundamental disconnect from the physics principles being tested. Some responses misstated the law, conflated it with other concepts (e.g., inertia or conservation of momentum) or included nonsensical equations (e.g., $F = m_1 - m_2\, t$, $F = t\, m_1 - m_2$). Common issues included incorrect proportionality, misuse of variables, and lack of mathematical rigor.

Image of Weaker Response


NEWTON'S 2ND LAW:

"If a force is applied
it will on action
on the object and
make it move"

EXPLAINATION:

•) Newton's 2ND law states that if ~~a force~~ we apply a force to any object, it will surely gonna change its rest and start to move.

•) Momentum is the force used to ~~a ob~~ make a object at rest to move. So, the rate of change ~~is eq~~ of momentum is equal to force.

Suggestions for improvement (Highlight all that apply)

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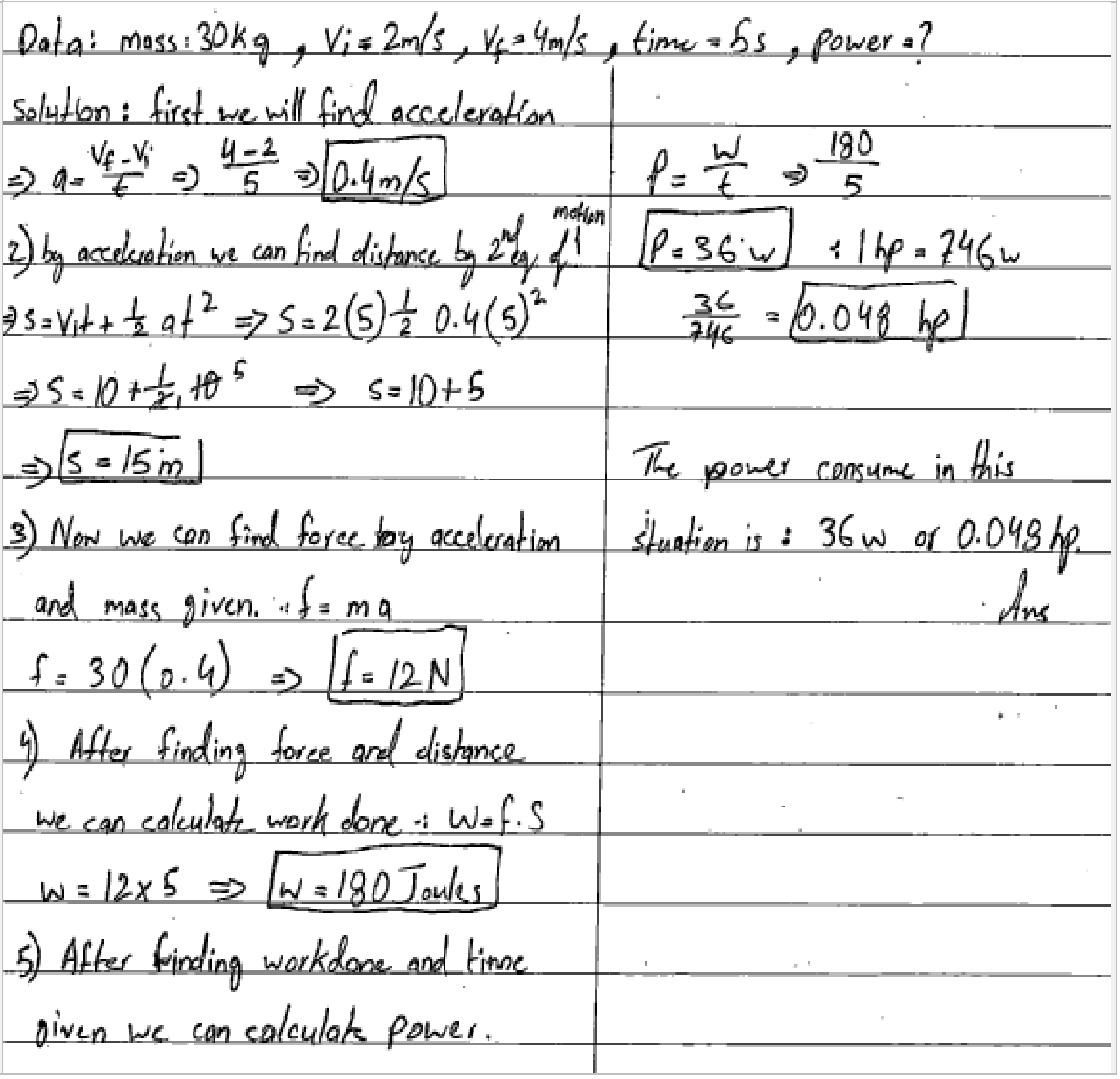
Any Additional Suggestions:

- Teachers must emphasise the correct definition: F = ma (Force = mass × acceleration). Use simple demonstrations (e.g., pushing objects of different masses) to show the relationship, and reinforce that momentum (P = mv) is a product of mass and velocity, not a "passing" entity.
- Ensure that students can derive and apply $F = \Delta p / \Delta t$ (Force = rate of change of momentum).
- Teachers are encouraged to focus on precise definitions, dimensional analysis and step-by-step derivations. Targeted practice with foundational problems would help bridge these gaps.

Question No. 7a	
Question Text	Sara has a mass of 30 kg. While running in the playground, she accelerates from 2 m/s to 4 m/s in 5 s. Calculate the power consumed in the given situation.
SLO No.	6.6.2
SLO Text	Solve word problems on the concept of power.
Max Marks	06
Cognitive Level	A
Checking Hints	1 mark for each mathematical step (6 required)
Overall Performance	Most of the candidates attempted this part of the question and the candidates' responses revealed a broad spectrum of understanding in solving the power calculation problem.
Description of Better Responses	*Better response* demonstrated a strong grasp of physics principles by systematically solving for acceleration, force, and distance before calculating power. The use of correct formulas (e.g., $F = ma$, $S = v_i t + \frac{1}{2} at^2$) and clear unit annotations (e.g., watts for power) reflected precision. Good responses demonstrated a systematic approach: correctly calculating acceleration (0.4 m/s^2), deriving distance (15 m) using kinematic equations and computing work (180 J) and power (36 W) with clear unit consistency. Candidates showcased logical progression and accurate application of formulas like $F = ma$ and $P = W/t$.
Image of Better Response	 Data: mass: 30kg, V_i = 2m/s, V_f = 4m/s, time = 5s, power = ? Solution: first we will find acceleration $\Rightarrow a = \frac{V_f - V_i}{t} \Rightarrow \frac{4-2}{5} \Rightarrow$ 0.4m/s 2) by acceleration we can find distance by 2nd eq of motion $\Rightarrow S = V_i t + \frac{1}{2} at^2 \Rightarrow S = 2(5) \frac{1}{2} 0.4(5)^2$ $\Rightarrow S = 10 + \frac{1}{2}.10 \Rightarrow S = 10+5$ $\Rightarrow$ S = 15m 3) Now we can find force by acceleration and mass given. ∴ f = ma f = 30(0.4) $\Rightarrow$ f = 12N 4) After finding force and distance we can calculate work done ∴ W = f.S W = 12x5 $\Rightarrow$ W = 180 Joules 5) After finding workdone and time given we can calculate power. $P = \frac{W}{t} \Rightarrow \frac{180}{5}$ P = 36 W ∴ 1hp = 746w $\frac{36}{746}$ = 0.048 hp The power consume in this situation is: 36w or 0.048hp. Ans

Description of Weaker Responses	*Weaker responses* demonstrated significant conceptual and mathematical errors. These responses incorrectly wrote arbitrary values (60 + 110 + 150) and subtracted 180 to arrive at an implausible "150 power", showing no connection to the given problem (mass = 30 kg, velocity change from 2 m/s to 4 m/s in 5 s). The calculations lacked any meaningful application of physics formulas (e.g., F = ma, P = W/t) and the units were entirely absent or incorrect. Such responses reflected a fundamental misunderstanding of the relationship between work, force, and power, as well as an inability to translate given data into actionable steps.
Image of Weaker Response	(EITHER) Part:- A Sara was mass of 30 kg and she is running in ground. And it accelerates from 2 m/s to 4m/s in 5 s The power consumed in the given situation Sol:- 30 × 2 = 60 30 × 4 = 120 30 × 5 = 150 60 + 120 + 150 = 330 − 180 = 150 it consumed in the given situation is 150 power.

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 Suggestions:

- Teachers are suggested to reinforce that Power (P) = Work / Time = (Force × Distance) / Time or P = F·v, not just P = ma / t, because many students confuse power with force or momentum and as well as the standard units (kg, m, s, W), and dimensional analysis. Make sure that students do not mix grams/kg or inventing units like "Ams" or "ω."

- Teachers are encouraged to teach students to:
  - List given data (m, Δv, t).
  - Calculate acceleration (a = Δv / t).
  - Find force (F = ma).
  - Compute work (W = F·d) or power (P = W / t).

Question No. 7b	
Question Text	i. Explain why the walls of a dam filled with water are usually wedge-shaped. Relate this to the pressure of liquid at different depths. ii. If the density of water is 1,000 kg/m^3, then calculate the depth of water in a dam when the pressure at the bottom is 1,00,000 Pa. (**Note**: Take the value of acceleration due to gravity as 9.8 m/s^2.)
SLO No.	7.5.4
SLO Text	Solve word problems on the concept of pressure beneath a liquid to depth and to density.
Max Marks	06
Cognitive Level	A
Checking Hints	i. 1 mark for writing each reason (3 required) ii. 1 mark for applying the correct formula of pressure. 1 mark for the correct substitution 1 mark for the correct answer
Overall Performance	The candidates' responses revealed a wide range of understanding regarding dam design and hydrostatic pressure calculations. These candidates logically connected the dam's structural design to pressure distribution and provided coherent solutions using the correct formula.
Description of Better Responses	*Better responses* demonstrated a strong understanding of hydrostatic pressure and dam design by correctly applying the formula P = ρgh and providing logical explanations for the wedge-shaped structure of dams. These responses systematically calculated pressure at different depths (e.g., 9,800 Pa at 1m and 49,000 Pa at 5m) with proper units and clear steps, showcasing a solid grasp of the relationship between depth, density, and pressure. These candidates also connected the dam's structural design to real-world physics principles, emphasising how wedge shapes distribute pressure effectively. While minor typographical errors (e.g., 98 m/s^2 instead of 9.8 m/s^2) were present, they did not detract from the overall accuracy.

Images of Better Responses	i) The walls of dams are wedge shaped to make flow of water easy. It is also because at the surface of water there is low pressure but as depth increase the pressure of water Starts getting high thats why the walls are usually wedge-shaped ii) Data: Density of Water = $1000 kg/m^3$ Pressure = 100,000 Pa gravity = $9.8 m/s^2$ depth = ? Solution: $P = \rho g h$ $h = \frac{P}{\rho g}$ $h = \frac{100,000}{(1000)(9.8)}$ $h = \frac{100,000}{9800}$ h = 10.204 m depth = 10.204 m
Description of Weaker Responses	*Weaker responses* demonstrated fundamental misunderstandings of basic physics principles. These responses nonsensically suggested that wedge-shaped dams prevent “water coming out favour rot dam” and absurdly linked dam failure to tsunami formation, showing no grasp of hydrostatic pressure or structural engineering concepts. The explanation contained multiple grammatical errors and invented terms (favour rot dam), making these responses nearly incomprehensible. No mathematical formulations or references to pressure-depth relationships were attempted, unlike better responses that correctly applied P = ρgh. Weaker answers reflected either extreme carelessness or severe gaps in fundamental physics knowledge. Some responses contained nonsensical explanations and flawed calculations (e.g., 10003 = 333.33), reflecting a lack of conceptual clarity and mathematical rigor. Common issues included misuse of formulas, incorrect units and disjointed reasoning.
Image of Weaker Response	b(i) Water are usally fillal with with wedge shaped because from that water will not come out foum rt dam and in different depth if water come out so sunami will come.

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	• Past paper questions • Discussion on E-Marking Notes • AKU-EB Digital Learning Solution powered by Knowledge Platform https://akueb.knowledgeplatform.com/login

Any Additional Suggestions:

- Teachers are encouraged to ensure that students understand pressure in fluids and structural design of dams (e.g., wedge shape distributes force, prevents collapse). Use diagrams to show how water pressure increases with depth.

- Address errors like “water causes tsunamis if it leaks” or “liquid takes edge shapes”. Reinforce that dams are wedge-shaped to withstand hydrostatic pressure, not to prevent tsunamis.

- Guide students to use the correct formula for pressure ($P = \rho gh$) and force ($F = PA$), avoiding arbitrary calculations (e.g., *30 × 4 = 120 power*).

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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