FEDERAL BOARD OF INTERMEDIATE AND SECONDARY EDUCATION
H-8/4, ISLAMABAD

No.1-10/FBISE/RES/334 14 March, 2025

NOTIFICATION

Assessment Frameworks for Practical Based Assessment (PBA) containing lists of experiments/praticals along with instructions and Model Question Papers (Composite) in the subjects of Physics, Chemistry, Biology and Computer Science at SSC and HSSC levels based on National Curriculum of Pakistan 2022-23 (Scheme of Studies 2006) are hereby notified for implementation with effect from Annual Examinations 2026 and onwards.

2. The Assessment Frameworks for Composite PBA (Scheme of Studies 2006) are available at FBISE website. The weblink is **https://www.fbise.edu.pk/curriculum_model_paper.php .**

(MIRZA ALI)
Director (Test Development)
Ph: 051-9269504
Email: director@fbise.edu.pk

Heads of all Institutions affiliated with FBISE
at SSC & HSSC levels

Distribution:

1. Director General, Federal Directorate of Education, G-9/4, Islamabad
2. Director General, FGEI, Directorate (Cantonments/ Garrisons), Sir Syed Road, Rawalpindi Cantt
3. Assistant Chief of the Air Staff (Education), PAF Air Headquarters, Peshawar
4. Director General (Schools), Directorate of Education Gilgit-Baltistan
5. Director Education, Directorate of Naval Educational Services, Naval HQ, Islamabad
6. Deputy Director General (DDG), Army Public Schools and Colleges System Secretariat, GHQ, Rwp
7. Director, CB Education Directorate, C/o Chaklala Cantonment Board, Rawalpindi
8. Director (Education), Fauji Foundation Head Office, Welfare Division, Chaklala, Rawalpindi
9. Director General, OPF Head Office, G-5, Islamabad
10. Director Education, Kahuta Research Laboratory (KRL), Kahuta, District Rawalpindi
11. Mrs. Sakina Fowad Bukhari, Principal, City Lyceum School House No.394 St.No.4, Gulraiz-3 near Madina Mall, High Court Road, Rawalpindi
12. Mr. Muhammad Ashraf Hiraj, Principal, Startwell Education House No.9, Main Khayban-e-Tanveer Chaklala Scheme-III, Rawalpindi Cantt
13. The Director, Punjab Group of Colleges, 6th Road, Rawalpindi
14. The Director Regional Office (North), Beaconhouse Regional Office (North), Capital View Road, Mohra Nur, Banigala Islamabad
15. The Director Regional Office (North), The City School, Street 7, NPF, Sector E-11/4, Islamabad
16. Roots International Schools and Colleges, Head Office, Main Service Road West, Opp. G-13/4, IBD
17. Brig Dr. Muhammad Hanif (R), SI(M), Principal, Dr. A Q Khan School & College, Bahria Town, Phase 8, Islamabad
18. The Citizen Foundation, Plot No. 20, Sector # 14, Near Brookes Chowrangi, Korangi Industrial Area, Karachi
19. Director, Maarif Pak Turk School & College, Head office, H-8/1 Islamabad
20. Director Education, PAEC Headquarter, K-Block Islamabad
21. All HODs, FBISE, Islamabad
22. Director IT (with the request to upload the same on FBISE website and social media)
23. Deputy Director (Colleges), Directorate of Education Gilgit-Baltistan
24. Incharge, FBISE, Sub-Office, Gilgit
25. Incharge, FBISE, Sub-Office, Skardu
26. PA to Chairman, FBISE, Islamabad
27. APS to Secretary, FBISE, Islamabad
28. APS to Director (R&A), FBISE, Islamabad
29. Chat Room. FBISE, Islamabad

ASSESSMENT FRAMEWORK

FOR PRACTICAL BASED ASSESSMENT (PBA) - COMPOSITE

PHYSICS

SSC LEVEL

NATIONAL CURRICULUM OF PAKISTAN (2022-23)

SCHEME OF STUDIES 2006

WE WORK FOR EXCELLENCE

FEDERAL BOARD OF INTERMEDIATE AND SECONDARY EDUCATION (FBISE), ISLAMABAD

Table of Contents

ACKNOWLEDGEMENT

It is a great honour that we at the Federal Board of Intermediate and Secondary Education (FBISE) have developed the Assessment Framework (AF) for the Practical Based Assessment (PBA) of Physics at the Higher Secondary School Certificate (SSC) level. The primary objective of the Assessment Framework is to optimize the Student Learning Outcomes (SLOs) of curriculum 2022-23 that are associated with practical concepts and laboratory work. This comprehensive framework has been crafted meticulously by subject matter and assessment experts who conducted an in-depth review of all learning outcomes of SSC level Physics curriculum.

This significant undertaking was the result of a series of extensive meetings and collaborative efforts of the subject and assessment experts. Their dedication and expertise have been instrumental in bringing this framework to fruition.

The Assessment Framework for Practical Based Assessment (PBA) will serve as a guiding document for students, teachers, and paper setters. Students will receive clear directions for preparing themselves for the PBA examinations. Similarly, teachers will use it as a guide to perform laboratory work and to prepare students for the final PBA examinations. Paper setters of PBA will also seek guidance from this document and prepare PBA paper accordingly for annual examinations. It may be noted that only those students will be able to attempt the PBA paper who have performed all the practicals in laboratory.

Following subject as well as assessment experts remained constantly engaged in the development of the Assessment Framework for PBA:

1. Dr. Munazza Faheem, Associate Professor, Islamabad Model College for Girls, F-6/2, Islamabad
2. Dr. Humaira Anwar, Associate Professor, Islamabad Model College for Girls, F-7/4, Islamabad
3. Mr. Muhammad Jahangir Mirza, HOD Physics, OPF College for Boys, H-8/4 Islamabad
4. Mrs. Robina Ahmad, Assistant Professor, Islamabad Model College for Girls, I-8/4, Islamabad
5. Ms. Hoor-E-Irum, Assistant Professor, Islamabad Model College for Girls (PG), G-10/4, Islamabad
6. Mr. Muhammad Imran Khaliq, Assistant Professor, Islamabad Model College for Boys, G-10/4, Islamabad
7. Ms. Sehrish Imran, Lecturer, Islamabad Model College for Girls, I-8/4, Islamabad

The whole work was successfully accomplished under the able supervision and guidance of Dr. Ikram Ali Malik, Chairman, FBISE and due to the hard work and dedication of the staff of Research Section of FBISE, in particular, Syed Zulfiqar Shah, Deputy Secretary, Research and Academics who played pivotal role in finalizing the Assessment Framework for PBA.

MIRZA ALI
Director (Test Development)
FBISE, Islamabad

ABOUT THE PBA ASSESSMENT FRAMEWORK

To ensure clarity and precision in the understanding of Practical Based Assessment (PBA) Question Paper, the Student Learning Outcomes (SLOs) have been categorized into two distinct groups: formative for PBA and summative for PBA in the separately composed Assessment Frameworks for Classes SSC-I and SSC-II. Subsequently, all the SLOs of SSC-I and SSC-II meant for summative PBA have been translated into workable and functional composite lists of major and minor experiments which are part of this booklet. This extraction of lists of experiments helps in effectively measuring student progress and understanding of the scientific concepts linked with laboratory work. These experiments must be performed by the students under the supervision of their teachers in the laboratories in order to prepare themselves for the PBA Examinations.

The Assessment Framework for Practical Based Assessment (PBA) will act as a comprehensive guide for students, teachers, and paper setters. Students will receive clear instructions in order to perform experiments in the laboratory and prepare themselves for the PBA examination. Teachers will use the same to strategize the optimal use of the laboratory for performing experiments (major and minor).

The Model Question Paper for Practical Based Assessment (PBA), along with clear instructions, has also been developed and made part of this booklet to provide a structured format for upcoming examinations. The model question paper ensures consistency and fairness, offering students a comprehensive understanding of PBA examination.

All the experiments have been aligned with their corresponding SLOs marked summative for PBA. The purpose of this alignment is to explain how the experiments relate with their corresponding summative SLOs for PBA.

Instructions for paper setters have also been included before the PBA model question paper, providing self-explanatory guidance on the selection and nature of each question which is part of the model paper.

Guidelines/instructions for teachers/paper setters:

i. The paper will consist of two sections i.e section A and B.

ii. Section A will include Major Practicals. This section will have two questions, each question carrying 6 marks having parts in it, and each question will be performance / calculation/procedures/observations based encompassing a single practical.

iii. Section B will include Minor Practicals. This section will also have two questions, each carrying 4 marks having parts in it. Each question may be based on single or multiple practicals.

iv. The weightage of section A will be 60% i.e 12 marks, while that of section B will be 40 % i.e 8 marks.

v. In Practical Based Assessment (PBA), there will be no marks for practical notebooks and viva voce. However, students may record procedures, observations, apparatus and calculation etc on any type of plain papers/work sheets / practical folders for their future memory of all aspects of practical performance in order to attempt the PBA Examination amicably.

vi. It may be noted that performance of all the prescribed practicals is mandatory in the laboratory during the whole academic session because only those students will be able to attempt the PBA who have performed the practicals in the laboratory as per requirement of each practical.

vii. MCQs will not be included/assessed in the Practical Based Assessment paper.

viii. Questions carrying 0.5 marks will not be included/assessed as single part in any section of the PBA paper.

List of Experiments aligned with SLOs (Composite PBA)
For SSC Annual Examination 2026 & onwards
Physics Curriculum (2022-23) - Scheme of Studies 2006

Note: In the Practical-Based Assessment (PBA), questions will be taken/developed from the list of experiments provided below, aligned with the summative SLOs listed in the corresponding column.		
Section A (60% of practical marks — 12 Marks)		
No.	**List of Experiments**	**Aligned SLOs**
Major Practicals	1. Measure the radius and length of a metallic cylinder using vernier callipers up to correct number of significant figures.	[SLO: P-09-10-N-17] make measurements using common laboratory apparatus, such as millimeter scales, protractors, top-pan balances, newton meters, analogue or digital electrical meters, measuring cylinders, vernier callipers, micrometer screw gauges and thermometers. [SLO: P-09-A-19] Determine the least count of a data collection instrument (analog) from its scale [SLO: P-09-A-16] Round off and justify calculation estimates [Based on empirical data to an appropriate number of significant figures]. [SLO: P-09-10-N-20] measurement of physical quantities such as length, volume or force.
	2. Analyze the thickness of a metallic wire with vernier calipers and a screw gauge with their respective precision.	[SLO: P-09-10-N-17] make measurements using common laboratory apparatus, such as millimeter scales, protractors, top-pan balances, newton meters, analogue or digital electrical meters, measuring cylinders, vernier callipers, micrometer screw gauges and thermometers. [SLO: P-09-A-12] Justify and illustrate the use of common lab instruments to measure length [including how to measure a variety of lengths with appropriate precision using tapes, rulers, micrometers, and Vernier calipers (including reading the scales on analogue calipers and micrometers).
	3. Study the motion of a ball rolling down an angle iron. Measure the time intervals for different distances, and draw a distance-time graph for the ball's motion.	[SLO: P-09-10-N-21] measurement of small distances or short intervals of time. [SLO: P-09-10-N-28] timing motion or oscillations.
	4. Determine the time period of a simple pendulum, and investigate the relationship between length and its time period.	[SLO: P-09-A-14] Justify and illustrate how to measure time intervals using lab instruments [including clocks and digital timers] [SLO: P-09-A-15] Determine an average value for an empirical reading. [including small distance and for a short interval of time by measuring multiples (including the period of oscillations of a pendulum). [SLO: P-09-10-N-18] use a stop-watch to measure intervals of time, including the period of an oscillating system by timing an appropriate number of consecutive oscillations.

		[SLO: P-09-10-N-28] timing motion or oscillations
	5. Determine the specific heat capacity of liquid (water) or a metal (lead) using the method of mixtures.	[SLO: P-09-10-N-26] cooling and heating, including measurement of temperature [SLO: P-10- C-02] Suggest experiments to measure the specific heat capacities [of a solid and of a liquid].
	6. Draw the temperature- time graph for heating ice and water to measure the latent heat of fusion of ice and latent heat of vaporization of water using method of mixtures.	[SLO: P-09-10-N-26] cooling and heating, including measurement of temperature [SLO: P-10-C-27] Justify the experiments to determine the latent heat of fusion and latent heat of vaporization of ice and water [including illustrating the analysis of data by sketching temperature time graph on heating ice]
	7. Study the position of image formed by convex lens (converging lens) when object is placed at different positions in front of it.	[SLO: P-09-10-N-30] optics experiments using equipment such as optics pins, mirrors, prisms, lenses, glass or Perspex blocks (both rectangular and semi- circular), including the use of transparent, translucent and opaque substances to investigate the transmission of light
	8. Study the effect of combining resistors in series and parallel on the total (equivalent) resistance.	[SLO: P-09-10-N-29] electric circuits, including the connection and reconnection of these circuits, and the measurement of current and potential difference
	Section B (40% of practical marks — 8 Marks)	
Minor Practicals	1. Determine the spring constant of a Helical Spring using a load-extension graph.	[SLO: P-09-B-57] Sketch, plot and interpret load—extension graphs for an elastic solid and describe the associated experimental procedures [SLO: P-09-B-58] Define and use the term 'limit of proportionality' for a load-extension graph. [Including identifying this point on the graph (an understanding of the elastic limit is not required)]. [SLO: P-09-10-N-22] determining a derived quantity such as the extension per unit load for a spring, the value of a known resistance or the acceleration of an object. [SLO: P-09-B-22] Justify and illustrate the use of a force meter to measure weight. [SLO: P-09-10-N-27] experiments using springs and balances.
	2. Determine the position of centre of gravity of a plane (thin) lamina using plumb line.	[SLO: P-09-B-48] Describe how to determine the position of the center of gravity of a plane lamina using a plumb Line
	3. Determine the volume of irregular shaped insoluble stone by displacement method and calculate its density.	[SLO: P-09-10-N-25] comparing derived quantities such as density. [SLO: P-09-A-13] Justify and illustrate the use of measuring cylinders to measure volume [including both measurement of volume of liquid and determining the volume of a solid by displacement]. [SLO: P-09-B-21] Justify and illustrate the use of electronic balances to measure mass [Understand the internal workings of the electronic balance is not required: just how to practically used instrument in appropriate situations]. [SLO: P-09-10-N-19] use both analogue scales and digital displays. [SLO: P-09-10-N-27] experiments using springs and balances.

	4. Studying the laws of reflection using a plane mirror.	[SLO: P-09-10-N-24] comparing measured quantities such as angles of reflection. [SLO: P-09-10-N-30] optics experiments using equipment such as optics pins, mirrors, prisms, lenses, glass or Perspex blocks (both rectangular and semi- circular), including the use of transparent, translucent and opaque substances to investigate the transmission of light
	5. Investigate refraction through a glass slab and calculate its refractive index.	[SLO: P-09-10-N-24] comparing measured quantities such as angles of reflection [SLO: P-09-10-N-30] optics experiments using equipment such as optics pins, mirrors, prisms, lenses, glass or Perspex blocks (both rectangular and semi- circular), including the use of transparent, translucent and opaque substances to investigate the transmission of light. [SLO: P-10-D-39] Describe an experiment to show refraction of light by transparent blocks of different shapes.
	6. Find critical angle of a prism.	[SLO: P-10-D-40] Define the terms critical angle and total internal reflection.
	7. Measure the current and voltage across a resistor and plotting V-I characteristics.	[SLO: P-09-10-N-29] electric circuits, including the connection and reconnection of these circuits, and the measurement of current and potential difference. [SLO: P-10-E-34] Define and apply Ohm's law [Including reference to constant temperature. Use the equation resistance = p.d/current R = V/I to solve simple problems.] [SLO: P-10-E-36] Interpret current-voltage graphs [including for a resistor of constant resistance, a filament lamp and a diode.
	8. Identify the relationship between the potential difference across a wire and its length.	[SLO: P-09-10-N-23] testing and identifying the relationship between two variables such as between the potential difference across a wire and its length. [SLO: P-09-10-N-29] electric circuits, including the connection and reconnection of these circuits, and the measurement of current and potential difference.

Model Questions Paper Physics SSC (COMOSITE)

FOR ANNUAL EXAMINATION 2026 & ONWARDS
Practical Based Assessment (PBA)
Physics Curriculum (2022-23) - Scheme of Studies 2006

Total Marks: 20 Time: 2 hours

Note: Attempt all questions and write answers within provided spaces on E-Sheet.

SECTION-A (12 Marks)

Q.1 Consider the series combination of resistances:

i. Draw the labelled circuit diagram for two resistors in series with all circuit components. (02)

ii. Copy and complete the following table. All the measurements are taken in SI units. (03)

No. of Obs	Voltmeter Reading		Resistance		Equivalent Resistance R_e	Total Voltage V	Net Current I	Resistance by Ohm's law R	Difference R_e-R
SI Units	(---)		(---)		(---)	(---)	(---)	(---)	(---)
	V_1	V_2	R_1	R_2					
1	2	10	10	50					
2	6	10	60	100					
3	4.8	12	80	200					

iii. What will be effect on the equivalent resistance of the circuit (mentioned in the table) if another resistance is added in series with it? (01)

Q.2 Recall the experiment "motion of a ball rolling down an angle iron" and answer the following questions:

i. Write down apparatus which is required to study the motion of a ball rolling down an angle iron? (01)

ii. Copy and complete the given table. (02)

No. of Obs	**Distance (cm)**	**Time (s)**			**Velocity (cms^{-1})**
		t_1	t_2	Mean time t	
1	200	4.4	4.6		
2	180	4.1	4.0		

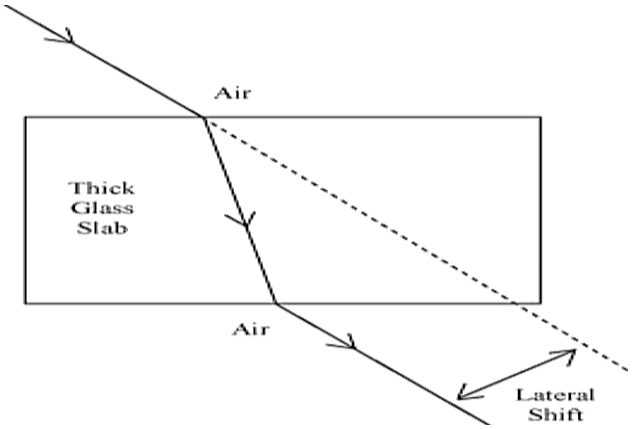
3	160	3.9	3.3		
4	140	3.2	3.1		
5	120	2.8	2.6		
6	100	2.5	2.0		

iii. Draw distance-time graph by using values from above table. (02)

iv. What will be effect on the speed of rolling ball if the angle of inclination is reduced? (01)

SECTION-B (8 Marks)

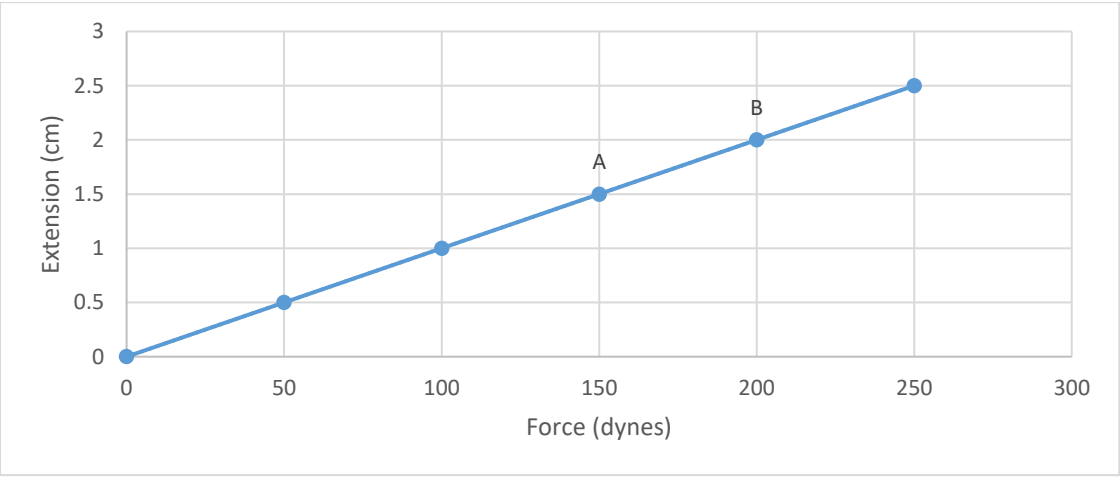
Q.3 Consider the experiment of refraction of light through glass slab and answer the following questions:



i. Find angle of incidence and angle of refraction from figure given in Q. 3 (02)

ii. Calculate refractive index of the glass. (02)

Q.4 The given graph shows the extension in the helical spring by increasing load.



i. Name the dependent variable and independent variable used in above graph. (01)

ii. Calculate the slope from force-extension graph by taking points A and B. (02)

iii. Which quantity is represented by the slope of force-extension graph? (01)

FEDERAL BOARD OF INTERMEDIATE AND SECONDARY EDUCATION
ISLAMABAD

111 032 473

For more information, please visit
www.fbise.edu.pk

/ Federal.BISE.Official / FBISEOfficial / fbise.official