



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



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**NOTIFICATION**

The Assessment Frameworks for Composite Practical-Based Assessment (PBA), in accordance with the Inclusive Scheme of Studies 2024 (Revised Version-I), comprising lists of experiments/practicals, relevant instructions, and Model Question Papers (Composite) for the subjects of Physics, Chemistry, Biology, and Computer Science at SSC and HSSC levels, based on the National Curriculum of Pakistan 2022–23, along with the E-Sheets for the said subjects, are hereby notified for implementation with effect from the First Annual Examination 2027 and onwards.

2. The Assessment Frameworks for Composite PBA and E-Sheets are available at FBISE website. The weblink is [https://www.fbise.edu.pk/curriculum\\_model\\_paper.php](https://www.fbise.edu.pk/curriculum_model_paper.php)

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at SSC & HSSC levels

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# **ASSESSMENT FRAMEWORK**

## **FOR PRACTICAL BASED ASSESSMENT (PBA) - COMPOSITE**

# **BIOLOGY**

## **SSC LEVEL**



**NATIONAL CURRICULUM OF PAKISTAN (2022-23)**

**SCHEME OF STUDIES 2024**

**WE WORK FOR EXCELLENCE**

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



# Table of Contents

| <b><u>S. No</u></b> | <b><u>Contents</u></b>                                | <b><u>Page No.</u></b> |
|---------------------|-------------------------------------------------------|------------------------|
| 1.                  | Acknowledgement                                       | 1                      |
| 2.                  | About the PBA Assessment Framework                    | 2                      |
| 3.                  | Guidelines/instructions for teachers/paper setters    | 3                      |
| 4.                  | List of Experiments aligned with SLOs (Composite PBA) | 4                      |
| 5.                  | Model Question Paper Biology SSC (COMPOSITE)          | 6                      |

# ACKNOWLEDGEMENT

It is a great honour that we at the Federal Board of Intermediate and Secondary Education (FBISE) has developed the Assessment Framework (AF) for the Practical Based Assessment (PBA) of Biology 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 Biology 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. Ms. Ruqayya Shaikh, Associate Professor, Islamabad Model College for Girls, F-6/2, Islamabad
2. Dr. Kashif Ali, Associate Professor, Islamabad Model College for Boys, F-7/3, Islamabad
3. Dr. Abid Ali Mughal, Associate Professor, Islamabad Model College for Boys, H-9, Islamabad
4. Mrs. Tayyaba Malik, Subject Specialist, APSAC Secretariat, Rawalpindi

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 composite Assessment Frameworks for SSC Classes based on the Revised Version-I of Inclusive Scheme of Studies 2024. Subsequently, all the SLOs of SSC-I and SSC-II meant for summative PBA have been translated into workable and functional composite lists of practicals which are part of this booklet. This extraction of lists of practicals helps in effectively measuring student progress and understanding of the scientific concepts linked with laboratory work. These practicals 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 practicals 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 practicals.

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



**PRACTICAL BASED ASSESSMENT (PBA)**  
**COMPOSITE**

**Biology SSC Level for Annual Examination 2027 & onwards**  
**Biology Curriculum (2022-23)-Scheme of Studies 2024**



**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 three 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 three 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 18 marks, while that of section B will be 40 % i.e 12 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 2027 & onwards  
Biology Curriculum (2022-23)-Scheme of Studies 2024**



**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.**

| <b>Section A (60% of practical marks — 18 Marks)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>No.</b>                                           | <b>List of Experiments</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Aligned SLOs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Major Practicals</b>                              | <ol style="list-style-type: none"> <li>1. Qualitative tests for different types of energy food (Iodine test for starch, Benedict's test for glucose, Biuret test for protein, Emulsion test for fatty substance).</li> <li>2. To study the effect of temperature and pH rate of enzyme-catalyzed reaction.</li> <li>3. To study the rate of photosynthesis using hydrogen carbonate indicator/ disc method.</li> <li>4. To study the effect of limiting factors (temperature and carbon dioxide) on rate of photosynthesis.</li> <li>5. To study the effect of minerals ions (Nitrogen and magnesium) on growth of plants.</li> <li>6. To study the process of transpiration in plants using cobalt chloride paper.</li> <li>7. To investigate that exhaled air contains Carbon dioxide.</li> <li>8. To study the effect of exercise on heart rate and breathing rate.</li> <li>9. To study the tropic responses (phototropism and geotropism) in plants.</li> <li>10. To study the reaction time response.</li> </ol> | <p><b>[SLO: B-09-10-X-02]</b><br/>Students should be able to carry out simple experiments of:</p> <ul style="list-style-type: none"> <li>• food tests</li> <li>• rate of enzyme-catalyzed reaction</li> <li>• use of hydrogen carbonate indicator</li> <li>• photosynthesis</li> <li>• effect of mineral ions on plant growth</li> <li>• transpiration</li> <li>• respiration</li> <li>• heart rate and breathing rate</li> <li>• tropic responses</li> <li>• nervous responses</li> </ul> |
| <b>Section B (40% of practical marks — 12 Marks)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Minor Practicals</b>                              | <ol style="list-style-type: none"> <li>1. To study factors affecting rate of diffusion.</li> <li>2. To study osmosis using potato strips.</li> <li>3. To dissect the seeds (Monocot and dicot seeds)</li> <li>4. To dissect the flowers (Monocot and dicot seeds).</li> <li>5. To study the germination of seeds (epigeal and hypogeal germination).</li> <li>6. To study continuous and discontinuous variation (human height and tongue rolling)</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p><b>[SLO: B-09-10-X-02]</b><br/>Students should be able to carry out simple experiments of:</p> <ul style="list-style-type: none"> <li>• diffusion</li> <li>• osmosis</li> <li>• observation and dissection of seeds and flowers</li> <li>• germination</li> <li>• continuous and discontinuous variation</li> <li>• sampling techniques</li> </ul>                                                                                                                                      |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                           |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
|  | 7. To study the ecosystem by using sampling technique (Quadrat method)                                                                                                                                                                                                                                                                                                                                                    |                                                                                                           |
|  | 8. Use of a microscope to study cells: Protista (Amoeba, Paramecium, Volvox and Euglena, Chlamydomonas), Animal cells (Human cheek cells), Plant cells (Onion epidermis)<br>9. To study animal tissue (epithelial, connective, muscle and nervous tissues) using prepared slides and charts.<br>10. To study plant tissues (Epidermal, vascular, photosynthetic and supporting tissues) using prepared slides and charts. | <b>[SLO: B-09-10-X-03]</b><br>Should be able to use of a microscope to examine biological specimens       |
|  | 11. Calculation of magnification, image size or actual size of specimen from provided data.                                                                                                                                                                                                                                                                                                                               | <b>[SLO: B-09-10-X-04]</b><br>Calculating the magnification of biological specimens (by using microscope) |



**Model Questions Paper Biology SSC (COMPOSITE)**  
**FOR ANNUAL EXAMINATION 2027 & ONWARDS**  
**Practical Based Assessment (PBA)**  
**Biology Curriculum (2022-23)-Scheme of Studies 2024**



Total Marks: 30

Time: 2 hours

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

**SECTION A (6 x 3 = 18)**

**Q.1** A student carried out biochemical tests on the given food material to find out its nutrient contents.

- a) Re-draw table 1.1 on E-sheet and complete with required information. [3]

| <b>Table: 1.1</b>               |                     |                     |
|---------------------------------|---------------------|---------------------|
| <b>Reagent</b>                  | <b>Used to test</b> | <b>Observations</b> |
| Absolute ethanol and cold water | Protein             |                     |
| Benedict's solution             |                     |                     |

- b) A student's test on food sample gives colour change with iodine. Does it indicate anything about the presence of glucose in the sample? If your answer is no, then, which biochemical test would the student have to perform to find out about the presence of glucose? [2]
- c) Identify the enzyme catalyzing the reaction shown in figure 1.1? [1]

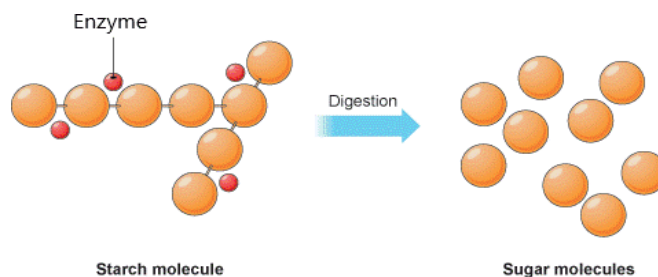


Figure: 1.1

**Q2.** A pot with a small plant was placed horizontally in dark condition. After few days, roots bended downwards and shoot grew upwards.

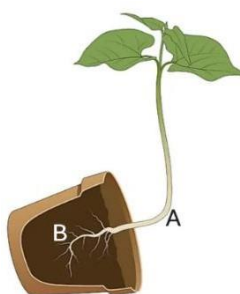


Figure: 2.1

- a) Identify the plant movements shown at point A and B in figure 2.1 and define them? [2]

- b) Relate these movements shown in figure 2.1 with the type of stimuli. [1]  
 c) Give one benefit of each type of movement to the plant shown in above figure? [2]  
 d) Name any other type of tropic movement in plants. [1]

**Q3.** A student studied the effect of limiting factors on rate of photosynthesis and obtained following data shown in **Table 3.1**

| Concentration of CO <sub>2</sub> (% age)              | 0.00 | 0.02 | 0.04 | 0.06 | 0.08 | 0.10 | 0.12 | 0.14 |
|-------------------------------------------------------|------|------|------|------|------|------|------|------|
| Rate of photosynthesis in <b>LOW LIGHT INTENSITY</b>  | 0    | 20   | 29   | 35   | 39   | 42   | 45   | 47   |
| Rate of photosynthesis in <b>HIGH LIGHT INTENSITY</b> | 0    | 22   | 35   | 47   | 68   | 84   | 94   | 99   |

- a) Make two graphs of above data to show rates of photosynthesis in low and high intensities of light. Compare the rates of photosynthesis in both graphs. [2]  
 b) Label the region of graphs that show carbon dioxide as limiting factor. [2]  
 c) Name two factors other than CO<sub>2</sub> and light intensities, that may act as limiting factor for rate of photosynthesis. How a factor becomes limiting factor for the process of photosynthesis? [2]

### **SECTION-B (12 Marks)**

**Q.4**

- a) Identify which type of germination is shown in figure 4.1. Identify labelled parts A, B and C. [2]

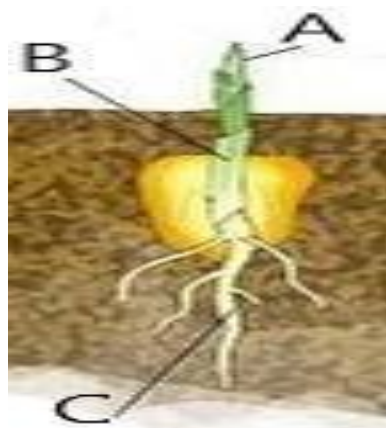


Figure: 4.1

- b) Identify the organism shown in figure 4.2. [1]



Figure: 4.2

- c)

d) Identify the type of plant tissue shown in figure 4.3.

[1]

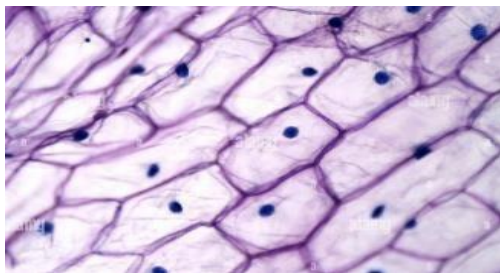


Figure: 4.3

**Q.5**

- a) The following diagram shows diffusion of ink in two glasses of water at different temperatures. Which glass will show faster diffusion? Give a reason for your answer. [2]

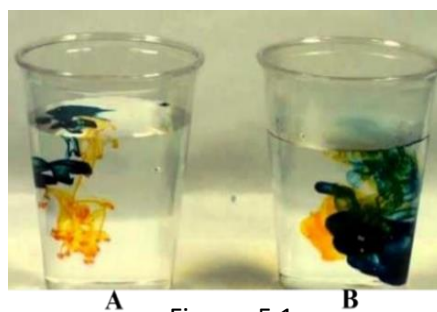
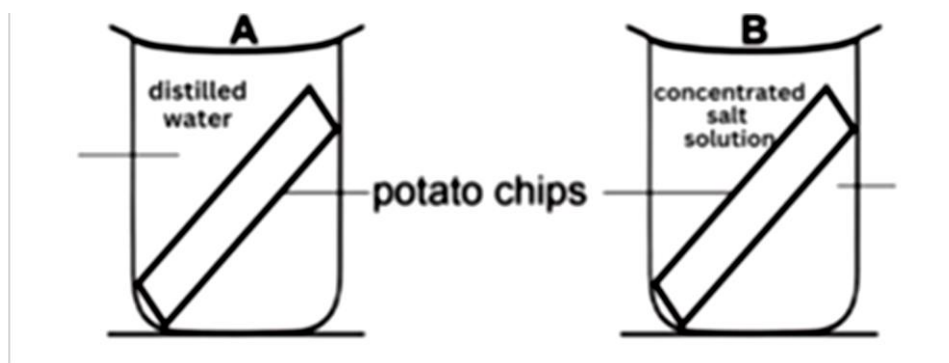


Figure: 5.1

- b) While recording the height of your classmates, you obtained the data given in table 4.1 and draw a histogram using your scale to represent this data. [2]

| Table: 5.1             |                    |
|------------------------|--------------------|
| Height range in inches | Number of students |
| 59-60                  | 2                  |
| 61-62                  | 5                  |
| 63-64                  | 12                 |
| 65-66                  | 18                 |
| 67-68                  | 9                  |
| 69-70                  | 3                  |
| 71-72                  | 1                  |

- Q6.** (a) The figure 4.1 shows process of osmosis. Identify the glass beakers in which exosmosis and endosmosis will occur. Give reasons of your answer. [2]



. Fig 6.1

(b) Name the three parts of dicot seed labelled as A, B and C indicated in diagram 6.2. Give the role of labelled part C in seed germination.[2]

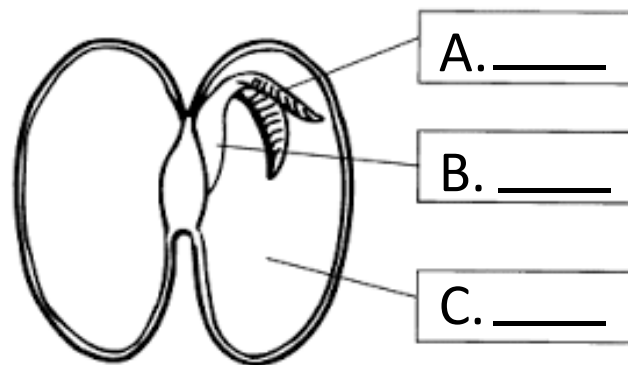


Fig:6.2



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