Federal Board of Intermediate &
Secondary Education,
Islamabad

Training Manual
for Item Developers

Vol. II

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Message from Federal Minister of Education

Provision of Quality Education to every child is the key to success of the nations in the modern world. To ensure the quality of education, a well-defined and transparent system of assessment is mandatory. Federal Board of Intermediate and Secondary Education (FBISE), Islamabad, is leading by example in the field of assessment through befitting reforms which shall prove truly beneficial to the public.

Over the past years several reforms like digitization of records, provision of online facilities to students and institutions, Digital Attendance Management System (DAMS), On Screen Marking of Answer Scripts, and development of Question Items Bank (QIB) are the hallmarks of quality work and gusto of the personnel at FBISE. ISO certification is a concrete proof of the organization of jobs being performed at FBISE.

In order to ensure the quality in assessment FBISE has rightly identified the need of periodic trainings and refresher courses for question paper setters. These question paper setters so trained will prove pivotal in shaping up the future of the candidates appearing in board examinations. It is indeed important to sensitize these paper setters to ensure the quality of assessment in order to fulfil the demands of curricula.

The manuscript of training manual in hand is another example of FBISE's strive for excellence. It is their continuous and untiring efforts which will help in improving the national standards of assessment and personal capacities of available human resource. It is believed that this manual will prove a mile stone in the path of paradigm shift from rote learning to Students' learning outcome (SLO) based examinations in the country.

It is my pleasure to acknowledge and appreciate the Chairman FBISE and his team for their sincere efforts in enhancing the quality of assessment and allied procedures. I believe that their enthusiasm and devotion will continue to be exemplary.

SHAFQAT MAHMOOD
FEDERAL MINISTER

Message from Federal Secretary of Education

Curriculum, pedagogy and assessment are the three fundamental elements of educational process. It is a known fact that assessment has a washback effect on pedagogy which can bring about notable and far-reaching changes in overall educational process. Ministry of Federal Education and Professional Training is persistently patronizing Federal Board of Intermediate and Secondary Education, Islamabad (FBISE) in introducing and implementing educational reforms especially in the domain of assessment.

FBISE, a federal examination body having an international reach out, shoulders the responsibility of keeping-up with the evolving trends in educational sector. The Federal Board recognized the need to shift from the outdated rote learning system to outcome- based education and assessment system. It was realized that children's attainments will remain poor unless the assessment moves away from the rote learning system of examination to the SLOs based examination system.

FBISE has thus been continuously improving itself through multi-dimensional developments in its systems such as use of technology in upgrading the conduct of examinations, electronic evaluation of examinations of students, online services provisions in the processes of affiliation, certificates issuance, developing and refining of question items to form Question Items Bank (QIB) for the purpose of automated question paper generation both validly and reliably. It is hoped that with consistent dedication, FBISE will surely excel and usher a highly credible and quality assessment system in the country.

Ms. NAHEED S. DURRANI
FEDERAL SECRETARY

Message from the Chairman FBISE

FBISE is an examining body which conducts examinations at Secondary and Higher Secondary levels. Apart from Pakistan, its scope also encompasses international mandate. Being an internationally operating examination body, FBISE is well aware of its importance and the worth of the examinations conducted by it. In order to standardize the examinations and facilitate all stakeholders of FBISE, concerted efforts are being made in the form of indigenous thought process and acquisition of feedback, based on critical analysis from the relevant stakeholders and clients.

Qualitative improvement in the overall examination system like Digital Attendance Monitoring System (DAMS), On Screen Marking of Answer Scripts, and development of Question Items Bank (QIB) are some emblematic achievements of FBISE. This training module will add substance to the aspects of validity and reliability of assessment especially in the context of paradigm shift towards SLOs based examinations. The booklet in hand is the outcome of the comprehensive academic abilities of experts from different educational strata of the country. It has been developed through meticulous thinking process and is based upon real needs of the real participants i.e., Paper Setters and Item Writers. It is believed that this training manual will prove pivotal in capacity building of the Paper Setters, Item Writers and Teachers in addition to validating and substantially standardizing the process of paper setting.

I take this opportunity to thank the honorable Federal Minister of Federal Education and Professional Training, Mr. Shafqat Mahmood and the honorable Federal Secretary of Federal Education and Professional Training, Ms. Naheed S. Durrani for their patronage and shared vision for achievement of Sustainable Development Goals (SDGs) by considering FBISE an essential partner in the process.

I also extend my gratitude to all the participants who played their part in the development of this training manual. It was their efforts and dedication to help realize the envisaged idea of developing a document which will be instrumental in the process of aligning the examinations with the SLOs listed in different curricula and ensure quality assessment conforming to international standards.

QAISAR ALAM
CHAIRMAN
FBISE, Islamabad

Preface

At FBISE whilst, we strive for excellence and put forth consistently the sincerest efforts for the quality output, we also consider the needs and requirements of our stakeholders. This document is a manifestation of several attributes of FBISE's works. It is based upon a wide consultative process with different stakeholders and other allied bodies.

We offer our cordial gratitude to Sqn. Ldr. Javed Iqbal from Fazaia TTI, PAF Complex, Islamabad, Mr. Suhail Bin Aziz from National Curriculum Council, Islamabad, Dr. Nasir Mahmood & Dr. Muhammad Azeem from Punjab Examination Commission, Lahore, Mr. Muhammad Shakeel & Syed Zulfiqar Shah from National Education Assessment System, Islamabad, Ms. Bushra Saqib from Bahria Schools and Colleges Systems, Islamabad, Mr. Muhammad Shafique & Mr. Zulfiqar Khan from Elementary and Secondary Education Department (ESED) Khyber-Pakhtun-Khwa, Mrs. Oneeza Amber Asif from Fauji Foundation Education System, Rawalpindi and Mrs. Maryam Adeel Awan from Army Public Schools and Colleges System, Rawalpindi for their valuable contribution as Unit Developers. Their work was graciously reviewed by Dr. Tariq Javed from Directorate of Federal Government Education Institutions (C/G), Rawalpindi, Dr. Muhammad Idrees from Govt. Gordon Graduate College, Rawalpindi, Dr. Shafqat Ali Janjua and Mrs. Riffat Jabeen from Federal Directorate of Education, Islamabad.

This effort of the experts will go hand in hand with FBISE in its future examinational endeavors.

AQEEL IMRAN
DIRECTOR (Strong Room)
FBISE, Islamabad

Assessment: Importance and Purpose

1.1. Introduction

Assessment is a process of measuring students' learning [1]. It involves planning, developing, collecting, analyzing and reporting. FBISE strives to develop a valid and reliable instrument and administer the same in Pakistan educational context. The responses by the students are transparently and wisely scored. Accordingly, the results are accumulated and reported to the stakeholders.

Educational assessment is a centerpiece of the teaching and learning experiences. It is a triangulated process that enables assessors to measure the effectiveness of the teaching by linking student performance to learning objectives [1]. As a result, teachers become able to institutionalize effective teaching choices and revise ineffective ones in their pedagogy. Without obtaining and analyzing evidence of student learning, teachers can never know whether their teaching, the curricula and the teaching methodologies are developing desired knowledge, skills, and attitudes.
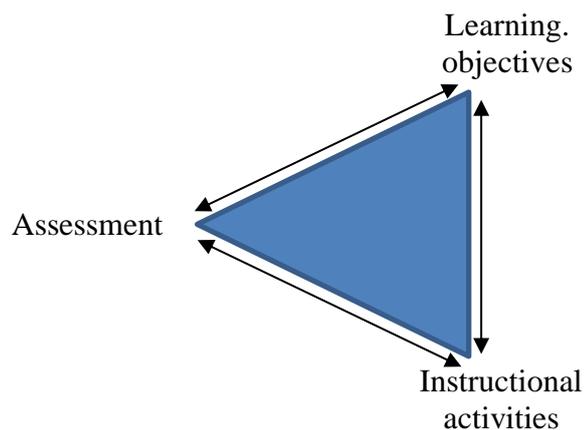
Figure 1-1 Triangulated Process of Assessment Activities [1]

There has been a continuous effort to bring education in Pakistan at par with the successful educational systems of the world. Educational curriculum has always been

criticized for promoting habit of cramming among the students. However, it is obvious that it is not the curriculum but assessment that drives not only curriculum but also teaching-learning practices.

1.2. Assessment Framework

The most important pre-requisite of any assessment is a well-defined framework [3]. A framework is an outline that guides to follow a certain process of developing an assessment tool. Since every subject has specific requirements to be assessed therefore a separate assessment framework is required.

An assessment framework comprises of taxonomy of desired learning outcomes, taxonomy levels, content details, types of items, weightage of items and prompts, proportionate of cognitive level and difficulty level of items.

1.3. Bloom's Taxonomy

The taxonomy of educational objectives is a framework for classifying statements of what we expect or intend students to learn as a result of instruction [4]. *Benjamin S. Bloom (1956)* initiated the idea of classifying educational objectives (Original Taxonomy). He wrote a book titled as *Taxonomy of Educational Objectives: The Classification of Educational Goals* [5]. This classification enables assessment experts to devise appropriate test items. The revision of this classification was done in 2001 by Anderson and Krathwohl (Revised Bloom's Taxonomy) [4].

Cognitive levels of original and revised Bloom's Taxonomies are as under:
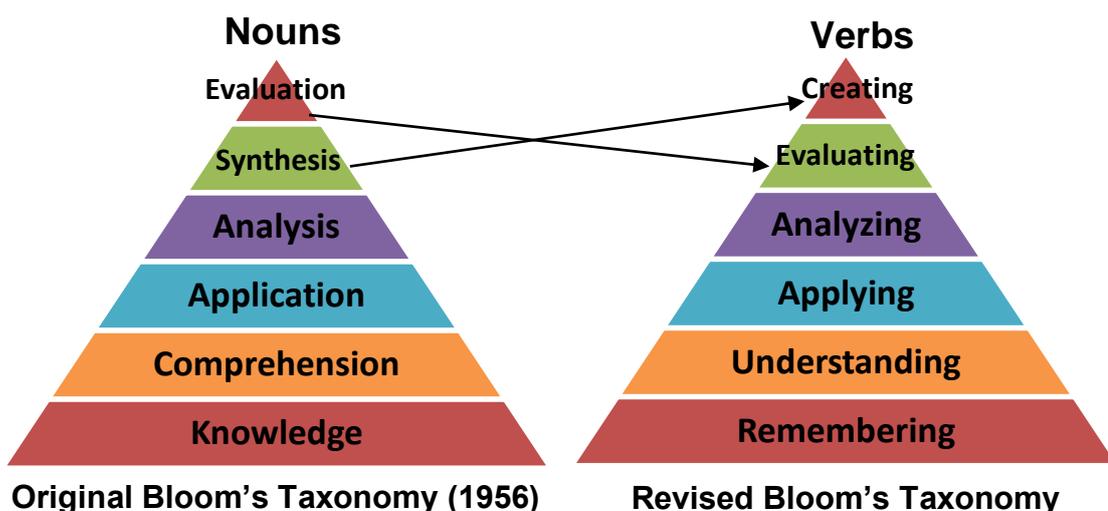
Figure 1-2 Original and Revised Bloom's Taxonomy [2]

Six cognitive levels, their definitions, sub categories and some action verbs are given below:

Table 1-1 Structure of the Cognitive Process Dimension of the Revised Taxonomy

Major Category	Sub Categories	Action Verbs
Remembering: Retrieving relevant knowledge from long-term memory.	• Recognizing • Recalling	cite, define, group, list, match, memorize, quote, record, repeat, reproduce, select, state, underline, etc.
Understanding: Determining the meaning of instructional messages, including oral, written, and graphic communication.	• Interpreting • Exemplifying • Classifying • Summarizing • Inferring • Comparing • Explaining	associate, classify, describe in own words, discuss, explain, give examples, identify, interpret, locate, observe, paraphrase, recognize, report, reorganize, research, restate, review, select, summarize, translate, etc.
Applying: Carrying out or using a procedure in a given situation.	• Executing • Implementing	adapt, apply in familiar context, apply in unfamiliar context, collect, change, choose, demonstrate, dramatize, exhibit, employ, illustrate, manipulate, operate, solve, schedule, sketch, etc.
Analyzing: Breaking material into its constituent parts and detecting how the parts relate to one another and to an overall structure or purpose.	• Differentiating • Organizing • Attributing	arrange, calculate, categorize, compare, contrast, criticize, differentiate, dissect, discriminate, distinguish, examine, experiment, group, investigate, inspect, make a diagram, order, organize, question, research, revise, separate, survey, test, etc.
Evaluating: Making judgments based on criteria and standards.	• Checking • Critiquing	appraise, argue, check, critique, criticize, defend, determine, debate, discriminate, evaluate, experiment, hypothesis, judge, make a monitor, predict, probe, rate, rank, reject, revise, select, support, score, test, value, validate, etc.
Creating: Putting elements together to form a novel, coherent whole or make an original product.	• Generating • Planning • Producing	act, assemble, blend, construct, compile, create, develop, devise, design, formulate, forecast, imagine, improvise, invent, make, organize, originate, plan, predict, set up, write, etc.

1.4. Alignment of Assessment with Curricula (SLO) and Cognitive Domain

Assessment items are developed in accordance with the cognitive level and content/concept [6] as given in the students' learning outcomes (SLO) of respective subjects and grades. Every subject has specific SLOs which can be assessed through different types of assessment items. Some SLOs will be better assessed through MCQs while others through CRQs. The skills listed in the curricula of science subjects may either be aligned with SLOs or with practical work depending on the requirement of each skill.

1.5. Training manual outline

This training manual is divided into four units. A brief description of each chapter is given below:

Unit 1: A brief introduction of Assessment, its Importance and Purpose along with the introduction of Assessment frame work. Brief discussion on Revised Bloom's Taxonomies (Overview) and Action Words / Verbs and Importance of Alignment of Assessment with Curricula (SLO) and Cognitive Domain Levels

Unit 2: This unit deals with the guidelines regarding Question Paper and its contents. Brief guidelines for
- Setting Question Paper
- Percentage Allocation of levels of Cognitive domains (K, U, A)
- Level(s) of difficulty (Easy, Moderate, Difficult)
- Equitable representation of contents (SLO Units)
  - Testing the Learning outcomes (Content + Cognitive)

have also been provided in this unit.

Unit 3: In this unit, fundamental principles for writing questions in question paper in accordance with layout of question paper are listed. Some guidelines for assurance of the quality of the stem of the question are also provided.

Unit 4: This unit deals with formation and development of rubrics and answer key of every question paper of respective subjects.

Unit 5: The final part deals with the practical implementation of learned assessment practices in line with relevant documentation.

Unit 6: Added in second volume of the Training Manual, deals with the Moderation and Super Moderation of Question Items.

Question Paper and its Contents

2.1. Setting Question Paper

There are various techniques to measure students' learning including paper-pencil test. The paper-pencil test comprises of content domain and cognitive levels that represent the desired curriculum. This question paper is meant to give a measure of students' learning accumulated over an academic year thus its validity and reliability have to be ensured. A question paper must be balanced and prepared carefully according to the table of specification because it has consequences upon students' future. Following are key guidelines which must be kept in mind while developing question papers:

1. Curriculum be divided (if required) into content strands as per Table of Specification (ToS). Number of questions in each strand be included (Selection type and Supply Type) for equitable representation of SLO units.

2. Paper developers will propose difficulty of level of each question by his expert opinion.

3. Preferably mark the question easy, moderate and difficult if 80% or more, 40% to 80%, and 40% or less students respectively can answer the question correctly.

4. Every paper developer (coordinator) will prepare the number of question papers as per policy.

5. Sets of question papers shall be sent in a sealed envelope to the Strong Room of FBISE.

2.2. Percentage Allocation of levels of Cognitive domains (K, U, A)

Question papers may be developed keeping in view cognitive levels as per curriculum requirements. Following proportion of Cognitive Levels may be adopted:

Table 2-1 Preferred allocation of different cognitive levels to the questions in each section of question paper

Cognitive Level	Percentage * for Grades 9th – 12th
Knowledge (Remembering)	30%
Understanding	50%
Applying (Analyze + Evaluate + Create)	20%
Total	100 %

* With ± 5% variation

2.3. Level(s) of difficulty (Easy, Moderate, Difficult)

While setting the question paper, the target audience i.e., students from different backgrounds (gender, locale, socio economic status, ethnicity, sects etc.) may be considered. A valid question paper should preferably address all ability ranges of the appearing candidates.

In order to produce a normal curve, the question paper should contain all types of questions i.e., easy, moderate and difficult in all sections (A, B, C, D etc.) of the question paper. A question belonging to knowledge level may be easy, moderate or difficult owing to the use of language and the candidates appearing. Similarly, for understanding and application levels the questions may not be limited to any specific difficulty level.

Table 2-2 Preferred allocation of different difficulty levels to the questions in each section of question paper

Difficulty Level	Preferred allocation* for Grades 9th – 12th
Easy	40%
Moderate	40%
Difficult	20%
Total	100 %

* With ± 5% variation

This difficulty level is dependent on the subjective approach of paper setter and nature of the subject.

2.4. Equitable representation of Contents/SLOs

In order to cover the contents (chapters/units) listed in the curricula, the spread of the question paper should be such that proportional representation of each unit is ensured.

2.4.1. Testing the learning outcomes (Content + Cognitive)

The question paper should cover, in all sections, the contents and the cognitive levels in accordance with the nature of each subject e.g., it is easier to give a higher percentage of application-based questions in Mathematics and Physics whereas in Biology the knowledge-based questions seem more convenient for the purpose ranges are given in the tables 2.1 & 2.2 of paper setting. Assessment of SLOs with respect to their due weightage is essential.

Construction of Test/Question Paper

3.1. Format of Question Paper:

There are mostly three sections in each question paper. Distribution of the questions with respect to cognitive domain and difficulty level within each section shall be according to the Table of Specification.

3.1.1.   Section-A

It comprises of Multiple-Choice Questions (MCQs). All questions are compulsory without any external or internal choice. Usually comprises of 20% of total marks of the (theory if applicable) paper. Each MCQ usually carries 1 mark.

3.1.2.   Section B

It comprises of Short Response Questions (SRQs). Candidates may have external choice up to 33%. In addition to that, internal choice may also be offered based upon model, content and/or nature of the subject. This section may contain almost 50% of total marks in some subjects of the (theory if applicable) paper. An SRQ may carry marks based upon the subject and relevant policy.

3.1.3.   Section C

This section comprises of Extended Response Questions (ERQs). Candidates may have external choice in the questions. In addition to that internal choice may also be offered based upon model, content and/or nature of the subject. For ERQs it should contain around 30% of total marks in some subjects of the (theory if applicable) paper. All ERQs may or may not carry equal marks based upon the subject and relevant policy.

3.2. Layout of Question Paper

1. The layout of the paper be as per policy. While developing the questions, the designated space should be kept in consideration for write-on papers. There be enough space (about 1.5 times the model answer) for responding to each question.

2. Instructions to candidates should be clear and unambiguous. They be presented in bold type.

3. Wherever possible, use a straightforward and consistent format with regular line lengths.

4. Use typesetting features such as bold, italics, indentation or boxes effectively to help candidates focus their attention on the task. (Note: Print in italics may present reading difficulty for young children.)

5. Long complex questions are best split up by the use of subsidiary numbering systems.

6. Structured questions should follow a graded and logical sequence.

7. Stimulus based questions (diagrams, pictures and photographs etc.) be of high quality and clear to have accurate responses.

8. Prompt (text for comprehension) and appended questions be set on the same page or on adjacent pages.

9. Ensure that marks assigned to each item / section are clearly indicated on the paper.

3.3. Development of Test Items (questions):

3.3.1. *Multiple Choice Questions (MCQs):*

Multiple choice questions (MCQs) are a form of objective test items, in which students are asked to select suitable answer from the choices offered as a list.

3.3.1.1. Anatomy of MCQ:

Example 1:

A body of mass 1500g when dropped from 20m high tower.

It will reach the ground in:

Stimulus

Stem/ Lead in

Options/ Alternatives

A. 6.5 seconds
B. 5.0 seconds   Distractors
C. 3.5 seconds
D. 2.0 seconds   → Key
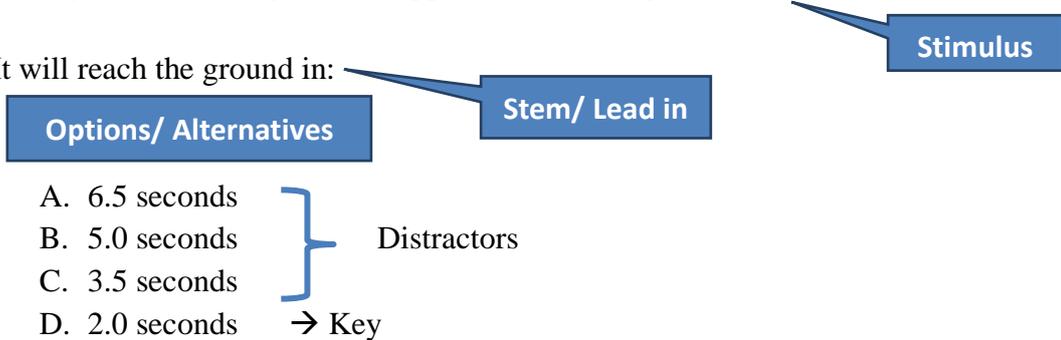
Other ways to write the same question are as follows:

- What time is required for a body of mass 1500g to reach the ground if dropped from a height of 20m?

- A body of mass 1500g reaches the ground in _____ seconds when dropped from 20m height.

Example 2:

All of the following words have primary stress **EXCEPT**:

A. Increase   → Distractor
B. Understand   → **Key**
C. Record   → Distractor
D. Black   → Distractor

3.3.1.2. Stem of an MCQ:

Stem presents a specific problem to the examinee. It may be written either as an incomplete statement, question or as a stimulus. It states an issue or describes a situation. This situation is mostly in a paragraph or a picture called the Stimulus.

3.3.1.3. Guidlines for writing Stem of MCQ:

- Stem should be Simple in language
- It should be Understandable
- It should be Directed
- It should be a Body of knowledge within itself
- It should be Smart in its length/size
- It measures single idea or concept

3.3.1.4.   Avoid the following:

- Clue in the stem
- Difficult & ambiguous language
- Double Negative
- Tricky

3.3.1.5.   Options of an MCQ:

There are four (4) options in an MCQ, out of which only one option should be the correct whereas the other three (3) are the unkeyable options called distractors.

Simply,
- The "Correct" answer is the key
- The other responses are "DISTRACTORS"
- "DISTRACTORS" are the logical misconceptions of the correct answer and seem plausible to the candidates who have partial, incomplete or inappropriate knowledge

3.3.1.6.   Guidelines for devising options:

When developing options for an MCQ following may be followed:

Options should be

- Parallel in structure
- Homogenous
- Clear and concise
- Smart in size
- Fit logical with stem /Syntax (with stem)
- In order (smallest to largest)

3.3.1.7.   Characteristics of Distractors:

While developing "Distractors", it should be kept in consideration that it is the hard part of MCQ. It can control/tune the difficulty level of an MCQ. Distractors have the following characteristics:

- Use to control for difficulty of item
- Logical misconception to the key
- Plausible but wrong; attractive to those lacking the required knowledge, skill or attitude
- Parallel in syntax and grammar and should make sense
- Avoid "specific determiners": Always, never
- If the stem is negative, avoid negative distracters
- Avoid All of the above, None of the above, both A & B etc.

3.3.1.8. Guidelines for writing Key:

In an MCQ key should have the following characteristics:
- One key and one key only
- Should not stand out
- Should not contrast directly with another option
- No clue in the stem
- Should not follow any pattern in placing key

Example of SLO Based MCQ:

SLO #24 (Physics X): State the rules for obtaining images formed by concave mirror, image formation by concave mirror, image formation by convex mirror, spherical mirror formula, and uses of spherical mirror.

Which of the following are commonly used in vehicles to observe rear view?
- A. Concave mirror
- B. Convex mirror
- C. Concave lens
- D. Convex lens

3.3.2. *Restricted Response Question (RRQ)*

Restricted Response Questions (RRQs) are short answer questions that measure knowledge, understanding and application-level cognitive skills. Restricted-response questions are assessment items that ask students to apply knowledge, skills, and critical thinking abilities to real-world, standards-driven performance tasks. These should be simple, requiring students to answer within designated space on E-sheet.

For example:

SLO: Outline the basic reactions of Solvay process
Question: What is slaked lime? How is it produced during Solvay process? (1+2 marks)

Sometimes students must use information to create a graphic organizer, create and correctly label a diagram, or draw a diagram showing a solution.

Restricted-response questions are scored using a pre-established rubric and sets of pre-scored sample papers. Scoring is relatively objective, based on the actual

components included in the response. Students may receive marks based on the pre-established rubric criteria. The SRQ portion should:

1. Reduce guessing about the content
2. Involve Teachers' judgment
3. Develop an understanding of content hence rote learning is minimized
4. Test a wide range of abilities
5. Give more room to students to express their point of view
6. Be easy to construct and score

3.3.2.1. Example of SLO Based RRQ:

SLO: **Skim** text to • have general idea of the text. • infer theme/ main idea.	
Question: "La Belle Dame sans Merci", a timeless ballad by John Keats is a manifestation of his moving poetry. Given stanzas of the poem are the closing remarks of the central character of the poem known as "Knight-at-arms". **Write a summary** of the given three stanzas.	I saw pale kings and princes too, 　　Pale warriors, death-pale were they all; They cried— "La Belle Dame sans Merci 　　Thee hath in thrall!" I saw their starved lips in the gloam, 　　With horrid warning gapèd wide, And I awoke and found me here, 　　On the cold hill's side. And this is why I sojourn here, 　　Alone and palely loitering, Though the sedge is withered from the lake, 　　And no birds sing.

3.3.3.   Extended Response Question (ERQ):

Extended response items are those items where students are asked to give a detailed answer to a question, hence allowing them to write down their detailed view point in response to a question. ERQs are best for measuring higher order thinking skills.

3.3.3.1. Constructing Effective ERQs

While constructing an Extended Response Questions following guidelines may be considered:

- Be clear about the requirement of the SLO

- In constructing ERQs, the time limitations should be considered.

- Items should be constructed in such a way that it may look attractive and motivating for the students.

- Clearly identify the main points to be addressed in the ERQ.

- The question posed in the question paper should address the scope and limitations of the required response.

- In order to cover maximum ideas (SLOs), the ERQs may be divided into sub-parts or questions. However, these sub-parts should have more marks than the marks of the SRQs.

3.3.3.2. Example of SLO Based ERQ:

حاصلاتِ تعلم: کسی بھی موضوع پر اپنے وسیع تر مطالعے کی روشنی میں ترتیب، استدلال، عمدہ مثالوں کے ساتھ منظر نگاری، مکالمہ نگاری، کردار نگاری، کہانی، انشائیہ یا مضمون وغیرہ کی صورت میں تحریر پیش کر سکے۔
سوال: دیے گئے عنوان پر ۲۵۰ الفاظ پر مشتمل مضمون تحریر کیجیے۔   "امن: معاشی ترقی کا ضامن"   عالمی معاشی منظر نامے اور امنِ عامہ کی صورت حال کا بھرپور تقابلی جائزہ سود مند ہو گا۔

3.4. Proof Reading of Question Papers

After formation of question papers, it is mandatory to validate it against the set criteria and requirements. Thus, the proof reading is mandatory. While proof reading, along many others, following aspects should be kept in consideration:

i. The question paper is based on curriculum and not on a particular textbook.

ii. The question paper is valid (measuring accurately and well) and reliable (measuring consistently);

iii. The Question Paper is strictly from within the prescribed curricula and is aligned with SLOs according to the Model Question Paper;

iv. Marks of every question, every section and total number of marks of the Question Paper are according to the Model Question Paper;

v. Numbers of questions in each section are in accordance with the Model Question Paper;

vi. The question paper covers and represents all the SLOs to the possible extent;

vii. The question paper **does not** contain material which can cause ethnic, social or religious hatred in the country;

viii. No Spelling, Grammar and Technical mistakes (Scientific terms, mathematical expressions, chemical formulae, botanical / biological names and statistical terms etc.) have been left unchecked;

ix. There is **only one correct** answer for each Multiple-Choice Question (MCQ) which has been checked and necessary correction (if any) has been made. The distracters have also been checked/reviewed and necessary corrections (where required) have been made in order to make them logical, rational and stronger and in order to attract the low achievers. Moreover, week distracters like all of them, none of the above, both A and B etc. have been removed;

x. The question paper is balanced and it discriminates among the abilities of all categories of the candidates (i.e., below average, average and above average / brilliant students)

xi. The question paper is solvable by an average student within the stipulated / allocated time;

xii. No question has been repeated in any of the three/four sections of the question paper;

xiii. No question has been repeated in the two simultaneously set question papers;

xiv. The supplementary material (i.e., Graph Paper, Drawing Paper, Log Table, Periodic Table and Calculator etc.) which is required in the examination hall has been mentioned against the relevant question in the Question Paper in the form of additional note(s);

xv. The supplementary material recommended at point (xiii) above will not become cheating material for the rest of the question paper;

xvi. The language of questions is correct, simple, precise and easily understandable; and

xvii. The Urdu version (if applicable) is equally good and corresponds with its English version. At the same time both the versions communicate the same sense, meaning, tone, connotations and context.

Marking Scheme and Rubrics

4.1. General

In order to evaluate the responses, following terms are used:

Table 4-1 A brief of fundamentals of assessments' evaluation

Answer Key	Limited to MCQs only
Solution	Possible answers of the Questions and are mandatory for developing Rubrics
Rubrics	A detailed evaluating predefined-criteria for scoring SRQs and ERQs
Marking Scheme	Award of marks according to required response

4.1.1.   *Formation of answer key and solution*

A solution set/answer key is prepared at the time of paper development, keeping in view the requirement of the question(s). The total number of marks available for each question and each part of a question is shown in the marking scheme and must tally with the marks shown on the question paper.

Following are some of the guidelines:

- Select the correct answer for each question
- State the responses in a standardized manner with sufficient detail
- Allocate marks for each question and parts of a question, with a detailed breakdown where necessary; each mark should reflect equal demand.
- Include instructions for assessing the quality of written expression, where applicable.

4.1.2.   *Marking Scheme and Rubrics*

Marking scheme is a system of awarding marks to responses or part of a response in an examination. A rubric is a useful assessment tool that evaluates a student's response

in terms of a particular score, point or grade. Rubrics clearly outline the criteria and expectations for one or more categories as they relate to a particular response.

4.1.3.   Basic Design of Rubric

A rubric improves marking efficiency. It has three parts: criteria, standards and performance descriptors.

- Criteria - the properties or characteristics used to judge the quality of the assessment task/ answer.
- Standards - the levels of achievement or performance.
- Performance Descriptors - the qualities required to demonstrate achievement of each standard for each criterion.

Table 4-2 Parts of rubrics

Criteria	Standards					
	I	II	III	IV	V	VI
Criterion A						
Criterion B						
Criterion C						
Criterion D						

4.2. Developing Assessment Rubrics

A good rubric communicates criteria and standards simply, concisely and clearly. It also provides sufficient detail to assist assessors, guide students and facilitate feedback. Following are the key steps in developing rubrics:

I.   Model answer/solution (refer or develop)

II.   Identification of important steps (refer or develop)

III.   Description of criteria for each step

IV.   Development of Grid/Matrix

V.   Add a descriptor or numerical score to each performance level

4.3. Flexibility in Solutions and Rubrics

Preparing a marking scheme ahead of time helps the paper setter to review the questions, to think about possible alternative answers that might come up, and to verify that they are really testing the Student Learning Outcomes (SLOs).

I. Make a user-friendly marking scheme/rubric to ensure that all the external examiners, assessors, paper checkers inside and outside the country can easily understand the marking scheme.

II. Give consequential marks. Generally, rubrics/marking schemes do not deduct marks for the same error repeatedly. If an error is made early but carried through the answer, mark is only deducted once if the rest of the response is sound. Allot positive marks only; learners gain marks for valid answers and no negative marking for incorrect or irrelevant answers.

III. Review the rubrics/marking scheme after the exam if maximum students interpreted the question in a way that is different from what was intended by the paper setter.

IV. Make notes on question paper, when marking, to clarify a particular mark, if needed. Notes help the students to understand their mistakes and correct them. It will also help to review their exam paper in case of rechecking.

Understanding Model Question Paper

5.1. General

It is a known fact that every subject has its own demands to be taught in a suitable way which requires different competencies to be tested for reliable evaluation of learners' achievement. Similarly, it can also be understood that development of a question paper, in the light of a defined curriculum, demands a better and reasonable understanding of curriculum and its SLOs. Having acquired the knowledge regarding the relevant curriculum would be pivotal for setting an SLO based question paper.

This unit deals with the practical orientation of the SLO based model question papers and alignment of their different question items with relevant SLOs.

5.2. Model Question Paper

Model question paper is a specimen question paper that sets the tone for the upcoming summative examination at the end of the academic year/term/session. It preferably comprises of three different parts namely Section A (Multiple Choice Questions), Section B (Short Response Questions) and Section C (Extended Response Questions). These sections are designed in such a manner to evaluate the true abilities of the candidates appearing in the examination in variety of test types. Principally, emphasis is laid upon the strengths of the students and not the weaknesses; thus, use of facilitative language and necessary aid-material is ensured along with the model question papers. The pattern of model question papers will be followed in the actual examinations.

5.3. Producing Questions from SLOs

In this section, we shall practically identify the requirements of each section of the model papers in the light of the curriculum and develop some sample questions and their rubrics accordingly. We shall learn about the spread of different cognitive levels and different knowledge areas within the curriculum as well as its comparison with the policy guidelines issued from FBISE time to time.

Moderation and Super-Moderation of a Question/ Item

Through paper-pencil different assessment questions/ items are written to gauge students' abilities. These include: Multiple Choice Questions, Short Response Questions and Extended Response Questions.

6.1. Moderation of Multiple-Choice Questions:

A well-constructed and a good MCQ consists of a positively worded leading statement or "stem", followed by four possible answers consisting of one agreed correct answer and three wrong answers or "distractors". A well-worded stem focuses on a single concept.

6.1.1.   *Important points to be considered while moderating MCQs:*

- Does the stem test the skill/knowledge/attitude that is called for by the SLO given in the curriculum?
- Is it aligned with the test specifications?
- Does the item measure something worth measuring or it is trivial or unimportant?
- Is the information asked in the stem, accurate and valid?
- Is there significant better way to test what the item tests?
- Does the item assess the appropriate cognitive level as given in ToS?

6.1.2.   *Validity of information*

Following points are to check the validity of information:

- Information has been taken from a reliable source
- Only authentic information is given in assessment strategy
- Authenticity has been cross-checked
- Content experts/specialists acknowledge the information

6.1.3. Plausibility of distracters:

An MCQ with four options is the most popular format of testing because of its 25% guessing factor. Therefore, in an MCQ four options should have one correct answer and three plausible distractors. A good distractor should be inferior to the correct answer but should also be plausible and attractive to a non-competent candidate or those who have partial concept. Among four options if one or two distractors are not working its guessing factor will be 33% and 50% respectively instead of 25%.

Moreover, all the above, none of the above should also be avoided in the options. Following points should be considered for review/moderation of options of an MCQ:

- Do all the options overlap?
- Are they in order? (Smallest to larger)
- Are they reasonably parallel in structure?
- Do they fit logically and grammatically with stem?
- Are they homogenous in content?
- Are they almost similar in size?
- Are they clear and concise?
- Are these distractors from the same class?
- Is there a single and correct answer in the given options?
- Is there a better key in the MCQ?
- Is there any pattern for placement of key in the test?

6.1.4. Solution Time:

According the literature time allocation for an MCQ varies significantly across cultural settings, students' demographic and academic backgrounds, and students' skills and values. Time ranges from 45 seconds to 90 seconds, in our context, at SSC and HSSC levels, time for each MCQ around one minute (60 seconds) is quite appropriate.

6.2. Super Moderation of MCQs

Super moderation should be conducted for MCQs in the context of following questions:

Question	Yes	No
▪ Is the stem worded clearly and appropriately?		
▪ Is the language of the stem understandable?		
▪ Is the stem of the item is concise?		
▪ Is the stem is directed?		

▪	Is the language of the stem / stimulus including distracters is correct i.e., grammar, punctuation, capitalization, and spelling?		
▪	Is the item in accordance with given format of MCQs?		
▪	Is the stem stated in a positive form?		
▪	If negative wording is used in the stem, it is emphasized in bold or by underlining.		
▪	Are the options parallel and homogeneous?		
▪	Are options grammatically consistent with the stem?		
▪	Is the key a correct and best answer?		
▪	Is there not any specific pattern of placement of key in the question paper?		
▪	Is the difficulty level tagging with each MCQ appropriate?		
▪	IS the item free from religious, regional, gender, cultural and ethnic biasness?		

The answers to all above questions should be in 'Yes'.

6.3. Moderation of SRQs

Short-Response Questions (SRQs) are usually open-ended questions in which the students are required to produce a precise answer. These types of question are usually used in examinations to assess the lower levels of cognitive domain that includes knowledge and understanding (and sometimes small applications) of a particular topic or subject. These questions require short and precise answers such as providing some fundamental information, giving short description or describing some qualitative of a specific article in consideration with or without diagrams and brief explanation. Responses may also be in bullet form or leading pointers [7].

6.3.1.   *Check for Correction of Information*

It is fundamental that every item written for any subject measures content domain and cognitive level. These two elements together provide evidence about what students know and are able to do. Therefore constructed-response items should allow students to provide explanations, support an answer with reasons or numerical evidence, draw diagrams, or display data. But most importantly, the information (asked or provided) should be correct, authentic and updated. Similarly, there must not be any disrespect for any gender, class or religion.

It may also be ensured that language is appropriate to the age and experience of the target students. Use simple vocabulary and sentence structure, and avoid using

complicated words in the item. Sometimes uncommon usage of language and terminologies lead to irrelevant direction and question itself becomes a language barrier.

6.3.2.   Validity of Information:

Irrelevant information leads student to undesirable direction; therefore, it should be eliminated from the stem. Unnecessarily, it increases the difficulty of the test items. The information given in the test item should be the requirement of the curriculum. It may be ensured test item given in the paper has similar understanding by each student and give same meaning as per demand of learning outcomes. The item should not be misleading at all. SRQs are mostly intended to assess higher cognitive process as well as lower cognitive process; therefore, the items may be developed and reviewed to assess the higher order skills.

6.3.3.   Requirements in accordance with marks

The verbs used in SRQs should be used in accordance with the requirements of marks. Verbs like 'discuss, elaborate, or explain' should be avoided as these verbs may better suit for Extended Response Questions (ERQs) but not so much for SRQs. Such words create ambiguity and allow students to utilize more time which is not aligned with the marks. SRQs should also have relatively easy items because this portion plays significant role determining the performance of the student particularly in high stakes examinations. However, few challenging SRQs may also written to discriminate between high achievers and low achievers.

6.3.4.   Testing Solution

When reviewing items, it is important to consider the time required for students to complete the required task. The amount of time required to complete an item should be consistent with the time allotment for items in the overall paper sections. Normally, SRQs in FBISE's context, carry 03 to 05 marks. Therefore, solution time may be around 5-10 minutes for each question i.e., SRQs or as per FBISE policy.

6.3.5. Rubrics for SRQs

The items in the paper should have clear and aligned rubrics. It may be ensured that the rubrics developed are unified for all markers and there is no choice of personal opinion during the marking process.

Before scoring, the major components/steps are defined and assigned marks. There should be a ***Model Answer*** with examiners so that they read and compare the student's answer with the model answer. If all the necessary elements are present, the student receives the maximum number or marks. Partial credit is given based on the elements included in the answer. In order to arrive at the overall exam score, the instructor adds the points earned on the separate questions.

6.4. Super Moderation of SRQs.

Super moderation of an SRQ should be conducted keeping in view the following points:

i.   Language of the item is clear, concise and to-the-point
ii.   The prompt has the ability to assess required content and cognitive level
iii. The language is motivating and attractive
iv.   Connotation is correctly and properly defined
v.   There is no confusion in the item/prompt

6.4.1. Fixing the confusion

If there is any ambiguity about the content, cognitive level, terminologies, layout, vocabulary, solution time and rubric of the SRQ required then first it may be identified and the same may be discussed, reviewed with item developer or reviewer.

6.5. Moderation of Extended Response Questions (ERQ)

ERQs are used for assessing higher order learning outcomes. When students compose a response in many sentences, their real abilities and depth of learning can be better assessed. Therefore, it is believed that ERQs is the most useful assessment strategy at the synthesis or evaluation levels of cognitive domain. To gauge the abilities of students with reference to organizing, integrating, expressing, and evaluating information, ideas, etc. Extended Response Questions are used.

6.5.1. *Validity of Information*

While constructing an Extended Response Questions following guidelines must be considered:

i. Information given in the question is correct and authentic.

ii. Be clear about the requirement of the SLO then develop an ERQ.

iii. The time limitation/ allocation should be considered for appropriate response.

iv. Items should be constructed in such a way that it may look attractive and motivating to the students.

v. Clearly identify the main points to be responded by the students.

vi. The scope and limitations of the required response is explicitly given.

vii. The language of the Prompt should be simple and to the point for accuracy of response.

viii. The writer of ERQs must develop its possible response for reference and record for examiners.

ix. Specify the time allotment for each item and/or specify the maximum number of points to be awarded for the "best" answer to the question.

x. Divide a question into separate components when there are obvious multiple questions or pieces to the intended responses.

6.5.2. **Rubrics for Scoring ERQs**

Rubrics allow for standardized evaluation of students' responses. It makes marking more systematic and scientific as well as simpler and transparent. A rubric may vary from simple checklists to elaborate combinations of checklist and rating scales. Keeping in view rubrics, marks can be assigned more efficiently and systematically. An example of the rubric is given below:

Question:
Describe five the most important factors of unemployment in Pakistan. (10 points)

Rubrics

- 1 point for each of the factors named, to a maximum of 5 points
- 1 point for each appropriate description of the factors named, to a maximum of 5 points
- No penalty for spelling, punctuation, or grammatical error

- o No extra credit for more than five factors named or described.
- o Extraneous information will be ignored.

6.6. Super Moderation of ERQs

Super Moderation is mandatory to ensure error free assessment particularly when assessment has high stakes. It is a process to judge students' responses against wisely and professionally developed questions/ items to award accurate marks to students' abilities. It ensures that granted marks or grades are reliable and valid. It further defines that marking criteria has been applied consistently and differences in academic judgment between individual markers are addressed wisely.

Super moderation of ERQs should be conducted keeping in view the following points:

i. The question measures an SLO given in the curriculum.
ii. Language of the item is clear, concise and to-the-point.
iii. The prompt has the ability to assess required content and cognitive level.
iv. The language of the item/ question is motivating and attractive.
v. Connotation is correctly and properly defined.
vi. There is no biasness against ant religion, region, belief system, race, segment of a society, etc
vii. There is no confusion in the item/prompt to have accurate response by the students.

6.6.1. Fixing the confusion

If there is any ambiguity about the content, cognitive level, terminologies, layout, vocabulary, solution time and rubric of the ERQ required then first it may be identified and the same may be discussed, reviewed with item developer, reviewer or any relevant authority.

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Appendix A List of commonly used command words with examples

WORD	MEANING	EXAMPLE
Define	Only a formal statement or meaning of the term required.	Define the term "energy".
What is meant by	Implies that a definition should be given, together with some relevant comment on the significance of the term(s) concerned.	What is meant by the term "weak acid"? Give one example.
Explain	Make clear; interpret the term or process; express clearly.	Explain the central idea of the poem…. /Given verses.
State	Implies a concise answer with little or no supporting argument; tell in a straight-forward or brief manner.	State Boyle's law.
List	Requires a number of points with no elaboration. Where a given number of points are specified, this should not be exceeded.	List the components of an ecosystem.
Describe	Give an account of; talk about; to state in words.	Describe the two functions of the parliament.
Discuss	Requires candidates to give a critical account of the points involved in the topic; examine a topic thoroughly.	Discuss the oxidation process with examples.
Deduce/Predict	Implies that candidates are not expected to produce the required answer by recall but by making a logical connection between the given pieces of information.	Deduce the empirical formula of the given compound----.

WORD	MEANING	EXAMPLE
Contrast	Bring out the points of difference.	Contrast between forest and desert environments.
Compare	Tell what is similar or different between things or processes.	Compare the games of basketball and cricket.
Criticize	State your opinion of the correctness or merits of an item or issue.	Criticize the use of nuclear power for generating electricity.
Enumerate	Name or list in some order and in concise form.	Enumerate the Prime Ministers of Pakistan.
Evaluate	Give the good points and the bad ones; explore the advantages and disadvantages of.	Evaluate the use of teaching machines in classroom learning.
Suggest	To apply their general knowledge to a 'novel' situation.	Suggest a media slogan against air pollution in your region.
Calculate	Is used when a numerical answer is required. Working to be shown.	Calculate the oxidation number of Mn in $KMnO_4$.
Measure	Implies that the quantity concerned can be directly obtained from a suitable measuring instrument, e.g., length, using a ruler.	Measure the angles of the triangle using a protractor.
Determine	Often implies that the quantity concerned cannot be measured directly but is obtained by calculation.	Determine the density of a solid by measuring its mass and volume.

WORD	MEANING	EXAMPLE
Show	To derive a given result stating important steps.	Show that the two identical balls will interchange their speeds after head on collision between them.
Write	To state; to record; to put on paper.	Write a letter to the editor ------/or a story on the-----/ an essay on -----.
Estimate	A reasoned order of magnitude or calculation of the quantity concerned.	Estimate in km the distance in one light year.
Sketch	When applied to graph work, implies that the shape and/or position of the curve need only be qualitatively correct. On a sketch graph it is essential that candidates clearly indicate what is being plotted on each axis.	Sketch the velocity of a ball thrown vertically upward against time.
Sketch/Draw	In case of diagrams, a simple, freehand drawing is acceptable.	Draw structure of nitric acid.
Analyze	Break the process into parts and show their linkages.	Analyze the working of a diesel engine.
Illustrate	Use a picture, diagram, sketch, chart of concrete example.	Illustrate the main steps of the nitrogen cycle in the environment.
Interpret	Make plain; give the meaning of; give your thinking about the meaning of.	Interpret the information reflected from the graph.

WORD	MEANING	EXAMPLE
Justify / Show how	Give reasons for; give evidence and facts to support your position.	Justify the American entry into World War II.
Outline	Give in order, the main points of; give a brief overview of a topic.	Outlines the issues of an urban environment.
Summarize	Briefly give the basic points of a topic or review the main points. No detail.	Summarize the play---/the story--/given paragraph.
Trace	Give a description of the development of events.	Trace the development of counting machines from the abacus to the microcomputer.
Label	Identify and write the names of the parts of a structure/diagram/body.	Labels the names of internal organs in the figure of the human body.
Demonstrate	To show clearly the learning.	Demonstrate the working of an AC generator.
Classify	To arrange or organize according to the category.	Classify the biotic and biotic components of a pond ecosystem.
Relate	To give logical linkage or rational association.	Relate the civic sense of a community with its literacy rate.
Find out	General term to calculate measure or determine.	Find out the potential energy of a body of 5 kg at a height of 8 m.

WORD	MEANING	EXAMPLE
Carry out	To put into practice or effect.	Carry out one day study of traffic violations on a busy road in your town and submit a brief report

Appendix B Sample Rubrics

Rubrics for Short Questions /Restricted Response Questions

Criterion/ Rating Scale	Excellent Response 3 Marks	Average Response 2 Marks	Below Standard Response 0 - 1 Mark
Ideas/Content	clear and well-expressed, including specific examples to demonstrate what is learnt (1)	More specific information is needed /needs to follow the directions more closely (1)	There is no clear or specific explanation in answer to the question. (0-0.5)
Use of terms	All terms are fully defined and used in the proper context. (1)	A few terms, related to context are used, reflecting insufficient understanding (0.5)	No terms from the lesson/context are used. (0.5)
Sentence Fluency & structure	Sentences are complete and they connect to one another easily. No structural mistakes / errors (1)	Some sentences are complete. Mistakes make it hard to mark. (0.5)	Sentences are incomplete, contain irrelevant details. Answers contain numerous spelling or structural errors (0)

Rubrics for Long Questions /Extended Response Questions

Criterion/ Rating Scale	Excellent Response full Marks	Average Response 50% Marks	Below Standard Response 0 - 1 Mark
Ideas/Content	Accomplishes the task, Clear and well-expressed answer, including specific details/ information	Attempts to accomplish the task, less specific information / details shared	Fails to accomplish the task, there is no clear or specific details in answer
Explanation	Provides explanation that address How & Why phenomenon with logical sequence	Provides very little/basic explanation, beginning/ending is abrupt	Does not provide any explanation at all, with disconnected details
Use of vocabulary	All terms are fully defined and used in the proper context.	. A few terms related to context are used, reflecting insufficient understanding	No terms related to the context are used.
Sentence structure	Sentences are complete and they connect to one another easily. Errors do not hinder overall clarity of the concept.	Some sentences are complete. Mistakes make it hard to comprehend the concept shared.	Sentences are incomplete, contain irrelevant details. Errors impede overall clarity of concept.
Examples / Evidences/ Reasoning	Shares particular examples & evidences/reasoning to support the question.	Shares example but cannot provide any evidence/reason to support the question.	Shares little/vague or no example / evidence to support the question.

Specific Examples
Subject: Chemistry

Question: Draw Bohr's Atomic Model for Potassium $^{19}K_{39}$ indicating the location of electrons, protons and neutrons (3 marks)	
SLO: Describe the structure of an atom representing the location of protons, electrons and neutrons.	

Criterion/ Rating Scale	Excellent Response 3 Marks	Average Response 2 Marks	Below Standard Response 0 - 1 Mark
Design of an atom	Show proper arrangement shells, placement electrons in each shell around the nucleus (1)	Atom structure is correct but has some flaws. (0.5)	Atom structure is not accurate/not drawn (0)
Calculation	Correct calculation of numbers of electron, protons & neutrons from the data shared. (1)	Correct numbers of electron, protons & neutrons written directly without any calculation. (0.5)	No/Incorrect calculation of numbers of electron, protons & neutrons. (0)
Diagram with labeling	Neat and well-drawn labeled diagram for Potassium reflecting its electrons, protons & neutrons (1)	Labeled diagram for Potassium reflecting its electrons, protons & neutrons (1)	Incomplete diagram (0.5) or wrong diagram (0) or Diagram is correct but wrong labeling (0.5)

Question: Define ionic bond. Give one example of two elements forming an ionic bond between them. (3 marks)
SLO: Describe the characteristics of ionic bonds (compounds).

Criterion/ Rating Scale	Excellent Response 3 Marks	Average Response 2 Marks	Below Standard Response 0 - 1 Mark
Ideas/Content	Student has a very good / firm grasp of the Ionic Bond Concept /definition (1)	Student has basic understanding of the concepts of Ionic bonds. (0.5)	Student has no understanding of the concepts of Ionic bonds (0)
Selection of Elements	Correct selection of atoms (as an example) based on their number of electrons are in outer shell (1)		Incorrect selection of atoms (0)
Diagram with labeling	Draws neat and labeled diagram (electron dot diagram) that illustrates ionic bonds between two atoms (1)	Labeled diagram showing ionic bonds between two atoms. No steps-wise bond formation shared (0.5)	Incomplete diagram (0.5) or wrong diagram (0)

Rubrics for Long Questions /Extended Response Questions

Question:	(a) Describe Rutherford's Experiment and its conclusions. (6)
	(b) Why is the boiling point of water 70∘C at the top of Mount Everest? (4)

Criterion/ Rating Scale	Excellent Response Full Marks	Average Response 50% Marks	Below Standard Response 0 - 1 Mark
Ideas/Content	Clear and well-expressed answer, including specific details/ information (1)	Very precisely expressed, less specific information / details shared (0.5)	Fails to accomplish the task, there is no clear or specific details in answer (0)
Explanation/ reasoning	Provides explanation that address How & Why phenomenon with logical sequence (1-2)	Provides very little/basic explanation, beginning/ending is abrupt (0.5-1)	Does not provide any explanation/reasoning at all, with disconnected details (0)
Use of vocabulary	All terms are fully defined and used in the proper context. (1)	A few terms related to context are used, reflecting insufficient understanding (0.5)	No terms related to the context are used. (0)
Sentence structure	Sentences are complete and they connect to one another easily. Errors do not hinder overall clarity of the concept. (1)	Some sentences are complete. Mistakes make it hard to comprehend the concept shared. (0.5)	Sentences are incomplete, contain irrelevant details. Errors impede overall clarity of concept. (0)
Example / Diagram (If required)	Shares particular examples/ evidences or diagram to support the answer. (1)	Shares incomplete diagram/example to support the answer. (0.5)	Shares no example / diagram to support the answer. (0)

Rubrics for Long Questions /Extended Response Questions

Question: (a) Define isomerism. Make all possible structural isomers of C4H10O, classify each giving IUPAC names. (1+2+2+2)			
Criterion/ Rating Scale	Excellent Response Full Marks	Average Response 50% Marks	Below Standard Response 0 - 1 Mark
Definition/ Content	Clear and well-expressed answer, including specific definition (1)	Less precisely stated definition (0.5)	Fails to define or share specific details in answer. Errors impede overall clarity of concept. (0)
Structures / Diagram	Shares all possible structures/ diagram to support the answer. (2)	Shares one of the diagram/structures to support the answer. (1)	Shares no structure / diagram to support the answer. (0)
Classification	Correct Classification (2)	Partially correct classification (0.5)	Incorrect classification /naming. (0)
IUPAC Naming	correct naming as per rules (2)	Partially correct naming (1)	Incorrect naming. (0)

Rubrics: SSC-I Model Paper 2021
Subject: Computer Science

Q# Part#	Criteria	Level I (Marks)	Level II (Marks)	Level III (Marks)	Level IV (Marks)
2(i)	Benefits and drawback of Laser Printer	Correct two benefits (2)	Correct one benefit (1)	Irrelevant/wrong Answer (0)	
		Correct one drawback (1)	Irrelevant/wrong Answer (0)		
2(ii)	Characteristics of third generation computer	Three correct characteristics (3)	Two correct characteristics (2)	One correct characteristic (1)	Irrelevant/wrong Answer (0)
2(iii)	Memory Management is an important function	Correct Justification of memory Management (3)	Partially Correct Justification of memory Management (1.5)	Little Correct Justification of memory Management (1)	Irrelevant/wrong Answer (0)
2(iv)	Purpose of Freeware and Shareware	Correct Purpose (1)	Partially Correct Purpose (0.5)	Irrelevant/wrong Answer (0)	Irrelevant/wrong Answer (0)
	Example	Correct example of each (2)	Correct example of anyone (1)	Irrelevant/wrong Answer (0)	
2(v)	Definition of three transmission impairments	Correct Definitions of each (1+1+1)	Partially Correct Definition (0.5+0.5+0.5)	Irrelevant/wrong Answer (0)	
3	Explanation of four types of unguided Transmission	Correct explanation of each type (2+2+2+2)	Partially Correct explanation of each type (1+1+1+1)	Little Correct explanation of each type (0.5+0.5+0.5+0.5)	Irrelevant/wrong Answer (0+0+0+0)
4	Explanation of four data communication lines	Correct explanation of each communication line (2+2+2+2)	Partially Correct explanation of each communication line (1+1+1+1)	Little Correct explanation of each communication line (0.5+0.5+0.5+0.5)	Irrelevant/wrong Answer (0+0+0+0)

Assessment Rubric for Picture Description   (Total Marks 6)

Criteria	Exceptional 2 pts	Very Good 1.5 pts	Average 01 pts	Emergent 0.5 pt	Total
Organization of ideas	Includes 4 elements of a good writing: Introduction Topic sentence Supporting sentences conclusion	Includes 3 elements of a good writing: Introduction Topic Sentence Supporting Sentences Conclusion.	Includes 2 elements of a good writing: Introduction Topic Sentence Supporting Sentences Conclusion.	Includes 1 elements of a good writing: Introduction Topic Sentence Supporting Sentences Conclusion.	
Vocabulary	Student uses sophisticated and varied vocabulary to express ideas suited to the topic.	Student uses appropriate vocabulary to express ideas suited to the topic with no vocabulary errors.	Student uses some appropriate vocabulary to express ideas suited to the topic with 1-2 vocabulary errors.	Student uses limited and repetitive vocabulary to express ideas suited to the topic	
Sentence structure and Grammar	Student makes no sentence structure and grammar errors at all.	Student makes one or two sentence structure and grammar errors.	Student makes three or four sentence structure and grammar errors.	Student makes five or six sentence structure and grammar errors.	

Assessment Rubric for Comprehension (Total Marks 3)

Criteria	Very Good	Average	Limited	Total
Understanding	1 Point Response is thoughtful and demonstrates clear under of text, is clearly supported with specific and relevant information from the text.	0.5 point Demonstrates some understanding of the text but includes limited or no examples from text, a basic understanding is shown by including some relevant information from text to support ideas.	0 point Demonstrates little if any understanding of text, response is illogical and vague.	
Detail	1 Point Shows ability to explore and further develop more ideas found in the text using specific and relevant information.	0.5 point Shows some ability to explore or develop ideas presented in text by including some relevant information from the text.	0 point Shows limited or no ability to explore the text or develop ideas from the text, incomplete or limited connection between ideas and text.	
Connection	1 Point Is able to make thoughtful, clear, and understandable connections between texts, other texts, and/or outside experiences and knowledge that are supported with relevant examples.	0.5 point Shows some ability to make some connections between texts, and outside experiences and knowledge, but does not use relevant information from text to support response.	0 point Shows little or no ability to make important connections between texts, other texts, and/or outside experiences and knowledge.	

Assessment Rubric for Paraphrasing (Total Marks 2)

Criteria	Meets	Needs Improvement	Total

Content Information	0.25 point
	  Accurately conveys main idea and all relevant information from the source text without being too specific
	  Avoids use of personal opinion
		0 point
		The information conveyed is not specific.
		Personal opinion is repetitively given.	

Word Choice	0.25 point Grade level word choice and avoids weak/ overused words	0 point Vocabulary used is very weak and replication of words.	
Correct Convention	0.25 point Spelling Punctuation Correct use of Grammar	0 point There are spelling and grammatical errors.	
Organization	0.25 point Writing is well organized and follows information found in original text	0 point Ideas or points are not connected.	

Assessment Rubric for Letter Writing (Total Marks 6)

CATEGORY	Exceptional 1 pts	Very Good 0.5 pts	Average 0.25 pts	Emergent 0 pt	Total
Salutation and closing	Used one salutation and closing and have no errors in capitalization and punctuation.	Used one salutation and closing and have 1-2 errors in capitalization and punctuation.	Used one salutation and closing and have 3 or more errors in capitalization and punctuation.	Salutation and/or closing are missing.	
Ideas	Ideas were expressed in a clear and organized fashion. It was easy to figure out what the letter was about.	Ideas were expressed in a pretty clear manner, but the organization could have been better.	Ideas were somewhat organized, but were not very clear. It took more than one reading to figure out what the letter was about.	The letter seemed to be a collection of unrelated sentences. It was very difficult to figure out what the letter was about.	
Sentences & Paragraphs	Sentences and paragraphs are complete, well-constructed and of varied structure. Each new idea starts a new paragraph.	All sentences are complete and well-constructed (no fragments, no run-ons). Paragraphing is generally done well. Most new ideas start new paragraphs.	Most sentences are complete and well-constructed. Paragraphing needs some work. Some new ideas start new paragraphs.	Many sentence fragments or run-on sentences OR paragraphing needs lots of work. All ideas are grouped into one paragraph.	
Grammar & spelling (conventions)	Writer makes no errors in grammar or spelling.	Writer makes 1-2 errors in grammar and/or spelling.	Writer makes 3-4 errors in grammar and/or spelling	Writer makes more than 4 errors in grammar and/or spelling.	
Capitalization and Punctuation	Writer makes no errors in capitalization and punctuation.	Writer makes 1-2 errors in capitalization and punctuation.	Writer makes 3-4 errors in capitalization and punctuation.	Writer makes more than 4 errors in capitalization and punctuation.	
Content	Message stated is clear, precise, and shows insight. Letter has three or more paragraphs. Letter encourages a response from the reader.	Message is clear. Letter has two paragraphs.	Message is mostly clear. Letter is one paragraph in length.	Message is not focused. Ideas wander. The reader may have to infer at times.	

Assessment Rubric for Paragraph/ Essay Writing (Total Marks 12)

Criteria	EXCELLENT 2 Points	VERY GOOD 1.5 points	AVERAGE 1 point	NEEDS IMPROVEMENT 0.5 points	UNACCEPTABLE o point	Total
Ideas	This paper is clear and focused. It holds the reader's attention. Relevant details and quotes enrich the central theme.	This paper is mostly focused, and has some good details and quotes.	The writer is beginning to define the topic, even though development is still basic or general.	Topic is not well-defined and/or there are too many topics.	As yet, the paper has no clear sense of purpose or central theme. To extract meaning from the text, the reader must make inferences based on sketchy or missing details.	
Organization	The organization enhances and showcases the central idea or theme. The order, structure of information is compelling and moves the reader through the text.	Paper (and paragraphs) are mostly organized, in order, and makes sense to the reader.	The organizational structure is strong enough to move the reader through the text without too much confusion.	Sentences within paragraphs make sense, but the order of paragraphs does not.	The writing lacks a clear sense of direction. Ideas, details, or events seem strung together in a loose or random fashion; there is no identifiable internal structure.	
Sentence Fluency	The writing has an easy flow, rhythm, and cadence. Sentences are well built, with strong and varied structure that invites expressive oral reading.	The writing mostly flows, and usually invites oral reading.	The text hums along with a steady beat, but tends to be more businesslike than musical, more mechanical than fluid.	The text seems choppy and is not easy to read orally.	The reader has to practice quite a bit in order to give this paper a fair interpretive reading.	
Conventions	The writer demonstrates a good	The write understands	The writer shows reasonable control	The writer seems to have made little effort	Errors in spelling, punctuation,	

Criteria	EXCELLENT 2 Points	VERY GOOD 1.5 points	AVERAGE 1 point	NEEDS IMPROVEMENT 0.5 points	UNACCEPTABLE o point	Total
	grasp of standard writing conventions (e.g., spelling, punctuation, capitalization, grammar, usage, paragraphing) and uses conventions effectively to enhance readability.	good writing conventions and usually uses them correctly. Paper is easily read and errors are rare; minor touch-ups would get this piece ready to publish.	over a limited range of standard writing conventions. Conventions are sometimes handled well and enhance readability; at other times, errors are distracting and impair readability.	to use conventions: spelling, punctuation, capitalization, usage, grammar and/or paragraphing have multiple errors.	capitalization, usage, and grammar and/or paragraphing repeatedly distract the reader and make the text difficult to read.	
Presentation	The form and presentation of the text enhances the ability for the reader to understand and connect with the message. It is pleasing to the eye.	The format only has a few mistakes and is generally easy to read and pleasing to the eye.	The writer's message is understandable in this format.	The writer's message is only understandable occasionally, and paper is messily written.	The reader receives a garbled message due to problems relating to the presentation of the text, and is not typed.	
Word Choice	Sophisticated use of nouns, verbs make the essay very informative	Nouns and verbs make essay informative		Needs more nouns and verbs	Little or no use of nouns and verbs	

Assessment Rubric for Phrasal Verbs (Total Marks 1)

Criteria	Emerging 0 Point	Expanding 0.5 Point	Bridging 1 Point
Overall Description of Writing	Basic/Minimal knowledge of how to use Phrasal Verb in sentences Errors (grammar, syntax, semantic) often impede the meaning of the Written expression	Developing/Some knowledge of how to use Phrasal Verb in sentences Errors (grammar, syntax, semantic) sometimes impede the Written expression, but much of the meaning is retained	Approaching/substantial knowledge of how to use Phrasal Verb in sentences Written expression is approaching grade level proficiency

Marking criteria for translation into English (Total Marks 8)

Bridging 7-8 Marks	Expanding 4 – 6 Marks	Emerging 1-3 Marks	Total Points
8 Marks No errors in comprehension of the passage. Rendition of the passage into English conveys, as far as is possible for a translated text, all aspects of the sense of the original, including nuances of style, register, metaphor and cultural reference.	6 Marks Very good comprehension of the passage; any problems are handled resourcefully, resulting in an English version that reads clearly and convincingly with no mistranslations or awkwardness of style.	3 Marks General comprehension of a reasonable range of structures and vocabulary, but with evidence of inability to handle some or the more difficult areas. Evidence of a reasonable attempt to handle areas of difficulty should be awarded a mark at the top of the range. English version shows awkwardness and tendency to literal translation. Where some of the English lacks sense and there is a lack of ability to handle some basic grammar in the language of study, the work should be awarded a mark at the bottom of the range.	
7 Marks No problems of comprehension of the passage. The English version shows flair in use of English, which accurately renders the original in an appropriate register. The student correctly identifies all points of difficulty in the translation and shows imagination in dealing with them. Only one or two imperfections. Work which would be judged as excellent or very good at the next highest level of study.	5 Marks Good comprehension of the majority of structures and no significant difficulties with vocabulary. Demonstrates sensitivity to the mismatch between structures existing/in common use in the language of study and those existing/in common use in English. There may be a few mistranslations and one or two examples of awkwardness of style	2 Marks Satisfactory understanding of the original but shows inability to handle relatively common structures and vocabulary. There may be serious misunderstanding of part of the passage. The translation is literal, showing several instances of failure to produce a comprehensible English text.	
	4 Marks Good comprehension of the majority of structures and vocabulary, but attempts	1 Mark Understanding of a minority of the passage demonstrating inability to comprehend basic	

Bridging 7-8 Marks	Expanding 4 – 6 Marks	Emerging 1-3 Marks	Total Points
	to overcome translation problems posed by the passage are not always successful. English version reads well but shows some areas of unsuitable register, mistranslations and awkwardness of style. The student sometimes assumes wrongly that a grammatical or idiomatic structure that exists in the language of study also exists, or is in common use, in English.	grammatical structures and vocabulary in context. English version not able to convey the gist of the passage, lacks sense and is disjointed.	

Messages of the Developers and Reviewers

Expert	Message
 Mrs. Maryam Adeel Awan APSACS Secretariate, GHQ, Rwp.	Training Manual for Paper Setters and Question Item Writers is a great effort of FBISE. I am fortunate to be able to witness and work amongst diverse educational experts & to devise a module, which will help to address the following questions: • How can we ensure that our instructional design will help our students achieve their intended learning outcomes? • What pedagogic options do we have to make our teaching successful? • What assessment practices can help our students learn more effectively? I am always left astounded at the level of dedication and hard work FBISE put in every stage. May it reach every height of success! Ameen.
 Dr. Shafqat Ali Janjua Federal Directirate of Education, Islamabad	This gives me immense pleasure that FBISE has taken a long-standing initiative as required by National Curriculum since 2006 i.e., SLOS-based examination. It is truly "better late than never". It goes without saying that credit goes to the dynamic leadership of FBISE who not only thought, convinced policy makers and implemented but get prepared this SLO-Based Manual for test developers / item writers by involving assessment experts. This is a historic decision towards quality education as it may entirely revolutionize teaching learning processes where learning takes place. I am highly obliged that I was also given an opportunity to contribute in the manual. High stake examinations are always a driving force of any education system; therefore, this manual may be an excellent tool if it is used in an orderly fashion. I congratulate all those associates who contributed in any capacity. May Almighty bestow upon us the wisdom and courage to care about today's students because this is really caring about tomorrow's Pakistan!

Expert	Message
Ms. Oneeza Amber Asif Fauji Foundation Education System, Rawalpindi	Attaining a strong and coherent relationship between SLOs and assessment standards demands careful attention to what, why, and how of the authentic assessment. This manual highlights a comprehensive and thoughtful combination of assessment methods, techniques and rubrics for improved standards. It had been an insightful experience which not only enriched my knowledge and skills but also helped me understand the nature of work and notions followed in board as a policy maker and public and private sectors as stakeholders, the three edges of this triangle.
Dr. Tariq Javed FGEI (C/G) Directorate Rawalpindi	In the 21st century, the core responsibility of the question paper setters is to assess higher order thinking and constructive mind mapping under the umbrella of cognitive, affective and psychomotor skills among students. The holistic and analytical rubrics are essential tools for maintaining consistency and level of quality during the assessment process. FBISE is highly appreciated for designing and developing training module for question paper setters to enhance their capabilities as per needs of the digital era.
Ms Bushra Saqib Bahria Schools and Colleges Systems, Islamabad	This training manual for paper setters will serve not only as a sacred document regarding an effective assessment of students' learning outcomes envisaged in introduced curricula by Federal Board but also an embarkment towards taking the role of paper setter in overall learning process to the next level. I firmly believe that the sincere efforts that have been put in, to make this task worthwhile, will have their positive outcome manifested in the change we are all going to witness in future. In sha Allah.

Expert	Message
 Mrs. Riffat Jabeen FDE, Islamabad	An Education System cannot work in isolation in face of our globalized world and its multiple challenges. Rapid advancement in the fields of science and technology have made education system a complex, vibrant and dynamic activity. To meet the international standards Assessment in education also needs improvement and I appreciate the initiative taken by Chairman FBISE to conduct SLO based Examination and I feel greatly proud being part of this team. Improvement in Assessment will surely lead to change in teaching practices. This manual is a work of experts who are visionary and it is the product of their extensive deliberation and addresses the needs of paper setters. Now it is the ability of paper setters to conceive the idea and incorporate their skills in paper setting to achieve the desired outcome.
 Mr. Zulfiqar Ali Khan ESE, Khyber Pakhtunkhwa	Fortunately, this is Federal Board of Intermediate and Secondary Education Islamabad that has kept pace and moved forward for standardization of assessment and examination by developing the training manual for paper setters/item developers. In the past the focus of exams was tilted toward content only. Concepts and skills were ignored as if these weren't necessary for future success. Our students are extremely capable and can compete in the global setting if they are appropriately equipped. Change is a given. It will happen. Why not embrace change and continue to work towards achieving standards in our education that will make our students stand out among the international student community at par or better.

Expert	Message
Mr. Syed Zulfiqar Shah National Education Assessment System, Islamabad	It is an honor to be a part of development of Training Module of Paper Setters and Item Writers. It is a wonderful initiative by the FBISE under the supervision of Mr. Qaiser Alam. This was envisioned in National Education Policy 2009 that "National standards shall be developed to reduce the differences in quality across regions. Assessment processes shall be standardized and become uniform across the Boards over time, so that students appearing in examinations under different Boards are assessed against standardized benchmarks". This module will be pivotal in the paradigm shift for the enhancement of quality of education. It is because the examination system will slowly and gradually change from book-based examination to students learning outcomes-based examination. In the same time the paper setters have huge responsibilities to design representative question papers based on the provided guidelines.
Dr. Muhammad Idrees Govt. Gordon College, Rawalpindi	Assessment serves as an engine or driver to achieve educational objectives. It is an important and high-stake element of teaching learning process. Well-designed assessment can encourage active learning especially when the assessment delivery is innovative and engaging. Curriculum based assessment plays a vital role for engaging students towards higher order thinking and problem-solving skills. FBISE initiative for outcomes-based assessment will prove a game changer in the history of Pakistan. I hope this assessment manual will help all the stakeholders of test development to streamline procedures according to international practices.

Expert	Message
 Dr. Muhammad Azeem Punjab Examination Commission, Lahore	I am Dr Muhammad Azeem, Research Fellow, Punjab Examination Commission (PEC). I participated in development and review process of Training Manual for Paper setters. This manual will facilitate the paper setters to develop curriculum representative papers for measuring students' achievements based on Bloom's taxonomy of cognitive development levels.
 Mr. Suhail Bin Aziz National Curriculum Council, Islamabad	This is encouraging to see that FBISE has developed "Training Manual for Item Developers" with a collaborative effort of the assessment experts. Bringing the concerned experts from public and private sector on one platform for developing such an important document, using their expertise and rich experience, is indeed a laudable effort. It is hoped that reliable high stake summative assessments at SSC and HSSC level would help gauge true potential of the learners, not on the basis of rote learning but on their conceptual understanding. This document is expected to be a stone breaking step to bring a revolution in our teaching-learning practices.
 Mr. Javed Iqbal Fazaia TTI, PAF Complex, Islamabad	Students' Learning Outcome based examination at SSC and HSSC levels in Pakistan was not only a dream but also a challenge. FBISE accepted this challenge and took the initiative to conduct first ever exam of its nature in Pakistan. This training module will definitely help to train the teachers, and guide the experts for developing test items and setting papers, based on SLOs. It will play a pivotal role to change the dream into reality.

Expert	Message
 Dr. Nasir Mehmood Punjab Examination Commission, Lahore	It gives me immense pleasure to share my gratitude to Federal Board of Intermediate and Secondary Education for taking initiative towards developing a reliable and valid assessment by taking steps by declaring the in future assessments will be developed by considering skills and concepts to be measured rather than bookish content based on memory skills only. I am happy to contribute in developing manual for test developers and markers. I hope this will prove to be a milestone in the history for shifting paradigm from rote memorization to concept based assessment. I appreciate the efforts of Federal Board to be happen a changing catalyst at secondary and higher secondary level. Punjab Examination Commission is already doing this kind of assessment in Punjab at elementary level, so this act of FBISE will help to bridge the gap of learning and assessment systems. PEC is always happy to assist in developing assessment system at federal level.
 Mr. Muhammad Shaifque Awan ESE, Khyber Pakhtunkhwa	This training manual covers the best international practices of test development process for a quality exam construction. Guidelines given in the training manual are extremely helpful to understand the basic techniques of item writing and easy to follow the steps to assemble a good question paper. This great initiative of curriculum-based assessment will enable the existing examination system to cope with modern challenges and play a vital role in quality teaching and learning process.