



# **MATHEMATICS COURSE CONTENT STANDARDS AND THE SCHEME OF ASSESSMENT OF JKBOSE AND CBSE AT X, XI AND XII LEVELS: - A COMPARATIVE ANALYSIS.**

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## **Abstract:**

- Quality and nature of course content plays a vital role in achieving learning outcomes. Before developing the course content, one should be able to define the course goals. For instance, one should understand what students should learn. With this in mind, it will be easier to develop content for students by thinking which kind of content to include, teaching methods to use and what kind of exams, assignments and projects to be included.
- Assessments play an important and vital role in the system of education. Assessments or examinations are so important that they direct the entire teaching-learning process at school level. Generally, we use mainly one tool to evaluate the achievement of students and that is the 'Question Paper'. So, if examinations have to stay vital, a viable mechanism for evaluation and assessment becomes inevitable. Question papers, Scheme and pattern of Evaluation adopted by the State Boards of School Education and The Central Board of Secondary Education in their examinations need to be continuously examined and improved, especially for the purpose of improving the quality of education at the school stage. The objective of this comparative analysis is to find out whether the questions papers are valid and reliable and what are their strengths and weaknesses.

## **Introduction:**

- A standard course content requires careful planning and vision. Educationists need to keep in mind different criterion to develop any course content. Planning is very important to build a course content. The team of experts has to meet in advance to discuss the content, teaching methods, course policies, learning outcomes etc.
- Assessment of performance is an essential part of the teaching learning process. The National Policy on Education-2020 recommends a paradigm shift from traditional learning to a competency-based learning. It also recommends an improvement in the program of assessment to make it powerful tool of competency-based learning assessment to check quality of the teaching-learning process at school level. The National Curriculum Framework has also emphasized on the quality of questions used for evaluation of performance. It highlights that as examinations and tests assess student's ability to recall and remember bookish knowledge. All efforts to reconstruct the curriculum towards competency-based learning will be wasted. First of all, question papers should be designed to find out what children have learnt in subjects and check their ability of using that knowledge in real life problems. In other words, they should be able to apply that knowledge in their real-life problems or situations. Further, question papers must be able to find if the learner has learnt where to find information how to use that new information and to analyse and

evaluate the same. The types of questions that are set for evaluation should be beyond what is printed in the book. Higher order thinking and challenging questions could be used in question paper. It is known that examinations are important in our system of education. They influence the teaching-learning process at school level. Generally, teachers teach only what is being tested and similarly, students manage their studies according to the examination. In fact, examination plays a significant role in teaching-learning process at school level. If the effects of examination are so much, why not to exploit it for the betterment of education? If examination process is improved, the teaching-learning methodology in schools will improve automatically. Class X, XI and XII examinations, are basically written examination in India and we use only one instrument to evaluate student's performance and that is question paper. If the question papers are improved, the education and the teaching-learning process will get improved automatically. So, the question papers set by the State Boards of School Education and the Central Board of School Education for different examinations need to be continuously examined and improved.

- The preliminary comparative analysis of the existing mathematics course content and mathematics question papers for classes X, XI and XII set by the Jammu and Kashmir Board of School Education and the Central Board of Secondary Education is the small step towards improving the quality of assessment and scheme of evaluation. Keeping in mind the importance of analysis of question papers and the marking scheme, I took a small research project to make a comparative analysis of Mathematics course content and mathematics question papers of classes X, XI and XII set by JKBOSE and CBSE.

## Objectives:

The main objective and the aim of this research project is to analyze and to evaluate variations of the different aspects and components of Mathematics curriculum, course content and Mathematics question papers of classes X, XI and XII set by JKBOSE with that of CBSE and the repercussions thereof. The main objective of this research project can be attained through following findings and outcomes:

1. Is the curriculum and course content of mathematics at par with national standards or not?
2. Are the Mathematics question papers set by JKBOSE for classes X, XI and XII, legitimate and valid in terms of:
  - (a) coverage of course content.
  - (b) coverage of instructional objectives.
3. Do these question papers have appropriate difficulty level to fulfill the needs of different kinds of students?
4. Are these question papers as per the national and international bench marking?
5. Whether the question papers have appropriate number of questions in terms of form, language and scope.
6. Does the typology of questions match with the national standards.

So, this study tried to find out whether curriculum and course content of mathematics is up to the mark and the questions papers fulfill the criterion of balanced papers and what are their weaknesses and strengths.

## Methodology:

- For this comparative analysis, Mathematics question papers of classes X, XI and XII set by JKBOSE and CBSE for the sessions 2020-2021 and 2021-2022 along with their syllabi, scheme of assessment and textbooks were procured from the official websites of Jammu and Kashmir Board of School Education and Central Board of Secondary Education.

## Tools:

The basis of analysis was actual syllabi, scheme of assessment, textbooks and Mathematics question papers of classes X, XI and XII set by JKBOSE and CBSE for the sessions 2020-2021 and 2021-2022. These question papers were used to find out:

- i) The Mental processes involved.
- ii) The Content area tested.

- iii) The Types of questions.
- iv) The Marks allotted.
- v) The Difficulty level estimated.
- vi) The Time allotted.

Following the steps of relevant research methodology and making use of research tools, the observations are reflected in the tabulated form as under:

**Table – 1**

**Weightage given to content as per analysis.**

Class	Content	CBSE	JKBOSE	Variation
12 <sup>th</sup>	Relations and Functions	08 Marks	10 Marks	02 Marks
	Algebra	10 Marks	13 Marks	03 Marks
	Calculus	35 Marks	44 Marks	09 Marks
	Vectors and Three-Dimensional Geometry	14 Marks	17 Marks	03 Marks
	Linear Programming	05 Marks	06 Marks	01 Marks
	Probability	08 Marks	10 Marks	02 Marks
	Total Marks	80 Marks	100 Marks	20 Marks
11 <sup>th</sup>	Sets, Relations and Functions	23 Marks	24 Marks	01 Marks
	Algebra	25 Marks	26 Marks	01 Marks
	Coordinate Geometry	12 Marks	20 Marks	08 Marks
	Calculus	08 Marks	10 Marks	02 Marks
	Statistics and Probability	12 Marks	12 Marks	0 Marks
	Mathematical Reasoning and Mathematical Induction	0 Marks	08 Marks	08 Marks
	Total Marks	80 Marks	100 Marks	20 Marks
10 <sup>th</sup>	Number System	06 Marks	04 Marks	02 Marks
	Algebra	20 Marks	23 Marks	03 Marks
	Trigonometry	12 Marks	12 Marks	No Variation
	Coordinate Geometry	06 Marks	06 Marks	No Variation
	Geometry	15 Marks	15 Marks	No Variation
	Mensuration	10 Marks	10 Marks	No Variation
	Statistics and Probability	11 Marks	10 Marks	01 Marks
	Total Marks	80 Marks	80 Marks	No Variation

- Table -1 reflects that the course content and syllabi of both the boards are almost same and similar, but there is a considerable amount of variation in weightage given to content, especially in the question papers for 11<sup>th</sup> and 12<sup>th</sup> classes. Such variations need to be addressed.

Jammu and Kashmir Board of School Education and Central Board of Secondary Education use many types of questions in their questions papers. These question types are long answer type questions, short answer type questions, very short answer type questions and objective type questions. The following table show the weightage given to different types of questions.

**Table-2**

**Weightage given to different types of questions as per analysis**

Class	Form of Questions	CBSE	JKBOSE	Variations	Remarks
XII 12 <sup>th</sup>	Multiple Choice Questions	20 Questions	04 Questions	16 Questions	
	Very Short Answer Type Questions	05 Questions	08 Questions	03 Questions	
	Short Answer Type Questions	06 Questions	11 Questions	05 Questions	
	Long Answer Type Questions	04 Questions	06 Questions	02 Questions	
	Source Based or Case Study Questions	03 Questions	No Question	03 Questions	
	Total Questions	38 Questions	29 Questions	09 Questions	
Class	Form of Questions	CBSE	JKBOSE	Variations	Remarks
XI 11 <sup>th</sup>	Multiple Choice Questions	20 Questions	04 Questions	16 Questions	
	Very Short Answer Type Questions	05 Questions	08 Questions	03 Questions	
	Short Answer Type Questions	06 Questions	11 Questions	05 Questions	
	Long Answer Type Questions	04 Questions	06 Questions	02 Questions	
	Source Based or Case Study Questions	03 Questions	No Question	03 Questions	
	Total Questions	38 Questions	29 Questions	09 Questions	

Class	Form of Questions	CBSE	JKBOSE	Variations	Remarks
X 10th	Multiple Choice Questions	20 Questions	20 Questions	No Variation	
	Very Short Answer Type Questions	05 Questions	05 Questions	No Variation	
	Short Answer Type Questions	06 Questions	06 Questions	No Variation	
	Long Answer Type Questions	04 Questions	04 Questions	No Variation	
	Source Based or Case Study Questions	03 Questions	03 Questions	No Variation	
	Total Questions	38 Questions	38 Questions	No Variation	

- It is clear from table -2 that there is a huge amount of disparity in weightage given to different types of questions. There are 20 Multiple Choice/ Objective type questions in CBSE question paper and only 04 Multiple Choice/ Objective type questions in JKBOSE question papers for 11<sup>th</sup> and 12<sup>th</sup> classes. This variation is liquidated in long answer type and short answer type questions. This indicates that the JKBOSE question papers give more importance to memory and remembering rather than analysis, creativity and application.
- Such variations are highly recommended to address.

Following table shows the weightage given to school based internal assessment and the broad based/ standardized annual assessment as per our analysis.

**Table-3**

**Weightage given to the question paper and internal assessment as per analysis**

CLASS	ASSESSMENT TYPE	CBSE	JKBOSE	VARIATION
XII /12TH	Main Question Paper	80 Marks	100 Marks	20 Marks
	Internal Assessment	20 Marks	No such Provision	20 Marks
XI /11TH	Main Question Paper	80 Marks	100 Marks	20 Marks
	Internal Assessment	20 Marks	No such Provision	20 Marks
X / 10TH	Main Question Paper	80 Marks	80 Marks	No Variation
	Internal Assessment	20 Marks	20 Marks	No Variation

- There is a provision of 20 marks' internal school-based assessment consisting of 3 periodical tests of 10 marks and performance in mathematical activities with same weightage in Central Board of Secondary Education assessment scheme for classes X, XI and XII while as no such provision is adopted in JKBOSE assessment scheme for class XI and XII. Though JKBOSE has adopted the 20 marks' internal school-based assessment for class X, which need to be adopted for class XI and XII as well

**Table-2**

**Weightage given to Instructional objectives as per analysis**

Class	INSTRUCTIONAL OBJECTIVES				TOTAL
	Knowledge	Understanding	Application	Skill	
CBSE					
JKBOSE					

## Major Findings:

Mathematics questions papers of JKBOSE and CBSE were analyzed in terms of content weightage, difficulty levels, weightage of instructional objectives and weightage provided to type of questions. The major findings are given as under:

1. The Curriculum and the course content prescribed by Jammu and Kashmir Board of School for Education and the Central Board of Secondary Education for mathematics at X, XII and XII levels are almost same and similar.
2. Both the boards prescribe NCERT Text Books for course content.
3. Language of question papers is appropriate.
4. The question papers of CBSE are less focused on memorization and are designed to be student friendlier. Students can learn subjects organically and may grasp concepts on an intuitive level.
5. CBSE Question papers are more flexible while as JKBOSE Question Papers are less flexible.
6. In question paper no question is about to sketch neat and clean diagram.
7. All the questions are taken from text book exercises and solved examples.
8. Unlike JEE Mains and Advanced, all questions are less standardized and there is no or little chance of testing higher order thinking of children.

## General suggestions:

- Many interesting facts and aspects were observed while analyzing the mathematics question papers of JKBOSE and CBSE for class X, XI and XII. Some of the questions were dissimilar in approaches, so it was difficult to compare them in terms of instructional objectives. Such dissimilarities should be rectified.
- Question papers of two boards were different in terms weightage given to different types of questions as well. Weightage should be uniform and legitimate as per the national standards.
- The present comparative analysis shows that there is a scope for improving the question papers of JKBOSE in order to have the scheme of assessment at par with national standards and benchmarking.
- Following are the suggestions regarding the improvement in question papers:
  - ❖ The quality of a question paper depends on the quality of its questions. A faulty question means a faulty question paper. A due care should be taken to minimize the inclusions of faulty questions.
  - ❖ A set of clear instructions regarding instructional objectives should be circulated to paper setters and evaluators in advance with sample question papers.
  - ❖ Question papers should not include knowledge-based questions only. It should include questions related to testing mental skills as well. Questions such as problem solving, critical thinking, imaginative thinking, interpretative, creative thinking reasoning etc should be included more in number.
  - ❖ Source based and case study questions which are in vogue at national level should be included in JKBOSE mathematics question papers.
  - ❖ All types of question viz MCQs, VSAQs, SAQs and LAQs should be included. Their number should be written in design. It will help a paper setter to cover the entire course content for reliable testing.
  - ❖ The number of questions to be included from.
  - ❖ The language of questions should not be defective. It should be appropriate and it should clearly specify the task. The use of appropriate directional words is necessary.
  - ❖ General instructions are also important and are the first thing an examiner reads. So, detailed general instructions should be provided in question papers.
  - ❖ The grouping of questions to be followed while listing should be from easy to difficult questions.
  - ❖ The board should carry out a post-examination analysis of the questions papers for further improvement by showing it to subject experts, paper-setter and evaluators.
  - ❖ Finally, evaluation is a technical area. Paper setters and evaluators should be regularly trained in this task. They should be trained according to recent trends and developments.

These are some of the suggestions, that emerged out after this comparative analysis. Since, at present, examination is the only and important way to certify and classify a large number of students, improvement at every stage in the examination process is important. Improvement in question papers itself enhances the credibility and reliability of the boards and solves many problems

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