



# LOGIC

## Standard XII

q	a	y	c	p
	P-S	•	b	
U	V	r	S	⊃
A-Z	( $\exists$ x)		S-P	$\Psi$
$\equiv$	$\sim$	$\forall x$	(x)	$\varphi x$

# The Constitution of India

## Chapter IV A

### Fundamental Duties

#### ARTICLE 51A

**Fundamental Duties- It shall be the duty of every citizen of India—**

- (a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;
- (b) to cherish and follow the noble ideals which inspired our national struggle for freedom;
- (c) to uphold and protect the sovereignty, unity and integrity of India;
- (d) to defend the country and render national service when called upon to do so;
- (e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities, to renounce practices derogatory to the dignity of women;
- (f) to value and preserve the rich heritage of our composite culture;
- (g) to protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures;
- (h) to develop the scientific temper, humanism and the spirit of inquiry and reform;
- (i) to safeguard public property and to abjure violence;
- (j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement;
- (k) who is a parent or guardian to provide opportunities for education to his child or, as the case may be, ward between the age of six and fourteen years.

The coordination committee formed by GR No Abhyas - 2116 (Pra. Kra. 43/16) SD-4 Dated 25.4.2016 has given approval to prescribe this textbook in its meeting held on 30.1.2020 and it has been decided to implement it from the educational year 2020-21.

# LOGIC

## STANDARD XII



2020

**Maharashtra State Bureau of Textbook Production and  
Curriculum Research, Pune.**



T3K3Z7

Download DIKSHA App on your smartphone. If you scan the Q.R.Code on this page of your textbook, you will be able to access full text and the audio-visual study material relevant to each lesson provided as teaching and learning aids.

Frist Edition : 2020 © Maharashtra State Bureau of Textbook Production and  
Reprint : 2021 Curriculum Research, Pune - 411 004

The Maharashtra State Bureau of Textbook Production and Curriculum Research reserves all rights relating to the book. No part of this book should be reproduced without the written permission of the Director, Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune.

### **Logic Subject Committee**

Smt. Dr. Smita Save, Chairman  
Smt. Shraddha Chetan Pai, Member  
Smt. Meeta Hemant Phadke, Member  
Ms. Sandhya Vishwanath Marudkar,  
Member  
Dr. Dilip Namdev Nagargoje, Member  
Dr. Balaji Marotrao Narwade, Member  
Dr. Sadanand M. Billur  
Member - Secretary

### **Logic Study Group**

Shri. Suresh Thombare  
Ms. Chhaya B. Kore  
Shri. Vasant Vikramji Lokhande  
Ms. Farzana Sirajoddin Shaikh  
Smt. Pinki Hiten Gala  
Shri. Dhanaraj Tukaram Lazade

### **Co-ordinator**

Dr. Sadanand M. Billur  
Special Officer, Kannada

Shri. R.M. Ganachari  
Asst. Special Officer, Kannada

### **Cover**

Shri Vivekanand S. Patil

### **Type Setting**

Nihar Graphics, Mumbai

### **Paper**

70 GSM Creamwove

### **Print Order**

.

### **Printer**

.

### **Production**

**Sachchitanand Aphale**  
Chief Production Officer

**Shri Liladhar Atram**  
Production Officer

### **Publisher**

**Vivek Uttam Gosavi**  
**Controller**

Maharashtra State Textbook Bureau,  
Prabhadevi, Mumbai - 25



## The Constitution of India

### Preamble

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC and to secure to all its citizens :

JUSTICE, social, economic and political ;

LIBERTY of thought, expression, belief, faith and worship ;

EQUALITY of status and of opportunity ;  
and to promote among them all

FRATERNITY assuring the dignity of the individual and the unity and integrity of the Nation ;

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949, do HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.

## NATIONAL ANTHEM

Jana-gana-mana-adhināyaka jaya hē  
Bhārata-bhāgya-vidhātā,

Panjāba-Sindhu-Gujarāta-Marāthā  
Drāvida-Utkala-Banga

Vindhya-Himāchala-Yamunā-Gangā  
uchchala-jaladhi-taranga

Tava subha nāmē jāgē, tava subha āsisa māgē,  
gāhē tava jaya-gāthā,

Jana-gana-mangala-dāyaka jaya hē  
Bhārata-bhāgya-vidhātā,

Jaya hē, Jaya hē, Jaya hē,  
Jaya jaya jaya, jaya hē.

## PLEDGE

India is my country. All Indians  
are my brothers and sisters.

I love my country, and I am proud  
of its rich and varied heritage. I shall  
always strive to be worthy of it.

I shall give my parents, teachers  
and all elders respect, and treat  
everyone with courtesy.

To my country and my people,  
I pledge my devotion. In their  
well-being and prosperity alone lies  
my happiness.

## PREFACE

Maharashtra State Bureau of Textbook Production & Curriculum Research is happy to introduce Logic textbook for standard XIIth. Logic is a science of reasoning. Though ability to reason is an inbuilt feature of human beings, the principles and methods of Logic, make students aware of their innate abilities, which they can develop further through practice.

The students at 10 + 2 level are curious and receptive, so the study of Logic will help them to sharpen their intelligence, enhance the power of reasoning, develop the skill of accurate thinking and enhance the creativity, which will help them to achieve their goals and aspirations.

The syllabus deals with topics such as Decision Procedure, Deductive proof and Quantificational Deduction, where the students will learn to first distinguish between valid and invalid argument and then to prove the validity of arguments.

Various activity-based questions and exercises given in this textbook will help students to understand the basic concepts of logic and master the methods of Logic. Q.R. code is given on the first page of the textbook. You will like the information provided by it.

The bureau of textbook is thankful to the Logic Subject Committee and Study Group, Scrutiny and Quality Reviewers and Artist for their dedication and co-operation in preparing this textbook.

Hope Students, Teachers and Parents will welcome this textbook.



(Vivek Gosavi)

**Director**

Maharashtra State Bureau of  
Text Book Production and  
Curriculum Research, Pune

Pune

Date : 21 February, 2020

Bharatiya Saur : 2 Phalguna 1941

## For Teachers

Logic subject committee and study group takes great pleasure in introducing logic textbook. The chapter on categorical syllogism is introduced in the textbook. After Standard XIIth, students have to take decision about their career. They have to appear for various entrance exams for the same. Most of the entrance exams have a paper to test reasoning ability. The chapter on categorical syllogism will help students to prepare for these various entrance exams. Teacher are expected to teach this chapter keeping in mind its importance for the competitive exams. Comparison between Aristotelian Categorical Syllogism and Nyaya syllogism will enlighten students, how logic developed in India in similar way without being influenced by the Greek thought. Which will enhance pride in Students mind about India's contribution to the subject.

Chapter on traditional logic is also introduced at this level, so that students can compare traditional logic with modern logic and understand the development of logic.

Introduction of predicate logic in the textbook will help students to understand the difference between propositional logic and predicate logic, limitations of propositional logic and need for predicate logic.

The chapter, Grounds of Inductions and hypothesis highlight the importance of logic in scientific investigation.

Logic studies abstract concepts, so the important concepts in logic need to be explained step by step, in easy to understand language and by giving examples and various activities in such a way that, students can relate the subject to their experiences in life. Keeping this in mind the textbook is made activity based. Teachers are expected to make use of various examples, teaching aids and activities like debates, logical puzzles and giving examples of good arguments and fallacies from everyday experience. In this way teaching and learning can become interesting and enjoyable experience for both students and teachers.



## Std XII Logic

### Competency Statements

Sr. No.	Unit	Competency
1.	Decision Procedure	<ul style="list-style-type: none"><li>To learn the method of Shorter Truth table.</li><li>To develop the ability to apply the method of shorter truth table as a test of tautology.</li></ul>
2.	Deductive Proof	<ul style="list-style-type: none"><li>To learn the method of Conditional Proof.</li><li>To learn the method of Indirect Proof.</li><li>To develop the ability to apply the method of Conditional Proof and Indirect Proof to prove the validity of the arguments</li></ul>
3.	Predicate Logic	<ul style="list-style-type: none"><li>To understand the need of Predicate Logic.</li><li>To learn the different types of non-compound propositions.</li><li>To learn to symbolize Singular and General propositions.</li><li>To understand the concept of Propositional function.</li><li>To learn methods of deriving propositions from propositional function.</li><li>To learn the rules and method of Quantificational Deduction.</li><li>To develop the ability to apply the method of Quantificational deduction to prove the validity of arguments.</li></ul>
4.	Traditional Logic	<ul style="list-style-type: none"><li>To understand the nature and classification of propositions.</li><li>To learn the distribution of terms in A, E, I, O propositions.</li><li>To learn the types of Inferences - Mediate and Immediate.</li><li>To learn the types of Mediate Inference and Immediate Inference.</li><li>To learn the Opposition of propositions and the develop the ability to apply them.</li><li>To learn and apply the Rule of Conversion and the Rule of Obversion.</li></ul>
5.	Categorical Syllogism	<ul style="list-style-type: none"><li>To understand the Nature and structure of Categorical Syllogism.</li><li>To learn figures of Categorical Syllogism.</li><li>To learn the rules of Categorical Syllogism and the fallacies.</li><li>To learn in brief about Indian logic and its comparison with categorical syllogism.</li></ul>
6.	Grounds of Induction	<ul style="list-style-type: none"><li>To understand the problem of Induction.</li><li>To understand the grounds of Induction - Material and Formal.</li><li>To understand the method of Observation, its Characteristics and Fallacies.</li><li>To understand the Conditions of good observation.</li><li>To understand the method of Experiment, its Characteristics and Limitations.</li></ul>
7.	Hypothesis	<ul style="list-style-type: none"><li>To define and understand the Characteristics of Hypothesis.</li><li>To understand the Origin of Hypothesis.</li><li>To understand the Conditions of Good Hypothesis.</li><li>To understand the Verification of Hypothesis.</li></ul>

## *INDEX*

<b>Chapter No.</b>	<b>Title</b>	<b>Page No.</b>
1.	Decision Procedure	1
2.	Deductive Proof	9
3.	Predicate Logic	17
4.	Traditional Logic	36
5.	Syllogism	54
6.	Grounds of Induction	67
7.	Hypothesis	78