

UNIVERSITY OF PUNE

F.Y.B.A. Logic

LOGIC AND PRINCIPLES OF REASONING

G1: Introduction to Logic and Principles of Reasoning

(Objective : To explain the basic principles of correct reasoning and to provide students ample scope to exercise their reasoning based on the above principles.)

FIRST TERM : TRADITIONAL LOGIC

Unit 1:

(A) The Nature of Logic as the study of Inference:

- a) Logic: Nature, subject-matter and scope
- b) Deductive and Inductive branches of logic.
- c) Difference between proposition and sentence; Proposition and prepositional form; Argument and argument form
- d) Formal character of Deductive logic.

(B) Traditional understanding of propositions and their classification

- a) Basic subject-predicate structure and components: Quantifier, subject term, copula, predicate term.
- b) Classification of propositions into Categorical, Hypothetical, Disjunctive.
- c) Four-fold scheme of Categorical Propositions (AEIO)

Unit 2:

Traditional understanding and classification of Inference:

- a) Distribution of Terms in A, E, I, O, Prepositional forms
- b) Venn Diagram (Representation of A, E, I, O Prepositions)
- c) Immediate Inference and Mediate Inference
- d) Opposition, Conversion, Obversion
(Nature, Rules and deductions based on these types)

Unit 3:

Traditional understanding and classification of Mediate Inference:

- a) Categorical Syllogism
- b) Figures and Moods of Syllogism
- c) Mixed Disjunctive Syllogism
- d) Pure and Mixed Hypothetical Syllogism
- e) Dilemma and its kinds; Refutation and Rebuttal
(Nature, Rules and deductions based on these types)

Unit 4: Fallacies and Set Theory

(A) Fallacies

- a) Formal fallacies (All those pertaining to kinds of Inference in Unit 2 and 3 above).
- b) Non-formal fallacies : Division, Composition, Accident, Converse Accident, Many Questions, Petitio Principii (Ignoratio Elenchi : Argumentum : ad baculum, ad misericordiam, ad hominem, ad ignorantiam, ad verecundiam, ad populum)

(B) Set Theory

- a) Definitions and Nature of : Sets, elements of sets, sub-set, proper sub-set, null-set, universal sets, compliment of set, identity of sets
- b) Modes of specifying sets : listing, defining.
- c) Basic operation on sets : union, intersection, complementation.

SECOND TERM : PREPOSITIONAL LOGIC

Unit 5.

Modern understanding of propositions and their classification

- a) Symbolic logic : nature, scope and applications
- b) Modern understanding of Propositions and their classification into :
 - (i) Simple and compound propositions
 - (ii) Truth-functionally and non-truth-functionally compound propositions.
- c) Propositional variables, Propositional constants, Logical constants and basic truth-functions
- d) Symbolizing propositions using the above.

Unit 6:

Decision Procedures

Use of the following Decision Procedures to identify propositional forms as Tautologous, Contradictory or Contingent:

- a) Truth Table
- b) Shorter Truth-Table
- c) Truth Tree

Unit 7:

Deductive Proof:

- a) Nature of Deductive Proof
- b) Rules of Inference; The Rule of Replacement.
- c) Kinds of Proof:
 - (i) Direct
 - (ii) Conditional
 - (iii) Indirect.

Unit 8:

Proof of Invalidity

- a) Use of the method of assigning truth-values to demonstrate the invalidity of invalid arguments.
- b) Application of the methods of reasoning to examples of different kinds.

Books for Study:

1. Copi I. M. *Introduction to Logic* Macmillan Company New York (Tenth Edition).
2. Copi I. M. *Symbolic Logic* Macmillan Company New York 6th Edition (Relevant Chapters).
3. Kawale. S. R. and Gole Leela; *Sugama Akariha Tarkasastra* Pune Vidyarthz Prakashan GrihaPune 1972
4. Ehlers : *Logic by Way of Set Theory*.
5. Quine W.V.O. : *Methods of Logic* (Relevant Chapters)
6. More, Hema; *Tarkasastra* Nimitta Prakashan Pune 1995