DEDUCTIVE LOGIC

I PUC - TEXT BOOK

2015-2016

Department of Pre–University Education
18th Cross, Malleshwaram, Bengaluru - 12
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Director's Message

Dear Students,

We at the Department of Pre-university Education, Karnataka strive to empower each student to dream big and equip them with the tools that enable them to reach new heights and successfully deal with the challenges of life. As Swami Vivekananda said, "**Real education is that which enables one to stand on one's own legs".**

The course contents in this book are designed with the objective of equipping you well for the next level of study.

We wish you well on your journey and look forward to you becoming a responsible citizen of the nation and give back to the betterment of the society.

With best wishes,

Sd/-
C. Shikha, IAS
Director
Department of Pre University Education
Bengaluru

PREFACE

Logic is considered as "Mother of all Sciences". Logic is defined as "Science of Thought". Hypothesis, conception, judgment and reasoning are the process of thought. Therefore, the pupil must be capable of understanding the structure, processes, validity of thought processes used in their day to day life, as well as in an academic disciplines. In fact, there is a dire need for the pupils to develop free, independent, analytical and critical thinking. The validity of the numerous opinions, beliefs, judgments that are often based on blind traditions, customs and superstitions, these factors mislead the young minds. Therefore, the right time to inculcate the habit of objective and sceptical thinking and a study of logic as a discipline would certainly be a great help in this direction.

The curriculum is framed with the objective of helping the students to acquire the ability to reason correctly, judge precisely and express clearly without any doubt. The curriculum is based on experimental learning which is better than theoretical learning. Further, the curriculum is so precisely objective and content based that it would be very helpful for question paper setters to set the question papers as per the weight-age.

We have great pleasure in presenting this book. We have followed the syllabus as laid down by the pre-university education Bangalore, Karnataka. We have tried our level best to explain intricate problem with the help of diagrams. This book is mainly concentrated with deductive Logic; Symbolic Logic and Indian Logic have been presented as a part of the whole subject.

I am thankful to Mrs. Kripa MM who helped us lot in the preparation of this text book.

This book may be considered as 'Mental gymnastic' is fresh and elucidative.

Ramakrishna B.G
Chairman
Logic Syllabus Committe.

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PRE- UNIVERSITY CURRICULUM
SUB: LOGIC (23)

I. Over-all AIM:

1. Analysis of different forms of inference to arrive at a systematic way of distinguishing valid from invalid forms.
2. Enable the student to reason correctly.
3. To understand the methodology of Science.

II. Specific Objectives:

A. Knowledge

1. To enable the student to know the differences between validity and truth, to understand the different types of arguments like eductions, opposition, mediate inference and deductive arguments.
2. To acquire elementary knowledge of modern developments of logic and the elementary use of symbols – relation between correct inference and the process of attaining truth.
3. To understand logical concepts, relationships, relationship between language and logic.
4. To understand basic concepts of Indian Logic.

B. Application

1. To reason inductively and deductively.
2. To express statements clearly
3. To apply formal techniques to arguments.
4. To judge the relevance of the evidence of the premises to the conclusion.

C. Skill

1. To enable the student to think analytically.
2. To learn to distinguish valid from invalid arguments.
3. Learn to detect fallacies.

D. Attitude

1. To enable the student to think objectively.
2. To develop a healthy sceptical attitude.

SYLLABUS – I YEAR

DEDUCTIVE LOGIC

Chapter I **NATURE OF LOGIC** **15 Hours**

Introduction – Need Of Rational Thinking – Thought as a Problem Solving Process – Logic Is a Science And An Art – Logic is a Normative Science – Definitions Of Logic – Scope Of Logic – Form Of Thought And Matter Of Thought – Truth And Validity – Uses Of Logic _ Inference: Meaning – Kinds – Deductive Inference And Inductive Inference

Chapter II **LOGIC AND LANGUAGE** **06 Hours**

Purpose Of Language – Descriptive, Expressive, Performative, Introgative – Relation between Logic and Language

Chapter III **JUDGEMENT, SENTENCE AND LOGICAL PROPOSITION** **15 Hours**

Meaning of Judgement, Sentence and Logical Proposition – Difference between Sentence and Proposition – Difference between Word and Term – Subject Term, Predicate Term – Classification of Terms

Chapter IV **TRADITIONAL CLASSIFICATION OF PROPOSITIONS** **16 Hours**

Three-Fold Classification – Categorical, Hypothetical and Disjunctive – Four-Fold Classification of Categorical Propositions – Distribution of Terms in Categorical Propositions – Euler's Circle

Chapter V **KINDS OF DEDUCTIVE INFERENCE.**

A. IMMEDIATE INFERENCE – **20 Hours**

Opposition of Proposition– Square of opposition of Proposition – Eduction 1) Conversion – Rules of Conversion 2) Obversion – Rules of Obversion

B. MEDIATE INFERENCE – **20 Hours**

Meaning – Kinds 1. Categorical Syllogism: Structure – General Rules And Fallacies Of Categorical Syllogism2. Mixed Syllogism: Meaning – Kinds – Rules And FallaciesA. Mixed Hypothetical SyllogismB. Mixed Disjunctive Syllogism

Chapter VI **Logical Definition** **08 Hours**

Meaning – Rules of Logical Definition – Fallacies

Chapter VII **A. Modern and Symbolic logic** **10 Hours**

Modern Classification Of Logical Propositions: Simple, Compound And General – Symbols Of Logical Proposition – Truth Table Of Conjunction. Disjunction, Implication And Negation

B. Basic laws of thought

1. The Law of Identity
2. The Law of Contradiction
3. The Law of excluded middle

Chapter VIII **Basic elements of Indian logic** **10 Hours**

Inference: Meaning –Kinds – Comparison Between Indian Inference (Nyaya Anumana) With Aristotelian Syllogism

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INTRODUCTION

Unexamined life is not worth living – **Socrates**

"Cogito ergo sum" – I doubt ∴ I understand" – **Descartes**

When a person wants to learn any subject, many questions arise in his mind. What is the nature? What are the definitions and What is the subject matter? and its use? It is indeed strange that to know about any subject without understanding its definition and scope. It is difficult to learn and fulfill the basic requirement. As the result of big explosion the earth found some lakhs of years ago, man's existence also started as said by Buddha; change is the nature or rule of world" – of all creations, man's life and nature, nature is very special and unique. This is because of his thinking ability.

The word 'Man' is derived from Human. Thinking ability is quite natural to him who leads to enthusiasm to learn more because of this he is able to know and analyze many subject. In animal life we cannot see many changes because they are unable to think, their life is limited to natural needs like food, sleep and fear, but man's life is always filled with observation, clearing, analyzing of different incidents and happening. Man always strives to find meaning and solutions to different problem in his life. In everyday life, he faces so many problems like family, social, political, economic and religious problems etc. which he tries to analyse and solve for those thinking process forms the basis but all men may not think alike about the same subject. Each one has his view about a particular subject. Sometimes it may be entirely opposite. This means that the line of thinking varies from man to man, mainly this is based on our personal views, partial knowledge of incidents and understanding of the same. These aspects are responsible for difference in thinking.

There may be lack of clarity and accuracy in the 'thought processes'. To overcome these shortcomings to know correct method of thinking and the systematic learning of 'thought process' is all known to be a subject called 'logic'.

Rules prescribed in this process are the main causes to solve the problems.

ORIGIN AND HISTORY OF LOGIC

The classical writer believed that, the subject Logic originated in India and Greece. Sophists of the ancient Greece used to train logists. Their aim and means were to win in the argument. It did not help in truth finding. Socrates the great philosopher of the age (period) was the first to criticize it. He argued that the intention of the argument was not only to win but also to be quest of truth. Otherwise logic (or argument) would lead to dispute. So the aim and means of logic should be interlinked to each other. Socrates wrote nothing but his disciple Plato, inspired by the thoughts of Socrates wrote the book "Dialogues". Plato's disciple Aristotle gave a systematic shape and structure to this. That is why Aristotle was called as the "Father of the Western Logic". This part of the logic initiated by Aristotle is called or termed as "Deductive Logic". The term logic was originated from the Greek word 'Logos'. The traditional logic has been studied through many centuries. In the logical term more prominence was given to 'form' than 'matters', so factual sentences were required essentially while taking decisions. For example in order to decide, Rama was mortal. It must be proved that "All men are mortal'. That series of arguments were used to defend the holy book the 'Bible' in western countries. This pattern of argument retained its value of importance until Renaissance was questioned on its sound quantity, formal quantity. Thus a new pattern of argument was originated on the basis of factual (mediate) quantity. Francis Bacon proved that sound quantity is an instrument to understand . . . . . .mediate quantity is an instrument to provide world's affirmative knowledge and became the father of modern scientific method. The book "Novum Organum" written by Bacon became basis for logic/ inductive logic. Later, classical writers like John Lock, David Hume, Carveth Reid, who are called inspirer (instigators) of experience argument worked hard for the development of inductive logic. In the 19th Century, J.S.Mill became successful classical writer for giving a systematic and vivid shape to this system. The incidents and topics which man experiences, examines and based on this, common rules with factual truth, introduced in his experimental methods for inductive methods provided an importance to inductive logic, gained prominence in the scientific field. After Mill, experts like Wavells, Jerones worked hard on inductive logic.

In the twentieth century another step/stage began in the development/evolution of logic. This logic having mathematical features is called as symbolic logic or mathematical logic. It has modified its importance of basic principles in inductive logic and introduced this method. Some of the classical writers like D. Morgan, Whane, Bhool, Shrooder, Freez, Russell, Whitehead, Pearl and Carnep who proved this method.

Indian logic is as old as the western logic. In Indian logic system, logic means Anveekshaki – justice, extensions, logical material science, visibility of justice, oath, reason (motive) etc. Acharya Gowthama was identified as the father of "Indian Logic" . His opinion was Justice is not for justice. Logic is not for Logic but is an instrument in truth finding. In the court of King Janaka, it is known that learned like Maithreya, Gargi used to conduct argument on the basis of the truth finding aspect. These structure and formats were seen in justice and 'Vyathershika'. This mean (or route) was used to control the development of non-vedic religions like Jainism, Buddhism and Lokayatha. It was profounded that the truth is not only related to spiritual philosophy but also transactional coherent one. It means logic is not only related to form but also matter. Doubts or disbeliefs are not only inductive but also deductive. Some of the famous profounder who worked hard to develop this special Indian Logic System were Vatsyana, Udaotkhaka, Vachaspathi, Udayana, Annambhatta, Gangesha, Jayantha etc. Vyshekshekas like Prashastapada, Sridhara, Vyomashiva, Bhudha, Logician, Nagarjuna, Dijnaga, Dharmakirthi Jaina, Logician Saptha Bhangeenaya and Syadwada contributed more to the Indian Logical heritage.

The study of Indian Logical system was ignored when English academic system was started, so its development retarded (reduced). The knowledge garnered in olden days remained as personal assets of a few Sanskrit learned. This is how the development took place in western logic that did not in Indian Logic. One of the reasons for reduction in the development of Indian logic was analysed i.e. logic was studied independently in Western, whereas in India, all Shastras, philosophies, quantitative systems have become instruments aiming to Liberty (Moksha) which lead to remain as a part of philosophy in India.

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1. INTRODUCTION

Logic is considered as a mother of all sciences, as well as art. Logic is study of various inferences.

In ancient period when there was no other subject like science or an art, 'Logic' developed. Greece and India are known as cradles of logic.

Western philosopher Aristotle introduced the logic in 374-322 BC. Likewise in the year 469-399 BC, Socrates introduced the logic as a Rational Thinking. In India, logic got its birth in 6th Century BC by Maharshi Gowtham. Therefore he is considered as an exponent of logic in India.

2. MEANING OF LOGIC

The word logic has been derived from the Greek word *"LOGOS"* – which means THOUGHT and a WORD, a "Reasoned discourse" – so logic is usually defined as "the science of thought". Thought is always expressed in language or through words. This is the reason that the thought and word related to each other. Therefore, "Logic is known as the science of thinking, which gains through the different words.

The term 'Thought' is nothing but the process of thinking thought and the product of thought. By the media of language we express our thoughts and opinions. Hypothesis, conception, judgement and reasoning are the process of thought. Terms, proposition and argument are the products of thoughts. The aim of logic is to execute the thoughts and thinking in correct way. It takes into consideration the various thought used by the people all over the universe.

3. DEFINITIONS

Logic has been defined by many logicians in different ways. Some important definitions are as follows:

1. *Aldrich — Logic as the "Art of Reasoning".
2. Keynes — Logic as "the science which investigates the principles of valid thinking.
3. Whately — Logic as "the Art and Science of Reasoning"
4. Thomson — Logic as "the science of Laws of Thoughts".
5. J.S. Mill — Logic as "The science of the operations of the understanding which are subservient to the estimate of evidence" – both the process itself of advancing from known truths to unknown and all other intellectual operations in so far as auxiliary to this".

4. THE NEED OF RATIONAL THINKING

Man is a social animal. He is living in the society and has the capacity of thinking, due to the power of reasoning; he is differentiated from other animals. Rational thinking makes him

the superior being i.e. MEN by Rational Thinking – man developed his mental tendency.

Reasoning means passing from something known to unknown. Thinking is the source of knowledge. Thinking determines his activities and behaviour and rational thinking helps us to solve the problem. Harmony of social life depends upon thinking.

The fact is that, all men think but all do not think alike. Sometimes two or more persons think about a thing in different manner. Logic helps us how to think correctly. Therefore, logic is known as science of valid reasoning.

Thinking is the source of knowledge. Thinking determines and influences our activities. Good thought will lead good action. Though thinking is natural to man, he may fail to think correctly. The thought may be good or bad or vague. Logic is a science that helps one to think correctly because logic is the science of valid reasoning.

5. THOUGHT AS A PROBLEM SOLVING

"Logic is known as the science of thought". The word THOUGHT has been used in various manners or different meaning. Sometimes Thought and Knowledge are used for synonymous terms. Therefore, in logic thought is used as "knowledge" on this basis "logic is known as science of Knowledge."

Thought knowledge and understanding are the gift of god. Mental tendency, mental ability and mental power is very important to man, by this tendency men are able to solve most of their problems. It is activity of thought that may be productive. By this productive knowledge and productive thought, man has been inventing so many useful things in life. The greatest discoveries have been made by man, by the use of these productive powers. This power is called in logical language – imagination – hypothesis – when man thinks properly he himself solve the problem and face the challenges of life and society.

Knowledge is the source of thought and thought is the source of experience. Knowledge, thought and experience help him to solve his problem.

Thought is a tendency through which man understand and interpret correctly. The various factors of his experience help him to develop the quality of thinking, imagination, observation and get ready to generalize over his problems.

In short, thought helps to proceed from known to unknown. When thoughts exhibit of all qualities then it satisfies two conditions viz.,

1. Formal thought of validity
2. Material thought of validity

Truth is the aim or goal of logic. Logic studies thoughts with the purpose of discovering truth. We know this truth – Formal truth and Material Truth. These two branches of logic deal with two kinds of validity.

1. Formal Logic
2. Material Logic

1. Formal Logic:

Formal validity or formal truth means the agreement of thought themselves. It is a self consistency. It concerns with the forms of thought. In formal logic it is accepted that premises are true and one can examine whether the conclusion follows correctly from the premises. Formal logic is called as 'Pure logic". Formal logic is also called as Deductive logic.

2. Material Logic:

Material validity, material truth means the agreement of ideas with their corresponding objects in the world outside. The premises are true as a matter of fact, and the conclusion must be corresponding due to the actual affairs, material logic is called as Applied Logic. Material logic is called as the Inductive logic.

6. LOGIC IS A SCIENCE AND AN ART

As we come to know that logic means thinking or discourse, it is a science of thought, mental process or functions of mind.

Likewise, before trying to explain whether logic is a science or

an art, we must know the meaning of the term science and an art.

There is a great deal of discussion among logicians regarding the logic; as an art or science or both i.e. science or art, logic is both science and art.

(a) Logic as a science: What is science? – Science is a systematic body of knowledge. Science deals with the laws and principles for a group of fact science makes our knowledge true and reliable. Logic has all the qualities of science. (i) It deals with only one subject matter e.g. thought and kind; (ii) it gives us exact and accurate knowledge.

Logic is a science of sciences. The different sciences concern themselves with a particular branch of knowledge and practical aspect of nature e.g. Botany studies the plants, Zoology as a living being, physics as astronomy – there is a continuity of subject matter in each science.

Logic deals with the general laws of valid thought. Subject matter of logic is quite different from other sciences. Logic deals with the general law of valid thinking and all sciences should necessarily conform to the general law of correct thinking. Therefore, logic is known as the backbone of all sciences.

LOGIC AS AN ART

As we know that, an art is a body of principles formulated with a view to attaining some practical end. It is an application of knowledge to life. It gives us a set of rules and regulation. The rules are not permanent, going to change according to time and place. Art teaches us to do things and is learn by practice e.g. painting, photograph, music etc.

Hence, logic has theoretical side as well as valid thinking and practical side. Logical is the art of right thinking and right thinking is the basis of all the other arts. Logic is the Art of Art, when the term extended the term 'art becomes skill'.

LOGIC IS BOTH A SCIENCE AND AN ART

The distinction between science and art should not be exaggerated, because the two have bearing to each other. Science is concerned with knowledge with knowing something. Art is concerned with doing

something. Science can be acquired by study and while art by practice. Hence science is theoretical while art is practical.

Thus, logic is both a science and an art. A science teaches us to know and an art to do logic has been described as the science of sciences and art of arts. Logic provides the common basis for all the sciences. Logic is called an art of arts because it prescribes rules of application for all arts for the attainment of truth in general.

In conclusion, logic is both (i) practical science; (ii) theoretical science. It may be regarded both as a science and an art. However, as the theoretical science is more prominent than the practical one. Hence Logic may be regarded primarily as a science and secondly as an art. Mill defines it as "Logic comprises the science of reasoning, as well as an art funded on that science."

7. LOGIC AS A NORMATIVE SCIENCE

Normative Sciences help us to make a distinction between right and wrong, good and bad, it gives importance to valid seasoning, therefore the criteria of normative science is truth. Hence, it is rightly described as a normative science because it deals not only with thoughts and valid reasoning but also wants to attain formal truth.

Hence, logic is the science of regulative principle of thinking its subject matter is thought, since logic lays down the norms needed for the purpose. It can be called as normative science.

8. SCOPE OF LOGIC

Every science studies in a particular subject matter. Similarly logic also has its own subject matter, namely thoughts or the thinking process of human mind.

Scope means the 'AREA' or 'PROVINCE' or 'BOUNDARY' or 'RANGE OF ACTIVITY', that is covered by a particular science and also known as subject matter of the of the particulate science.

As it is suggested that logic is the science of regulative principles of valid thought, Logic is concerned with the validity of reasoning. The term validity used in two senses.i.e, i)Formal ii)Material

Validity implies material truth:-

Under scope of logic, we may define the opinions of different is that is "Logic Studies Thought i.e. thought constitutes the subject matter of logic. Thoughts refer to both the processes and the products of thinking process of thinking are conception. Judgement and reasoning; when these processes are expressed in language they become terms, proposition and argument, which constitute the subject matter of logic; therefore, logic studies thought expressed in language.

The way of thinking is called the form and the objects thought about constitute the matter of thought. Under the scope of logic, logicians have recognized two broad division of logic, viz.,

1. Formal Logic
2. Material Logic

The formal truth – formal logic is agreement of thoughts themselves and material truth or material logic as agreement of ideas with their corresponding object.

9. FORM OF THOUGHT AND MATTER OF THOUGHT

Meaning: Form means shape and matter means the content. Every material object has certain shape or form and it is made up of same matter. Same matter may be found in different material e.g. a long shape table, made of either wood or any metal or stone. Thus, in short, "form" cannot exist without "matter" and every "matter" must have some "form".

Example: Form that is a shape of an object – Table any shape, long, round, square or even triangle, Matter is the material of table, either wood or any material (steel, iron) or even stone, the table that come under is MATTER. Let us study in detail the form and matter of thought in the following paragraph.

There is a slight difference between form and matter of thought.

"We think about something, the thing about which we think something — this is the matter of thought and we think it in particular way and this way of thinking is the form of thought".

In logic these thoughts expressed through terms, proposition and reasoning. E.g. the term, 'beautiful' and 'not beautiful' are positive and negative term. i.e. in the form. "All planets revolving around the sun" – this proposition is affirmative in form and meaning constitutes its matter.

- All planets revolve around the sun
- Earth is a planet
- Earth is revolving around the sun.

This example is a syllogism, in form and its matter consists the meaning of proposition.

"The form of thought may change but matter may not change, the matter may change even if the form may not change e.g. "All flowers are beautiful" [SAP, Universal – Affirmative proposition].

No flowers are ugly – [SEP, Universal Negative proposition].

In the above propositions, the form changes but the matter is same, both proposition express the same matter in different forms:

- All Indians are honest
- All Indians are wise

These are the universal affirmative proposition. Form is same both proposition but matter is different.

Thus, by all these comparison and some contrast, we cannot say that both are separate from each other. They are two faces of same coin.

10. TRUTH AND VALIDITY

Logic is the Science of valid reasoning. Reasoning or argument is valid depends on whether the conclusion logically follows from the premises depends on the form of argument. An argument is valid if its form is such that there can not be an argument in that form which has true premises and false conclusion.

The question validity is quite different from the question of truth. It is the premises and the conclusion that are true or false. It is the reasoning or the argument that is valid.

1) All men are mortal

All Kings are men.

∴ All Kings are mortal.

11. USES OF LOGIC

"Logic is a science of thought". It is concerned itself with valid reasoning. Logic is considered as a science of knowledge or it deals as a systematic study of knowledge. The following points explain clearly the uses of logic.

1. Logic deals with the principles of reasoning, thinking and systematic application.
2. Valid knowledge and reasoning develops with the study of logic.
3. Student of logic develops the sound knowledge and process of valid thinking, to serve and think from many views.
4. A student of logic is better equipped to give explanations.
5. It is a function of the study of logic that uses to avoid the mistakes in our reasoning and arguments of other people.
6. The study of logic helps us to cultivate the power of abstract thinking to every problem.
7. Logic deals in the general laws of thoughts.
8. Logic helps us to cultivate the habits of thinking and argue correctly.
9. The study of logic is useful to solve the probabilities.
10. By the study of logic, ideas of observation, hypothesis and experience are developed.
11. With the study of logic, one can be aware of certain rules that help one to judge whether the thought and opinion are right or wrong. This advantage is by the study of logic and enables one to know the reason.
12. Logic provides a discipline in reasoning. It furnishes the principles of correct thinking. It deals with the general principles of laws and thoughts. It cultivates the abstract thinking and develops the reasoning power.

13. Study of logic ensures correct reasoning.
14. The study of logic concerned with the medicine of mind.
15. Knowledge of logic is indispensable to detect the cause of the error and to find out how to correct reasoning.

We can conclude by saying that:

- Logic furnishes a scientific knowledge of the principles of correct thinking;
- Logic is the science of sciences. Different science deal with different departments.
- Logic has no concern with special subject matter. The chief value and use of logic is intellectual discipline or a mental gymnastics, because it cultivates the power of abstract thinking. The student of logic trains his mind to think and reason correctly.

Therefore, logic is known as medicine or tonic of mind. Logic is known as the gymnastic of mental process.

11. INFERENCE

A. MEANING OF INFERENCE:

Inference as reasoning is the source of knowledge and is a perception of direct knowledge of things.

Inference is the process of passing from one or more proposition to another when the inference expressed in a language, it is called an argument. To see the smoke on the mountain, we infer there is fire.

B. KINDS OF INFERENCE

The term 'inference' is taken into consideration a process as well as product.

Inference is the name given to the process of thought, by which we either pass from a single given proposition to another, or from two given proposition to third proposition, implied in them therefore inferences are broadly classified into two following kinds:

1. Deductive Inference
2. Inductive Inference

C. DIFFERENCE BETWEEN DEDUCTIVE AND INDUCTIVE INFERENCE

We come through that inference is divided into two categories. Often the formal logic is used as Deductive Logic and Material Logic as Inductive Logic.

By Deductive and Inductive inference we mean two forms of reasoning. In the following, we will study how the deductive and inductive inferences are related to each other:

1. In Deductive reasoning we proceed from Universal truth to particular truth

   Ex.: All men are mortal

   John is Man

   ∴ John is mortal.

   In Inductive reasoning we proceed from a particular truth to universal truth.

   Ex.: Gandhiji is mortal

   Nehru is mortal

   Kalam is mortal

   All Men are mortal.

2. In Deductive inference the conclusion cannot be more general than the premise.

   In inductive inference the conclusion will be more general than the premise.

3. In deduction, conclusion may be true or false. In Induction, conclusion is always true.

4. In deduction, we proceed for universal to particular.

   In induction, we proceed from particular to universal.

5. In deduction, importance is given to formal truth.

   In induction importance is given to formal as well as material truth.

6. In deduction, then there is no necessary for inductive leap.. In induction, inductive leap is necessary.

7. Deduction is in descending order-process.
   Induction is in ascending order.
   In Deduction, we proceed from whole to part.
   In induction, we proceed from part to whole.

8. In Deduction observation and experiment is not necessary. In Induction observation experiment is necessary.

9. In deduction, Aristotle Dictum and Laws of thought is required. In induction, postulates of induction i.e. Laws of Uniformity of Nature and Law of Causation are required.

10. In Deductive inference the premises are hypothetical.

    In Inductive inference the premises are observed and experienced – depends upon observation and experience.

11. In Deduction, it cannot test whether the premises are true or not.

    In Induction it test that promises are true.

12. Deduction is independent for selecting the premises.

    Induction is dependent on experience for selecting the premises.

CONCLUSION

Apart from the differences in nature, the deductive inference and inductive inference, they are not opposite. Because in deductive inference, we proceed through general phenomena but in inductive inference we precede observed phenomena.

They are not contradictory but complimentary to each other. They have reciprocal relationship. Therefore they are known as two faces of same coin.

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MODEL QUESTIONS

I. ONE MARK QUESTIONS

1. What is the subject matter of logic?
2. What is thought?
3. What is science?
4. What is an art?
5. What is normative science?
6. Write any one definition of logic
7. What is inference?
8. What is deductive inference?
9. What is inductive inference?
10. Who is the father of western logic?

II. TWO-MARK QUESTIONS

11. What are the kinds of inference?
12. Why logic is known as normative science?
13. What is form and matter of thought?

III. FIVE-MARK QUESTIONS

14. Prove how logic is science as well as art.
15. Logic is normative science. Explain it.

SHORT NOTES

16. Need of Rational Thinking
17. Thought as a problem solving process
18. Logic as a science and as an art
19. Definitions of Logic
20. Uses of study of logic

IV. TEN-MARK QUESTIONS

21. Compare and explain Deductive and Inductive inference.

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CHAPTER -II

LOGIC AND LANGUAGE

I. Logic and Language

The main purpose of logic is valid reasoning. Logical reasoning is expressed through the medium of language. The function of a language is the expression and communication of thought. In order to convey or communicate our thoughts precisely to others the process of communication has to be objective, accurate and clear. As the communication of thought has to be unambiguous or exact every language needs certain rules. All languages follow certain universal rules. An adequate and correct usage of the language is the very purpose of a universal language. According to the science of logic, a language is defined as follows: "By language, we understood a system of articulate sounds produced by the organs of speech or a system of written words, as symbols of spoken words".

Both the spoken and the written words are used as tools of thinking and expressing what we think, i.e., our thoughts. Logic considers an idea or thought as an abstract or conceptual entity and therefore there is no thought can exists or take shape without a language. A language is inevitable for thing

II. Purposes of Language:

"Language is communication of thought". The fact that a language is the means of communication is indisputable. The philosophers of the twentieth century have extensively explained various purposes for which a language is used. Traditionally language was considered as means of communication of thoughts and opinions. But Ludwig Wittgenstein, a renowned philosopher, stated that we use symbols, words and sentences in a number of different ways. He illustrated how a language is used in different contexts to fulfil different requirements. A language is very complex in nature. It is used not merely for the expression of our thoughts

or opinions. It is used extensively to create and solve puzzles in our life, to scold or to make fun of somebody, to make one angry or to tease and even to please someone in our everyday life.

Further, we use a language to examine a hypothesis, to explain the results of an experiment, to describe a of picture, to write poems, to tell as story, to dramatize, to sing, to solve different problems in the field of science etc. Thus we use language in so many different ways in our daily life.

Language is broadly classified into the following four categories".

1. Descriptive. 2. Expressive. 3. Performative. 4. Interrogative.

I. Descriptive:-

The use of language for some descriptive purpose is its most important functions. We understand different objects, topics (matters) and the nature of actions around us through this descriptive language. This method is adopted in the process of exchange and transfer of knowledge among ourselves. We confirm (accept) or contradict (reject) a particular statement through a logical sentence.

For Example:

"The earth continuously undergoes a number of changes. The process of erosion of the surface by the rivers and avalanches of snow, the erosion of soil, the disintegration of rocks etc., gradually transform the features of the earth.

There are several invisible activities and changes going inside the earth also'. Only the Logical sentences can be termed either True or Untrue (False). The questions (interrogative sentences) or orders are neither true nor false.

II. Expressive:

Language is used not only for exchanging information but also for expressing our feelings. We find such use of Language in literature. A story, good poetry, an essay, some biographies or autobiographies, makes the reader experience all the strong feelings, imagination that the writer has put across in his work through language. The phrases – "Oh, how sad?" "It's a pity" "Horrible!" "Wonderful" etc express various moods and feelings.

Ex: Oh! What a beautiful Garden!

III. Performative :-

Language cab be used to motivate somebody or to change his behaviour. This is an example for the Performative use of Language. A sermon or religious preaching illustrates the per-formative use of language.

Ex.: "Friends, be good human being yourself and then you will see people voluntarily following you. Get rid of hatred and Jealousy. Believe in the power of good deeds. Be courageous! Stop simply cursing other's. Leave behind your good name when you ultimately depart from this world."

IV. Interrogative:

We use the language to ask questions in our daily life or even in specialized fields of human knowledge. Asking questions in order to get information or to discover things is called the interrogative use or purpose of Language.

Ex:- 1) Who invented the T.V?
2) What is the force that motivates our mind and body?
3) What is the distance between the sun and the earth?

If the meaning of a sentence must be accurate and clear the meanings of the words used in the sentence must be clear. Sometimes a few words could be unclear and ambiguous. At times some regional differences might lead to confusion as the same word may mean two different things. For example, Kannda word "Sira" might mean Kesaribath in south canara where as it means neck in the Mysore region. It can happen in any language. Even certain English words are used in different senses in The USA and the U.K.

It is important for us to know all these facts if we have to make use of the Language in a precise manner. Logic tries to make the meanings of words clear through appropriate explanations. The Grammar (Language) and Logic (Thanking) are complementary to each other.

The descriptive purpose of language is more important in the context of Logic. Therefore the descriptive purpose is given more importance than the other ones. If anyone is interested in learning more about the other purposes of language they are advised to study the books which are indicated in the Bibliography given at the end of the book.

V. THE RELATION BETWEEN LOGIC AND LANGUAGE

The different sounds or words communicate or convey a thought. A language enables the expression and systematic collection of our thoughts. Without a language, a progression of thought or a permanence of thought is not possible. Logic studies a language as a tool essential for the thought process and the effective communication of the same. It should be noted that Logic is primarily related to ideas or thoughts and its relation with language is only an indirect one. Logic is related to language exclusively for the purpose of valid reasoning. In Logic, Language is used strictly in a definite sense and an accurate manner to facilitate valid reasoning.

MODEL QUESTIONS

One Mark Questions

1. What is Language
2. What is descriptive language?
3. What is expressive language?
4. What is performative language?

Two Mark Questions

5. What is Interrogative language?
6. Give an example a performative language.
7. Explain the performative language.
8. State the difference between expressive and descriptive language.

Five Mark Questions

9. Logic and language (short note).
10. Explain the expressive language?
11. State the descriptive language?
12. Write the Interrogative language?

Ten Mark Questions

13. Explain the purpose of language?
14. How many kinds of classified the purpose of language?
15. State the language is communication of thought.

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CHAPTER-III

Judgment, sentence & proposition

A judgment is a single act of thought or simplest unit of thought. A judgment is the mental process by which two or more ideas are compared and combined with each other. For example man is one concept and mortal is another concept. The comparison is "man is mortal". It is the mental act of relating two or more ideas.

Sentence:-

A sentence is group of words which gives full or complete meaning.

Proposition:-

Judgment expressed in words is known as proposition. According to Aristotle a proposition is a statement in which something is said regarding something else either affirmatively or negatively.

A proposition consists of three parts namely subject, predicate and copula. The subject is the term about which something is said. Predicate is the term which is said about the subject. That is the quality of the subject is known as predicate. The connecting or linking word between subject and predicate is known as copula.

For example- man is mortal

Here "man" is subject term.

"Mortal" is Predicate term and 'is' is the copula because it is connecting man and mortal

Difference between grammatical sentence and proposition:

1. All propositions are sentences but all sentences are not propositions. Only assertive sentences resemble proposition. Sometimes assertive sentences too will be expressed in an improper way but we can reduce these sentences to logical form.
2. As assertive sentences alone resemble proposition, questions, orders, exclamations, are not proposition. But we can reduce these to logical form.

3. Grammatical sentences will be expressed in past tense, present tense & future tense. But a logical proposition is always be expressed in present tense.
4. Sometimes one grammatical sentence is equal to more than one proposition. For eg. Cats, dogs, cows are quadrupeds. We can reduce this grammatical sentence into three logical propositions. A) All cats are quadrupeds b) All dogs are quadrupeds c) All cows are quadrupeds.
5. We can express one logical proposition in different forms of grammatical sentence. For ex: All dogs are barking animals

   Each dog is a barking animal

   Every dog is a barking animal
6. In grammatical sentence subject and predicate may interchange. But in a logical proposition we should first state subject and then predicate.

   For eg. Blessed are the poor

   The poor are blessed.

Difference between word and ter

Words are oral or written signs. Their function is to communicate. In logic we are concerned with the communication of thoughts through words. A word or group of words cannot communicate anything by themselves. They have meaning only as parts of sentence or a proposition.

A term is a word or a group of words which is used as the subject or the predicate of a proposition. For example “man is mortal” is a logical proposition. The words man and mortal are terms because they are capable of being used as the subject or the predicate of a proposition.

Subject and predicate term

The subject is the term about which something is said. It is the term of which something is affirmed or denied. In the proposition “man is mortal”, man is the subject because mortality is affirmed of man. In the proposition “man is not perfect” perfection is denied of man.

The predicate is the term of which is said about the subject. It is the term which is affirmed or denied of the subject. In the proposition "man is mortal", "mortal" is the predicate because it is affirmed of "man" In the proposition "man is not perfect" perfect is the predicate because it is denied of man.

Classification of terms.

The following are the list of classifications of terms has been accepted by the logicians.

1. Simple or composite
2. Singular or general
3. Collective or non-collective
4. Concrete or abstract
5. Positive, negative or privative
6. Absolute or relative
7. Connotative or non-connotative

1. Simple or composite term:-

A term may consist of one word or a combination of words. When the term is made up of a single word it is called a "simple term" or a single worded "term".

For ex: man, house, college, etc.

When the term consists of a group of words it is called a

"composite term" or a many worded term.

For eg: Bright student, wise-man, university-college.

2. Singular and general terms:

A term is called "singular" if it denotes only one thing, person or unit.

For eg: the earth, the Ganges, Gandhiji, etc.

A "general term" denotes a class of objects, things or persons.

For eg: colour, planet, and student

3. Collective and Non-collective terms:-

A collective term is the name of a group of similar but distinct units taken as a whole.

For eg: Army, Navy, crowd, etc.

A non-collective term is not applicable to a group of similar objects regarded as one whole. It is separated from the group

For eg: soldier, deafness, Bangalore.

4. Concrete and abstract term:-

A term is concrete when it denotes individual existing, things, place, persons or events.

For eg: man, book, college, etc.

An abstract term is the name of an attribute considered by itself. That is a term is abstract when it indicates an attribute.

For eg: Humanity, honesty, beauty etc.

5. Positive, Negative and privative terms:-

A term is said to be positive when it denotes the presence of a thing or an attribute.

For eg: happy, white, man, etc.

A negative term implies the absence of an attribute

For eg: unhappy, useless, unselfish, etc.

A privative term implies the present absence of an attribute but it also implies the capacity for it. Thus private terms refer to an attribute which the object previously possessed or was capable of possessing and which is now deprived of.

For eg: blind, Deaf, Ignorant, etc.

6. Absolute and relative terms:-

A term is called absolute if its meaning is complete without reference to any other term or relation

For eg: flower, horse, silver etc.

A relative term is a name which becomes meaningful only with reference to some other term.

For eg; teacher, child, mother, etc.

7. Connotative and non-connotative term:

Connotes or conveys an attribute that is a connotative term thus consists of the attributes possessed by the Individual thing and implied by the term.

For eg: man, town, school, etc.

A non-connotative term either denotes things or connotes attributes but not both.

For eg: Raghu, whiteness, Dharwar, etc.

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MODEL QUESTIONS

I. one mark questions:-

1. What is a judgment?
2. What is a sentence?
3. What is a proposition?
4. What is a word?
5. What is a term?

II. Two mark questions:-

Answer the following questions giving an example

1. What is simple term?
2. What is general term?
3. What is non-collective term?
4. What is concrete term?
5. What is abstract term?
6. What is negative term?
7. What is privative term?
8. What is relative term?
9. What is connotative term?
10. What is non-connotative term?

11. What is composite term?
12. Give any four logical character of the following terms:

    a). Man b) Deaf c) unhappy d) Army e) soldier

    f) honesty g) Beauty h) book i) College j) Bangalore

III. Five mark questions:

1. Explain parts of a proposition
2. State the differences between grammatical sentence and proposition.

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Chapter IV

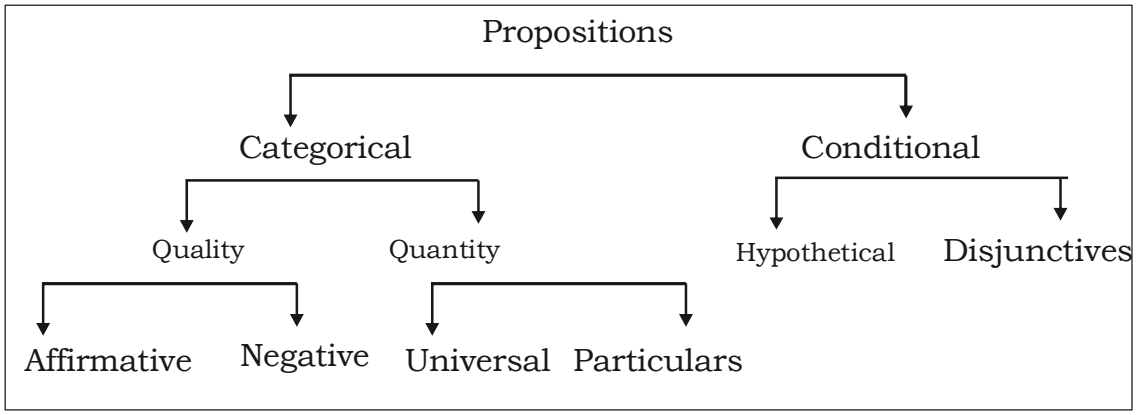
Traditional Classification of Propositions

Introduction

It is very important that we understand the difference between propositions and sentences. A proposition strictly speaking is a sentence stating information is true or false. It is very clear that all sentences are not propositions

Classification of proposition.

proposition



The three fold classification of propositions.

1) Categorical proposition.
2) Hypothetical proposition
3) Disjunction proposition.

1) Categorical proposition is one which affirms or denies directly of unconditionally "man is mortal"
2) Hypothetical proposition is one which affirms or denies under a condition called if .....then,

   Eg:- If you work hard, you will succeed

3) Disjunction proposition is one which affirms alternatives either.....Or Eg:- propositions are rather affirmative or negative.

Traditional classification of proposition.

A proposition is judgment expressed in words propositions are traditionally classified under three heads they are 1) Relation 2) Quantity 3) Quality

Classification of Proposition On The Basis Of Relation:-

On the basis of relation propositions are classified into two types they are

1) Categorical proposition.

2) Conditional proposition.

1. Categorical proposition: A categorical proposition is one which asserts directly and unconditionally. In a categorical proposition the predicate is either affirmed or, dained of the subject without any condition. A categorical proposition is an unconditional statement. It is of the form's' is 'p' and's' is not 'p' Ashoka is a man and weather is not pleasant.
2. Conditional proposition: A conditional proposition is which do not directly assert anything that is conditional propositions is assertion under conditions they state the consequences that necessarily follow from a certain condition.

   Conditional propositions are of two kinds they are 1) Hypothetical proposition.

2) Disjunction Proposition:

1. Hypothetical proposition:- A hypothetical proposition affirms or denies conditionally the hypothetical proposition affirms or denies under a condition called if ..... then. It is expressed in one of the two forms.

If A is B then A is C

If you work hard then you will succeed.

If A is B then C is D

If it rains heavily, the rivers will be flooded.

There are two parts of hypothetical proposition. They are antecedent and consequent. The part which states the condition is known as antecedent and the part which fallows the condition is known as consequent.

2. Disjunction proposition:-

A Disjunction proposition is one which affirms alternatives either .....Or the disjunctive propositions can also be expressed in one of two forms.

Eg. Either A is B or A is C.

The Signal lights are either red or green,

Either A is B or C is D

Either war should be banished Or humanity will perish.

II. Classification of proposition on the basis of quantity.

According to quantity propositions are classified in to two types. They are universal and particular the quantity of a proposition is determined by the extension of the subject term.

1) Universal proposition: -

Universal proposition is one in which the predicate is affirmed or denied of the whole of the subject for example in the proposition. "All men are mortal" the predicate mortal is affirmed of the whole of the subject men.

2) Particular proposition:-

Particular proposition is one in which the predicate is affirmed or denied of the portion or some part of the subject for example in the proposition some men are wise, the predicate wisdom is affirmed of a portion of the subject men.

III. Classification of proposition:

On the basis of quality we have seen that every proposition either affirms or denies that is it states that a thing is such and such is not such and such this is called the quality of the proposition. In respect of quality the propositions are classified into two types they are

1) Affirmative

2) Negative

1. Affirmative proposition :

In an affirmative proposition the predicate is asserted as belonging to the subject the affirmative proposition is of the form 's' is 'p' in the proposition Rose is Red the predicate red is a affirmed of the subject rose.

2. Negative proposition :

In a negative proposition the predicate denied of the subject the negative proposition is of the form s is not p in the statement man is not perfect the predicate 'perfect' is denied of the subject man.

Four fold classification of categorical propositions:

We have seen that all propositions have quality and quantity they are either affirmative or negative and universal Or particular combining these distinctions we have four types of propositions this scheme is known as four - fold scheme of propositions in order to symbolise these four types of propositions A.E.I.O are used A & I are the first two letter in the Latin word affirmo and they stand respectively for universal affirmative or particular affirmative propositions E & O are in the Latin word Nego and they stand respectively for universal and particular negative propositions.

The four fold classifications of propositions are.

1. Universal Affirmative proposition A
   All S are P

   All men are mortal SAP

2. Universal Negative Proposition – E
   No S is P
   No man is perfect – SEP

3. Particular Affirmative proposition – I
   Some S are P
   Some men are wise - SIP

4. Particular Negative proposition – O.
   Some S are not P

   Some men are not honest- SOP

Distribution of terms in categorical Propositions.

Distribution of terms plays an important role in deductive logic there are two terms in every categorical proposition that is subject term and predicate. The extension of subject and predicate term is known as distribution of term. A term is said to be distributed when it is taken in its entire extent (4)

A term is said to be undistributed when it is taken in its partial extent **(×)**

We have to know which term is distributed and which term is undistributed in the categorical propositions A.E.I. and O.

1. Universal Affirmative proposition $\overset{\checkmark}{S}A\overset{\times}{P}$:- in the universal affirmative (A) proposition the subject term is distributed and predicate term is undistributed.

For eg: All men are mortal- $\overset{\checkmark}{S}A\overset{\times}{P}$. In this example 'men' is the subject term. It is distributed because it is taken in its entire extent. The predicate 'mortal' is undistributed because it is taken in the partial extent. Because it includes plants and animals apart from men.

2. Universal Negative proposition $\overset{\checkmark}{S}E\overset{\checkmark}{P}$: - in the universal Negative proposition (E) both the subject term and predicate terms are distributed because as it is negative proposition both the terms are excluded from each other.

   For Eg : No men are perfect $\overset{\checkmark}{S}E\overset{\checkmark}{P}$

   In this example the entire class of men is excluded from the entire class of perfection

3. Particular affirmative proposition $\overset{x}{S}I\overset{x}{P}$:- in the particular affirmative proposition (I) both the subject term and predicate term are undistributed. Because both the terms are taken in the partial extent.

   For eg : some men are honest $\overset{x}{S}I\overset{x}{P}$

   In this example the subject men is taken in the partial extent and predicate honest as if belongs to some men it is also partially taken.

4. Particular Negative proposition - In the particular Negative proposition (o) the subject term is undistributed and predicate term is distributed because as if is negative proposition if denies the subject.

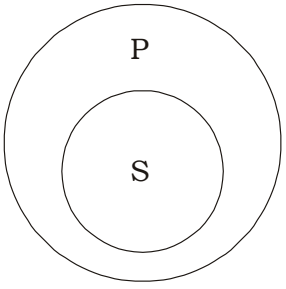
   For eg : some men are not selfish $\overset{x}{S}O\overset{✓}{P}$:-

   In this example the subject term men is taken in the partial extent is undistributed the predicate selfishness does not belong to some men, hence if is distributed.

Euler's Circle

Logician Euler has represented distribution of terms by circles

1. A Proposition.

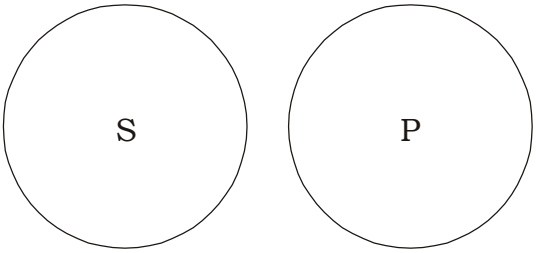


Eg. All men are mortal

The small circle represents the subject form meni.e, included in the big circle which represents predicate term mortal

2. E. Proposition

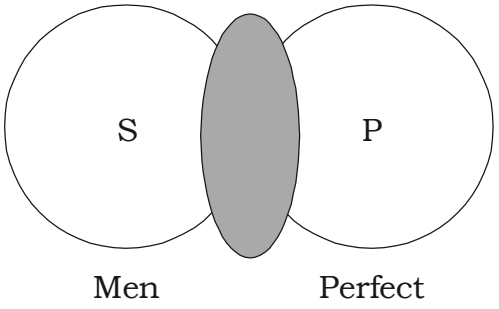
Eg : No men are perfect



Here the two circles representing subject and predicate class exclude each other completely the circles never meet.

3. 'I' proposition

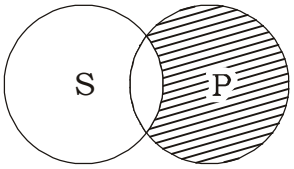
"Some men are wise"



In this proposition both the terms are undistributed because here a part of the circle representing the subject term coincides with the part of the circle representing predicate circle. The two circles intersect and overlap each other it refers to men who are wise.

4. 'O' proposition

'Some men are not honest'



In this proposition subject is undistributed and predicate is distributed here the shaded part of the circle is completely excluded from the predicate circle. It refers to men who are not honest. Here honesty is denied to some men. The predicate is denied only of portion of the subject.

Conclusion:

1. In all universal propositions subject terms is distributed (A and E)
2. In particular propositions subject term undistributed (A and I)
3. In affirmative propositions predicate term is undistributed (A and I)
4. In Negative propositions predicate term is distributed (E and O)

Proposition	Subject	Predicate
A	Distributed	Undistributed
E	Distributed	Distributed
I	Undistributed	Undistributed
O	Undistributed	Distributed.

The scheme of distribution may be summed in one word ASEBINOP

As - SAP

EB - SEP

IN - SIP

OP - SOP

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MODEL QUESTIONS

1. mark:

1. What is a proposition?
2. State the basis for the classification of proposition
3. What is categorical proposition?
4. What is conditional proposition?
5. What is universal proposition?
6. What is particular proposition?
7. What is affirmative proposition?
8. What is negative proposition?

2 Mark questions

9. Name the two types of conditional propositions
10. What is hypothetical proposition? Give an example.
11. What is disjunctive proposition? Give an example.
12. Expand the A.E.I.O.
13. What is the meaning of distribution and undistribution?

5 Mark questions

14. Explain the three fold classification of proposition?
15. Explain the basis for the classification of propositions.

10 Mark questions

16. Explain the four told scheme of categorical proposition
17. Explain the distribution in categorical proposition.

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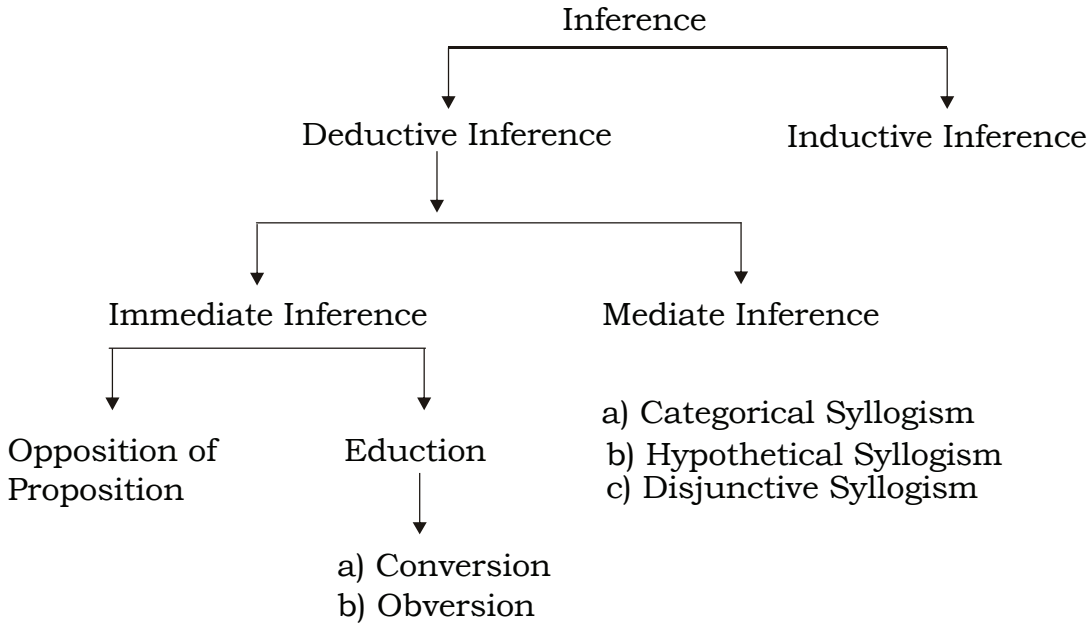
CHAPTER V

KINDS OF DEDUCTIVE INFERENCE:

In Deductive inference our thought proceeds from universal instances to particular instances. So, the conclusion is less general than the premises.



Deductive inference are divided into two kinds ; They are as follows:-

A) Immediate Inference

B) Mediate Inference

A) Immediate Inference:

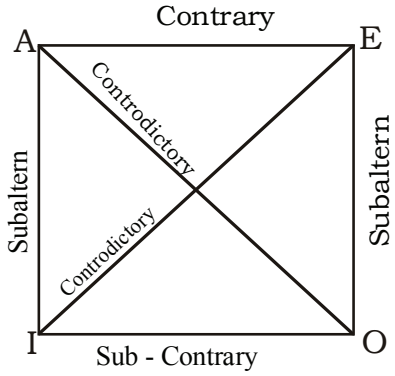
Immediate inference is a kind of deductive inference in which the conclusion is drawn from a single given proposition opposition of proposition and eduction are the two kinds of immediate inference.

Opposition of Proposition:

Opposition of proposition is a kind of immediate inference. The

relationship between two categorical propositions having the same subject and same predicate, differ either in quality or in quantity or both in quality and quantity is known as opposition of proposition. Opposition of proposition is expressed with the help of a square. This square is known as square of opposition of proposition.

Square of opposition of preposition



There are four kinds of oppositions

1. Subaltern opposition – Between AI and EO
2. Contrary opposition – Between AE
3. Sub contrary opposition – Between IO
4. Contradictory opposition – Between AO and EI

1. Subaltern Opposition

The relation between two categorical propositions having the same subject and predicate, similar in quality but differ in quantity is called subaltern opposition. The relation between AI and EO.

Ex: A - All men are mortal E – No men are moral

I - Some men are mortal O–Some men are not mortal Rules

a) Truth of universal implies the truth of corresponding particular, but not conversely

If A is true, I is true

If E is true, O is true

If A is false, I is doubtful

If E is false, O is doubtful

b) Falsity of particular implies the falsity of corresponding universal, but not conversely

If I is false, A is false

If O is false, E is false

If I is true, A is doubtful

If O is true, E is doubtful

2. Contrary opposition

The relation between two universal propositions having the same subject and predicate differ only in quality is called contrary opposition the relation between AE.

Ex: A - All men are mortal

E - No men are mortal

Rule – Truth of one implies the falsity of another but not conversely

If A is true, E is false

If E is true, A is false

If A is false, E is doubtful

If E is false, A is doubtful

3. Sub- Contrary opposition

The relation between two particular propositions, having the same subject and predicate but differ only in quality is called sub contrary opposition the relation between IO.

Ex : I - Some men are mortal

O - Some men are not mortal

Rule: The falsity of one implies the truth of another, but not conversely.

If I is false, O is true

If O is false, I is true

If I is true, O is doubtful If O is true, I is doubtful

4. Contradictory Opposition

The relation between two categorical propositions, having the same subject and predicate, but differ both in quality and quantity is called contradictory opposition. The relation between AO and EI.

Ex: E - No men are mortal
I - Some men are mortal
A - All men are mortal
O - Some men are not mortal

Rule: The truth of one implies the falsity of another and falsity of one implies the truth of another.

If A is true, O is false
If A is false, O is true
If O is true, A is false
If O is false, A is true
If E is true, I is false
If E is false, I is true
If I is true, E is false
If I is false, E is true

	A	E	I	O
If A is true	_____	False	True	False
If A is false	_____	doubtful	Doubtful	True
If E is true	False	_____	False	True
If E is false	Doubtful	_____	True	Doubtful
If I is true	Doubtful	False	_____	Doubtful
If I is false	False	True	_____	True
If O is true	False	Doubtful	Doubtful	_____
If O is false	True	False	True	_____

Eduction

Eduction is a kind of immediate inference in which from a given proposition accepted as true, we derive other implied in it though different from it ins subject or predicate or both, without changing the meaning of

1. Conversion
2. Obversion

1. Conversion:

Conversion is a kind of immediate inference in which there is a legitimate transposition of the subject and predicate. The proposition of the form S-P is converted in to the form P-S by exchanging its subject and predicate.

In conversion the given proposition which is to be converted is called convertend and the proposition which is inferred from the given proposition is called converse.

Rules of Conversion

1. The subject of the convertend becomes the predicate of the converse.
2. The predicate of the convertend become the subject of the converse
3. The quality of the converse is the same as that of the convertend. If the convertend is affirmative, the converse is affirmative, and if the convertend is negative, the converse is negative.
4. No term can be distributed in the converse unless it is distributed in the convertend.

Violation of any one of these rules leads to the fallacy of illicit conversion.

Conversion of A – The conversion of an A proposition is an I proposition.

Convertend – All men are mortal- $\overset{\checkmark}{S}AP^{\times}$

Converse - All mortals are men - $\overset{\checkmark}{P}AS^{\times}$

(Illicit conversion. Violation of 4th Rule)

In converse predicate term is undistributed but in convertend it is distributed hence a proposition cannot be converted in to A proposition. By following all the rules of conversion a proposition is converted in to I proposition.

Convertend - All men are mortal - $\overset{\checkmark}{S}AP^{\times}$

Converse – Some mortals are men - $\overset{x}{P}I\overset{x}{S}$

Conversion of E

Convertend – No men are mortal - $\overset{\checkmark}{S}\,E\,\overset{\checkmark}{P}$

Converse - No mortals are men $\overset{\checkmark}{P}\,E\,\overset{\checkmark}{S}$

Conversion of I

Convertend - Some men are mortal - $\overset{\checkmark}{S}\,E\,\overset{\checkmark}{P}$

Converse - Some mortals are men - $\overset{x}{S}\,I\,\overset{x}{P}$

O Proposition

An O Proposition cannot be converted; an O proposition being negative its converse must be negative, according to the third rule. Then the predicate would be distributed in the converse. The predicate of the converse, however, cannot be distributed, because it being the subject of the convertend is undistributed, hence if the convertend is an O proposition, no conclusion follows, (violation of IV rule).

Convertend – Some men are not mortal - $\overset{x}{S}O\overset{\checkmark}{P}$

Converse – Some mortals are not men - $\overset{x}{P}O\overset{\checkmark}{S}$
(Violation of the fourth rule)

Convertend – Some men are mortal - $\overset{x}{S}O\overset{3}{P}$

Converse – No mortals are men - $\overset{\checkmark}{P}\,E\,\overset{\checkmark}{S}$
(Violation of the fourth rule)

Illicit / Conversion

Convertend	Converse
SAP ⟶	$\overset{x}{P}I\overset{x}{S}$
SEP ⟶	$\overset{\checkmark}{P}\,E\,\overset{\checkmark}{S}$
SIP ⟶	$\overset{x}{P}I\overset{x}{S}$
SOP ⟶	Cannot be converted

Kinds of Conversion:

There are two kinds of conversion

a) Simple Conversion

b) Conversion by limitation / Per accidens

A) Simple Conversion :

If the quantity of the converse is same as the quantity of the convertend is known as simple conversion. If the convertend is universal, the converse also universal. If the convertend is particular, the converse is also particular E and I propositions are converted by simple conversion.

B) Conversion by limitation or per accidens :

If the quantity of the converse is differed from the quantity of the convertend is known as conversion by limitation. An A proposition, convertend is universal but the converse is particular. Hence an A proposition is converted by limitation

2. Obversion:

Obversion is a kind of immediate inference in which we infer the conclusion from a single given proposition by changing the quality of the given proposition, but its meaning remains unchanged.

In obversion, the given proposition which is to be obverted is called 'obvertend' and the conclusion is called 'obverse'.

The rules of obversion are as follows.

1. The subject of the obverse is the same as the subject of the obvertend.
2. The predicate of the obverse is the contradictory of the predicate of the obvertend. (By adding the term 'non '-' to the given predicate.)
3. The quality of the obverse is the opposite of the quality of the obvertend i.e if the obvertend is affirmative, the obverse is negative, if the obvertend is negative, the obverse is affirmative.
4. The quantity of the obverse is the same as the quantity of the obvertend i.e. if the obvertend is universal, the obverse is also universal. If the obvertend is particular, the obverse is also particular.

Obversion of a proposition.

Obvertend – All men are mortal – SAP
Obverse – No men are non mortal – $SE\overline{P}$

Obversion of E Proposition
Obvertend – All men are mortal – SEP
Obverse – All men are non mortal – SAP

Obversion of I Proposition
Obvertend – Some men are mortal – SIP
Obverse – Some men are not non mortal – SOP

Obversion of O Proposition
Obvertend – some men are mortal – SOP
Obverse – some men are non mortal – SIP

Obvertend	Obverse
SAP	SEP
SEP	SAP
SIP	SOP
SOP	SIP

****

MODEL QUESTIONS

1. Mark Questions:

1. What is immediate inference?
2. What is convertend?
3. What is converse?
4. What is obvertend?
5. What is obverse?

2. Mark questions:

1. What is opposition of proposition?
2. What is contrary opposition?
3. Define sub contrary opposition.
4. Define contradictory opposition.
5. What is eduction?
6. What is conversion?
7. What is obversion?

5. Mark questions

1. Explain subaltern opposition.
2. Write the rules of conversion.
3. O Proposition cannot be converted explain.
4. Write the rules of obversion.

10. Mark questions:

1. Explain opposition of propositions with the help of square.
2. Convert and obvert A.E.I.O. propositions according to the rules.

****

B. Mediate Inference / Syllogism:

Mediate inference is a kind of deductive inference in which the conclusion is drawn from two premises taken jointly.

Ex All men are honest

Socrates is a man

Socrates is honest

Kind of mediate inference/ Syllogism

1. Categorical syllogism
2. Hypothetical syllogism
3. Disjunctive syllogism

1. Categorical Syllogism

Categorical syllogism is a kind of mediate inference in which the conclusion is drawn from two premises taken jointly. It is a kind of deductive inference, so the conclusion cannot be more general than the premises; the aim of categorical syllogism is only to establish the formal validity of an argument.

Categorical syllogism is also known as 'pure syllogism' because in which all the three propositions are of the same relation. i.e. All the three are categorical propositions.

Structure of Categorical Syllogism:

A categorical syllogism consists of three propositions, the two given propositions are known as 'premise' and an inferred proposition is called 'conclusion'. Each proposition consist of two terms, therefore, a syllogism which consist of three propositions should have six terms, but on an examination we find that it consists, not of six different terms but of three terms, each of which occurs twice. These three terms are given different names; the predicate of the conclusion is called major term and is denoted by the letter 'P'. The subject of the conclusion is called the minor term and is denoted by the letter 'S'. The term which occurs in 'both the premises' but does not occurs in the conclusion is known as 'middle term' and is denoted by the letter 'M'. Middle term establishes a relation between major and minor term. The premise in which the major

term occurs is known as 'major premise'. The premise in which minor term occurs is known as 'minor premises'. Third proposition is the conclusion. In the major premise, major term is compared with the middle term. In the minor premise, minor term is compared with the middle term. Thus, ultimately in the conclusion, the relation is established between the major term and minor term.

M P
Ex All men are mortal – Major Premise

S M
All kings are men - Minor Premise

S P
∴ All Kings are mortal – Conclusion

Rules of categorical syllogism and their fallacies

Rule I - Every syllogism must contain three and only three terms

Proof: A syllogism consists of three terms, the major term, the minor term and the middle term, each of which occurs twine violation of this rule lead to the **"fallacy of four terms"** and **"the fallacy of equivocation"**.

1 2
Ex: My arm touches the table

3 4
The table touches the ground

∴ My arm touches the ground

In this argument there are four terms. My arm, Table, Table, Ground. So this argument is invalid. It commits the fallacy of four terms.

Fallacy of equivocation means the ambiguous use of a term in a syllogism. Any one of the term is ambiguous we commit the fallacy of equivocation.

There are three kinds in the fallacy of equivocation.

They are

A. Fallacy of ambiguous Major

B. Fallacy of Ambigious Minor

C. Fallacy of Ambigious Middle.

A Fallacy of Ambiguous Major:

When in a syllogism major term is used in one meaning in the major premise and another meaning in the conclusion then the fallacy of ambigious major occurs.

P M

Light is essential to guide our steps

S M

Lead is not essential to guide our steps

S P

∴ Lead is not light

This argument is invalid because it commits the **"fallacy of ambiguous major"**. This fallacy is committed when we violate the I rule of categorical syllogism.

In this argument in the major premise, the major term 'light' means opposed to darkness' but in the conclusion the major term light means opposed to 'heavy'.

B. Fallacy of Ambiguous Minor:

When in a syllogism minor term is used in one meaning in the minor premise and another meaning in the conclusion then the **"fallacy of ambiguous minor"** occurs.

M P

No man is made of paper

S M

All pages are men

S P

∴ No pages are made of paper

This argument is invalid because it commits the fallacy of ambiguous minor'. This fallacy is committed when we violate the I rule of categorical syllogism.

In this argument in the minor premise, the minor term 'pages'

means 'boy servants' but in the conclusion the minor term pages means 'pages of a book'.

C. Fallacy of Ambiguous Middle

When in a syllogism middle term is used in one meaning in the major premises and another meaning in the minor premise then the fallacy of ambiguous middle occurs.

M P

All cold is dispelled by heat

S M

His ailment is cold

S P

∴ His ailment can be dispelled by heat.

This argument is invalid because it commits the fallacy of 'ambiguous middle'. This fallacy is committed when we violate the I rule of categorical syllogism.

In this argument in the major premise, the middle term 'cold' means 'chillness' but in the minor premise, the middle term cold means 'disease'.

Rule II - A syllogism must consist of three and only three propositions.

Proof: The very definition of the syllogism secures this rule directly and nothing more need be said about this rule. Syllogism is a kind of mediate inference in which the conclusion is drawn from two premises taken jointly. Hence there are three propositions in a syllogism.

Rule III - The middle term must be distributed at least once in the premises.

Proof: Middle term establishes a relation between major term and minor term. Unless the extremes are related to one and the same part of the middle term. There cannot be relation between the extremes. The middle term is the bond of connection, but if one part of the middle term is compared with the major term, and another part with minor term, no conclusion is possible.

Violation of this rule leads to the fallacy of '**undistributed middle'.**

P M

All agriculturists are hard workers - $\overset{\checkmark}{P}A\overset{\times}{M}$

S M

All scientists are hard workers - $\overset{\checkmark}{S}A\overset{\times}{M}$

S P

∴ All scientists are agriculturists - $\overset{\checkmark}{S}A\overset{\times}{P}$

This argument is invalid because it commits the fallacy of **'undistributed middle'**. This fallacy is committed when we violate the third rule of categorical syllogism. In this argument middle term is undistributed in both the premises because major and minor premises both are A propositions, and middle term occurs in the predicate place in both the premises.

Rule IV – No term can be distributed in the conclusion unless it is distributed in the premises.

Proof: Syllogism is a kind of deductive inference; hence the conclusion cannot be more general than the premises. A term which is not taken in its entire extent in the premises cannot be taken in its entire denotation in the conclusion.

The violation of this rule leads to two kinds of fallacies.

a) Fallacy of Illicit Major

b) Fallacy of Illicit Minor

A) Fallacy of Illicit Major:

If the major term is distributed in the conclusion without being distributing in the major premise, we commit **the fallacy of illicit major**.

M P

All cows are quadrupeds - $\overset{\checkmark}{M}A\overset{\times}{P}$

S M

No dogs are cows - $\overset{\checkmark}{S}E\overset{\checkmark}{M}$

S P

∴ No dogs are quadrupeds - $\overset{\checkmark}{S}E\overset{\checkmark}{P}$

This argument is invalid because it commits the **fallacy of illicit major**. This fallacy is committed when we violate the IV rule of categorical syllogism. Syllogism is a kind of deductive inference. So, the conclusion cannot be more general than the premises. In this argument major premise is an A proposition and major term occurs in the predicate place and hence it is undistributed. But conclusion is an E proposition and major term is distributed.

B. Fallacy of Illicit Minor:

If the minor term is distributed in the conclusion without being distributed in the minor premise, we commit the fallacy of illicit minor.

M P

No men are prefect - $\overset{\checkmark}{M}E\overset{\checkmark}{P}$

M S

All men are animals - $\overset{\checkmark}{M}A\overset{\times}{S}$

S P

$\therefore$ All Animals are perfect - $\overset{\checkmark}{S}A\overset{\times}{P}$

This argument is invalid because it commits the fallacy of **'illicit minor'**. This fallacy is committed when we violate the IV rule of categorical syllogism.

Syllogism is a kind of deductive inference. So, the conclusion cannot be more general than the premises. In this argument minor premise is an A proposition and minor term occurs, in the predicate place and hence it is undistributed. But conclusion is an E proposition and minor term is distributed

Rule V – From two negative premises no conclusion can be drawn

Proof: A negative proposition states that the predicate is denied of the subject, and if both the premises are negative, it means that neither the major term nor the minor term is connected with the middle term. If the middle term is not connected with either the major term or the minor term, there is no common bond between them. So, no relation can be established between them. So, no relation can be established between

major and minor term in the conclusion. Thus **two negative propositions** cannot yield a valid conclusion.

Ex No men are quadrupeds

No quadrupeds are rational

No conclusion can be drawn

Violation of this rule leads to the fallacy of 'two negative premises'.

VI Rule: if one premise is negative, the conclusion must be negative; and vice versa, that is to prove a negative conclusion, one premise must be negative.

Proof: According to V rule both the premises cannot be negative; hence at least, one of the premises must be affirmative in order that a conclusion can be drawn VI rule says that if one of the premises is negative, the conclusion must be negative. The negative premises merely expresses that there is no connection between the middle term and one of the extremes, and the other premise, which must be affirmative, says that there is some connection between the middle term and the other extremes. From all this we can conclude that there is no connection between the extremes.

The converse of this rule, viz, to prove a negative conclusion, one of the premise must be negative is also true. If the conclusion is negative, it means that there is no connection between the extremes. This can only be proved if we have a negative premise, showing that there is no connection between the middle term and one of the extremes, and an affirmative premise shows that there is some connection between the middle term and other extremes.

Rule VII – If both the premises are affirmative, the conclusion is affirmative, and vice versa i.e. if conclusion is affirmative, both premises must be affirmative.

Proof: If both the premises are affirmative, it means that the middle term has a connection with both the extremes and from this we can infer that the extremes themselves have some connection with each other.

Conversely, if the conclusion is affirmative, both the premises must be affirmative. If both the premises are not affirmative, they can either be both negative and one of them may be negative and the other affirmative. If both are negative, no conclusion follows according to the V rule and if either of the two premises is negative, the conclusion must be negative according to the VI rule. Hence the conclusion can be affirmative, only if both the premises are affirmative.

Rule VIII – If both the premises are particular, nothing can be inferred.

Proof: This rule may be proved in the following way. If both the premises are particular. The possible combinations are II, IO, OI and OO

II does not yield any conclusion because, an I proposition does not distribute either the subject or the predicate and hence, if both the premises are I propositions, no term is distributed in the two premises. But according to the III rule, the middle term must be distributed at least once in the premises. Hence we commit the **fallacy of undistributed middle**

$\overset{x}{M}\ \overset{x}{I}\ S$ Fallacy of undistributed middle

$\overset{x}{S}\ I\ \overset{x}{M}$

IO and OI – If one premises is an I proposition and the other is an O proposition, the two premises, distributes only one term, and this must be the middle term, to avoid the fallacy of undistributed middle. But if one premise is negative, the conclusion must be negative according to the VI rule. Then the major term would be distributed in the conclusion, without being distributed in the major premise. Hence in attempting to draw a conclusion we either commit the fallacy of undistributed middle or the fallacy of illicit major.

$\overset{\times}{M}I\overset{\times}{P}$	$\overset{\checkmark}{P}O\overset{\times}{M}$	
$\overset{\times}{S}O\overset{\checkmark}{M}$	$\overset{\times}{S}I\overset{\times}{M}$	Fallacy of Illicit major
$\overset{\times}{S}O\overset{\checkmark}{P}$	$\overset{\times}{S}O\overset{\checkmark}{P}$	

OO – According to the V rule form two negative premises no conclusion can be drawn.

Thus two particular premises yield no conclusion.

Rule IX – If one premise is particular, the conclusion must be particular.

Proof: This rule may be proved in the following way.

If one premise is particular, the other premise must be universal, and therefore, the possible combinations are – AI, IA, AO, OA, EI, IE, EO and OE of these eight possible combinations we may reject EO and OE, in which both premises are negative and as such no conclusion can be drawn according to V rule.

Universal Conclusion		Particular Conclusion	
AI - $\overset{\checkmark}{M}A\overset{\times}{P}$ $\overset{x}{S}I\overset{x}{M}$ $\overset{\checkmark}{S}A\overset{\times}{P}$	Fallacy of illicit minor	$\overset{\checkmark}{M}A\overset{\times}{P}$ $\overset{x}{S}I\overset{x}{M}$ $\overset{x}{S}I\overset{x}{P}$	Valid
IA- $\overset{x}{M}I\overset{x}{P}$ $\overset{\checkmark}{M}A\overset{\times}{S}$ $\overset{\checkmark}{S}A\overset{\times}{P}$	Fallacy of illicit minor	$\overset{x}{M}I\overset{x}{P}$ $\overset{\checkmark}{M}A\overset{\times}{S}$ $\overset{x}{S}I\overset{x}{P}$	Valid
AO- $\overset{\checkmark}{M}A\overset{\times}{P}$ $\overset{\times}{M}O\overset{\checkmark}{S}$ $\checkmark\ \checkmark$ S E P	Fallacy of illicit minor	$\overset{\checkmark}{P}A\overset{\times}{M}$ $\overset{\times}{S}O\overset{\checkmark}{M}$ $\overset{\times}{S}O\overset{\checkmark}{P}$	Valid
OA- $\overset{\checkmark}{P}O\overset{\times}{M}$ $\overset{\checkmark}{S}A\overset{\times}{M}$ $\checkmark\ \checkmark$ S E P	Fallacy of illicit minor	$\overset{\times}{M}O\overset{\checkmark}{P}$ $\overset{\checkmark}{M}A\overset{\times}{S}$ $\overset{\times}{S}O\overset{\checkmark}{P}$	Valid

EI-	✓ ✓ M E P x x S I M ✓ ✓ S E P	Fallacy of illicit minor	✓ ✓ P E M x x S I M x ✓ S O P	
IE-	x x M I P ✓ ✓ S E M ✓ ✓ S E P	Fallacy of illicit minor	x x M I P ✓ ✓ S E M x ✓ S O P	Fallacy of illicit major because of the violation Vilation of X rule

Thus, if one premise is particular, the conclusion must be particular.

Rule X – From a particular major and a negative minor no conclusion is possible.

Proof: If the minor premise is negative, the major premise must be affirmative, and the conclusion must be negative. The conclusion being negative, the major term is distributed in the conclusion, but the major premise being particular affirmative does not distributed any term. Hence in attempting to draw a conclusion we commit the fallacy of illicit major.

The possible combinations are IO, OE, OO and IE.

In these four combinations OE and OO are rejected because according to the V rule from two negative premises no conclusion can be drawn.

We reject IO combination also because according to the VIII rule from two particular premises no conclusion can be drawn.

IE
x x
M I P
✓ ✓
S E M Fallacy of illicit major
x ✓
S O P

Thus from a particular major and a negative minor no conclusion is possible.

Conclusion about rules of categorical syllogism:

It may be observed that the last four rules are the result of the first six rules. A violation of any one of these last four rules is the result of the violation of some of the other rules. Hence, the first six rules are called primary rules, while the last four rules are called secondary rules.

To sum up, the first two rules relates to the structure of a syllogism; the third and the fourth rules deals with the distribution of terms; the fifth, sixth and seventh deals with the quality of the propositions; the eighth and ninth rules deals with quantity of the propositions; lastly the tenth rule deals with both quantity and quality.

I and II rules	Relates to the structure
III and IV rules	Deals with distribution of terms
V, VI and VII rules	Deals with quality of the proposition
VIII and IX Rules	Deals with quantity
X Rule	Deals both quantity and quality

2. Mixed Syllogism:

A mixed syllogism is one in which conditional and categorical propositions are combined in the same argument.

There are two kinds of mixed syllogism. They are

A) Mixed Hypothetical syllogism

B) Mixed Disjunctive Syllogism

A) Mixed Hypothetical Syllogism:

Hypothetical syllogism is a kind of mixed syllogism consisting of hypothetical major premises, a categorical minor premises and a categorical conclusion. Hence, hypothetical syllogism is also called hypothetical categorical syllogism.

Ex: If it rains, there will be a good crop
It is raining

∴ There will be good crop.

Symbolic Ex : If A is B, then C is D
A is B

∴ C is D

Rules and fallacies of hypothetical syllogism:

I Rule – To affirm the antecedent is to affirm the consequent, but not conversely.

Affirm the antecedent in the minor premise and then affirm the consequent in the conclusion.

Ex: If a man is deaf, he talks loudly

This man is deaf

∴ This man talks loudly

The violation of this rule leads to the fallacy of **'denying the antecedent'.**

Ex: If it rains, the ground is wet

It is not raining

∴ The ground is not wet.

This argument is invalid because it commits the fallacy of **'denying the antecedent'.** This fallacy is committed by the violation of the first rule of hypothetical syllogism.

According to the rule categorical minor premise should affirm the antecedent of the hypothetical major premises. Then categorical conclusion affirms the consequent. But in this argument categorical minor premise instead of affirming the antecedent, it denies the antecedent. So, the categorical conclusion denies the consequent instead of affirming.

II Rule – To deny the consequent is to deny the antecedent, but not conversely.

Deny the consequent in the minor premise and then deny the antecedent in the conclusion.

Ex: If a man is deaf, he talks loudly

This man does not talks loudly

∴This man is not deaf

The violation of this rule leads to the fallacy of 'affirming the consequent'.

Ex: If it rains, the ground is wet

The ground is wet

∴ It is raining

This argument is invalid because it commits the fallacy of **'affirming the consequent'.** This fallacy is committed by the violation of the second rule of hypothetical syllogism.

According to the rule categorical minor premises deny the consequent of the major premise. Then categorical conclusions deny the antecedent. But in this argument, minor premise instead of denying the consequent it affirms the consequent. So, the conclusion instead of denying the antecedent it affirms the antecedent.

B) Mixed Disjunctive Syllogism:

Disjunctive syllogism is also a kind of mixed syllogism in which major premises is a disjunctive proposition. Minor premise is a categorical proposition and conclusion is also a categorical proposition. Hence, disjunctive syllogism is also called disjunctive categorical syllogism.

Ex: Signal light is either red or green

Signal light is red

∴Signal light is not green

Symbolic Ex : A is either B or C

A is B

∴ A is not C

Moods of Disjunctive Syllogism

Mood I – Modus - Ponendo – Tollens

It is a mood of disjunctive syllogism in which one of the alternatives of the major premise is affirmed in the categorical minor premise. Then other alternative is denied in the conclusion. This mood is known as **'negative disjunctive syllogism'** denies by affirming.

Ex: Students are either girls or boys

X is a girl

∴x is not a boy.

Mood II – Modus – Tollendo – Ponens

It is a mood of disjunctive syllogism in which one alternative of the major premise is denied in the categorical minor premise then the other alternative is affirmed in the conclusion. This mood is known as **'affirmative disjunctive syllogism',** affirms by denying.

Ex: Men are either honest or dishonest

He is not dishonest

∴ He is honest

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MODEL QUESTIONS

1 Mark Questions:

1. What is mediate inference?
2. What is categorical syllogism?
3. What is major term?
4. What is minor term?
5. What is middle term?
6. What is mixed syllogism?

2. Mark Questions:

7. What are the kinds of mixed syllogism?
8. Define the fallacy of ambiguous major.
9. What is the fallacy of ambiguous minor?
10. What is the fallacy of ambiguous middle?
11. What is hypothetical syllogism?
12. What is disjunctive syllogism?

3. Mark questions:

Test and explain the validity of the following arguments:

13. Light is essential to guide our steps
    Lead is not essential to guide our steps.
    ∴ Lead is not light

14. No man is made of paper
    All pages are men
    ∴ No pages are made of paper

15. All cold is dispelled by heat
    His ailment is cold
    ∴ His ailment can be dispelled by heat

16. All agriculturist are hard workers
    All scientists are hard workers
    ∴ All scientists are agriculturist

17. All cow are quadrupeds
    No dogs are cows
    ∴No dogs are quadrupeds

18. No men are perfect
    All men are animals
    ∴ No animals are perfect

19. If it rains, the ground is wet
    It is not raining,
    ∴The ground is not wet

20. If it rains the ground is wet
    The ground is wet
    ∴It is raining

10 Mark questions:

21. Write all the rules of categorical syllogism.
22. Explain the kinds of mixed syllogism.

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Chapter-6

LOGICAL DEFINITION

Nature of Definition:

Definition is indispensable to clear thinking and to the communication of thoughts. When we cannot understand things about which we are thinking, confusion arises. If we want to make our thoughts clearly and precisely understandable, we need to define words. Unless we understand what a word means, we cannot significantly use it. Thus in order to make ourselves sensible to others, we have to define the words meaning fully and precisely.

Definition states the entire connotation, definition appeals to thought definition is scientific the aim of definition is to make our ideas of things distinct and clear.

We define the term and the proposition describes the thing of which the term is the name. Definition means a statement of the connotation of a term. The terms which do not possess any connotation cannot be defined under such circumstances we can describe the things denoted "Definition is the explicit statement of the entire connotation of a term" the connotation of a term consists of the attribute or collection of attributes which the term implies. Definition means a statement of the entire connotation.

Definition is defined as a statement of the connotation of the proximate genus and the differentia of the term. The connotation of the proximate genus includes all the attributes common to the different species included under the genus. Only when the differentia is added to that the statement of connotation becomes complete. Before we define a term we must know to which class of things it belongs and what are the attributes which distinguishes it from other members of that class. We say that 'Man is a rational animal' thus we make it clear that man is one of the species of animals. We also point out the differentia which distinguishes him from animals.

The object of definition is to make our ideas of things distinct and clear; it appeals to our thoughts. The object of description is to form before us the mental picture of the things. So that we may identity or recognize the object it appeals to our imagination.

THE RULES OF DEFINITION

A good definition has to fulfil the followings Rules:

Rules I: "IT SHOULD STATE THE ENTIRE CONNOTATION OF THE TERM DEFINED NEITHER MORE NOR LESS"

The connotation of a term includes common and essential attributes. While we define a term, we should take care to avoid in-essential attribute.

Example:-

Man is a rational animal. The connotation of the term 'man' includes the common and essential attributes, namely, 'animality' and 'rationality'. If we say that 'Man is a smiling rational animal', the definition is called accidental definition. The attribute 'smiling' though found in all men is not a part of the connotation of the term.

Examples:-

1. A gentleman is a person who moves in good society.
2. Gold is precious metal.
3. Man is a laughing animal.
4. An ambassador is an honest man sent to lie aboard for the good of his country.

The Definition contain less than the connotation of the name.

It becomes too wide and will be applicable to a greater number of things than are included in the denotation of the term defined.

Examples:-

1. Man is an animal.
2. Rock is a hard substance.
3. If we define a triangle as a plane figure.

Thus a definition should be adequate and precise

Rule – II A DEIFINITION SHOULD NOT BE EXPRESSED IN OBSCURE

If the language of a definition is more difficult than the term defined. It involves the fallacy of an obscure definition.

Examples:-

1. Pension is an allowance made to anyone without an equivalent.
2. Cow is a kind of animal.

THE DEFINITION SHOULD NOT BE EXPRESSED IN VAGUE OR FIGURATIVE LANGUAGE.

It involves the fallacy of a figurative definition. Such definitions are often misunderstood and bear more than one interpretation.

Examples:

1. The lion is the king of beasts.
2. Music is an expensive noise.
3. Necessity is the mother of invention.
4. Logic is the medicine of mind.
5. A camel is a ship of the desert.

Rule – III A DEFINITION SHOULD NOT CONTAIN THE TERM DEFINED OR SYNONYMS OF IT. IN OTHER WORDS, IT SHOULD NOT BE A TAUTOLOGOUS.

It involves the fallacy of a synonymous definition.

Examples:-

1. Man is a human being
2. Life as a vital force.
3. Plant is a vegetable
4. Humour is thinking in jest.

Rule – IV A DEFINITION SHOULD NOT BE NEGATIVE WHEN IT CAN BE AFFIRMATIVE.

A definition should not be negative when it can be affirmative. The definition should not be negative unless the whole meaning is negative. A definition is meant to state what the term means. A negative proposition merely states what a term does not mean. Hence, if it is possible to make

a scientific. On the other hand a negative definition serves the purpose of description.

Examples:-

1. Peace is the absence of war.
2. Knowledge is the opposite of ignorance.
3. Mind is not matter.
4. Light is not darkness.

A definition should be clear and precise in its expression.

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MODEL QUESTIONS:

(One mark questions)

1. What is Logical Definition?
2. What is proximate genus of term?
3. What is accidental definition?
4. What is obscure definition?
5. What is figurative definition?

(Two mark questions)

6. What is too wide definition?
7. What is synonymous definition?
8. What is Negative definition?
9. Name the fallacy 'man is a human being'?
10. Name the fallacy 'The lion is king of beasts'?

(Five mark questions)

11. Explain with the example of figurative definition?
12. Explain the obscure definition?
13. Explain the rules of Logical definition?

(Ten mark questions)

14. "Definition should be per genus et differentiam "Explain with illustrations".
15. State the rules of a good definition?

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CHAPTER – VII

A. MODERN AND SYMBOLIC LOGIC:

MODERN LOGIC:

In traditional logic proposition explain from one subject to another subject in all propositions there is subject as well as predicate. Subject describes about an object, a person (Subject) or a group or class. Predicate is a quality like wise the characteristics of traditional logic, any quality of predicate term may be affirmed or denied.

For Example:-

1. Rama is intelligent.
2. Rama is Indian.

In traditional logic these sentences are considered in the form of subject and predicate term. Rama is intelligent; this indicates the quality of Rama. Rama is Indian; this indicates that Rama belongs to the Indian category (Class).

Hence in traditional logic the relation between subject term and predicate term is taken into consideration, remaining relation is denied.

Modern Classification of Propositions

In Modern Logic propositions are classified into 3 kinds.

1. Simple proposition
2. Compound proposition
3. General proposition

I. Simple proposition

One and only one statement is known as simple proposition. For Example:- Kranthi Veera Sangoli Rayanna is Freedom fighter.

II. Compound proposition

In any sentence if more than one statement is combined, such sentence is known as compound proposition.

Example:- Indians are honest and intelligent.

III General Propositions

When the subject and predicate of proposition indicate a class, such proposition is known as General proposition. A general proposition indicates the Universal class or particular class. It can be joined from one class to another class or one category to another category.

Example:-

1. Bangalorians are Indians.

2. Horses are not donkeys

Symbolic Logic

George Boole is the founder of Modern Symbolic logic (1815-1864 He was the great Mathematician and as well as a philosopher of England.

Inference can be analysed through any Natural language.

Some times the language may be difficult, vague, and figurative. To avoid this difficulty the Logicians used artificial symbolic language. When the Symbols are used then there is a possibility to explain the inference clearly.

To indicate the subject and predicate we use two kinds of symbols. To indicate the subject and object (Thing & person) we use the small Alphabet of English from 'a' to 'w' the symbol of 'Socrates is's'. The symbol of Rama is 'r'. The qualities of the thing or person can be explained in capital letters of English language. The above predicate can be indicated by the symbol 'H'

Human = Men, The first alphabet is 'H'. According to the rules first the predicate can be shown, and then the subject. The above example can be symbolically written as follows:-

Socrates is Human being = Hs.

Rama is Human being =Hr

The symbols of conjunction, Negation, disjunction and implication are right truth table of compound sentence.

1. Conjunction:

Two statements can be joined together by the word 'and'

Example: Kranthi Veera Sangoli Rayanna' is brave man, Kranthi Veera Sangoli Rayanna is honest.

This sentence can be joined together with the term 'AND'. The symbol of conjunction "." (dot). Two statements can be written in a symbolic way as P and q, can be written p.q

Each statement is either true or false. Therefore each statement has truth value. The truth value of true consequent is 'T'. and for false 'F'. The truth of conjunction depends upon elements of truth. When the both elements are true, then the joint conjunction sentence will be true otherwise it will be false.

If P is true and q is true p.q is true.

If p is true and q is false p.q is false.

If P is false and q is true p.q is false.

If p is false and q is false p.q is false.

The above possibilities (indications) can be explained through the truth table

P	Q	P . Q
T	T	T
T	F	F
F	T	F
F	F	F

2. Negation

To denying or Negation of statement we use 'No' or NON term.

The symbol of negation '~' (Curle) if p is a statement the form of Negation is as follows.

P	~P
T	F
F	T

3. Disjunction

When two statements joined together by the term 'or' it is known as disjunction.In disjunction always one disjunct is true and another one is false.

Example : Delhi is the capital of India or Bangalore is the capital of India.

The symbol of disjunction is "V" (vedge). The above example can be shown with the symbol in the following way Delhi is capital of India 'V' Bangalore is capital of India.

If p and q are two disjunction these two terms are symbolically may be shown as PVq disjunction may be shown through the following truth table

If p is true and q is true pVq is true

If p is true and q is false pVq is true.

If p is false and q is true pVq is true

If p is false and q is false pVq is false

P	Q	P VQ
T	T	T
T	F	T
F	T	T
F	F	F

4) Implication

Two statements joined together by the term 'IF'.

Example:- If he is saint, he use the orange cloth. The symbol of IF is

" ⊃" (Lala). Horse shoe. The two terms p and q can be joined together or implicated by this symbol p ⊃ q. Implication can be shown by the following truth table

If p is true and q is true p ⊃ q is true.

If p is true and q is false p ⊃ q is false.

If p is false and q is true p ⊃ q is true.

If p is false and q is false p ⊃ q is true.

P	Q	P ⊃ Q
T	T	T
T	F	F
F	T	T
F	F	T

B. BASIC LAWS OF THOUGHT

Traditional Logicians defined logic as the Science of valid thinking. Logic, according to them aims at discovering the various forms of inferences. The principles of validity of such inferences. The principles of valid thought or the principles of validity of inferences are called the laws of thought. These laws of thought, according to traditional logicians are three,

1. The law of identity
2. The law of contradiction.
3. The law of excluded middle

The Law of Identity

This law normally expressed as 'A is A', or whatever is, is' or 'A thing is what it is'. Thus it means a thing is identical with itself. It remains the same amid it a diversity of circumstances. Its qualities may change. But it remains the same. Socrates the child, the boy, the youth, is different

and yet it is the same Socrates. It is this fundamental identity in all changes that makes thought systematic. This does not, however, rule out the possibility of a change in the qualities of a thing.

The Law of Contradiction

The principle of contradiction is very often stated as 'A can not both be A and not A' or 'Nothing can both be and not be' or 'A cannot be not – A'. Thus stated, the principle means that two contradictory judgements cannot both be true, or that two incompatible attributes cannot be both predicated of the same subject at the same time. For instance, if this drink is 'Sweet' it is 'sweet'. When it is 'sweet' and is not 'non-sweet' when it is 'sweet' it cannot be both 'sweet' and 'non-sweet' at one and the same time. In short, this principle means that two incompatible terms cannot be attributed of the same subject, and two contradictory propositions cannot both be true at the same time.

The Law of Excluded Middle

According to the law of Excluded Middle, two contradictory propositions cannot both be false. If one of them is false, the other must be true. If one of them is true, the other must be false. For example, if the proposition "Jawaharlal Neharu is living" is false, then it's contradictory "Jawaharlal is not living" must be true.

Like the law of contradiction, the law of Excluded Middle also applies to contradictory propositions on the assumption that they refer to a definite object at a given time.

Mill has raised an objection to this law. He points out that there are three possibilities about a proposition. A proposition may be true, false or unmeaning. Therefore, when one of the contradictory propositions is false, the other contradictory proposition may be either true or unmeaning. However, a meaningless expression is not a proposition. Therefore, this is not a proper objection.

As applied to things, the Law of Excluded Middle is interpreted thus. The law states that "A thing is either A or not - A" that is to say, the same thing must possess one of the two contradictory qualities.

MODEL QUESTIONS

ONE MARK QUESTIONS:

1. What is laws of thought?
2. What is law of identity?
3. What is law of contradiction?
4. What is law of excluded middle?
5. What is simple proposition?
6. What is compound proposition?
7. Who was the founder of modern symbolic logic?

TWO MARKS QUESTIONS:

8. What is general proposition?
9. What is conjunction?
10. What is denying or negation?
11. What is disjunctive proposition?
12. What is compound proposition?

FIVE MARKS QUESTIONS:

13. Explain the law of identity.
14. Explain the law of contradiction.
15. Explain the law of excluded middle.
16. Explain the truth table of the conjunction.
17. Explain the truth table of denying or negation.
18. State the truth table of disjunctive.
19. Illustrate the truth table of implication.

TEN MARKS QUESTIONS:

20. Explain the basic law of thought.

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CHAPTER – VIII

BASIC ELEMENTS OF INDIAN LOGIC

Introduction:

Indian logic was developed during the ancient era. **Gauthama was the exponent (father) of the Indian Logic.** The Nyayasutra of Gauthama is the first epic of Indian Logic. Vatsyayana, Uddyotaka and Vachaspathi helped it to grow. It was called as **"Padartha Prathipadana"** in Ancient India.

According to the Indian Logic the second source of knowledge is Inference. The word **'Anumana'** is made of **'Anu'** and **'Mana'. 'Anu'** means after and **'Mana'** means knowledge. The combination of the meaning of these two words reveals that Inference becomes knowledge after perception. The word 'Logic' can be understood using different words, such as 'Anvikshiki', 'Nyayadarshana', 'Logic', 'Pramanashastra' etc in Indian Orientalism.

In olden days, the Indian Logic had ten sentences (Avayava) of Inference. Gradually, the numbers were reduced to five by Gauthama, the first Indian Logician. But the Buddhist Logicians presented two sentenced Inference. Mimasakas advocated that Inference needs three sentences.

According to the Indian logical discourse, knowledge can be classified in to five types.

1. Prathyaksha: knowledge comes out of sense organs. Or perception is the form of knowledge which results from the contact between the object and sense organs.
2. Anumana or Inference: knowledge comes out of thought. Or Knowledge which is preceded by perception.
3. Upamana: knowledge comes out of comparison. Or Comparison is the attribute of knowledge arising out of similar cognition.

4. Shabdha Pramana: knowledge which comes out of authorities. Or Knowledge which arise out of sentences uttered by reliable individuals.
5. Arthapatthi: knowledge can be illustrated by an example. Or inferring on the basis of fast experience to connect the meaning.

Inference includes five sentences (Avayava), according to the Indian Traditional Logic.

1. Prathijna: That can be justified or explained. Or the very beginning of the thesis to be established.
2. Hethu/ Reason: That can be reasoned doubt. Or Paksata is a necessary condition of Inference.
3. Udaharana: The Drastanta is a complete comprehensive sentence which, along with an example, shows the invariable relation between Sadhya and Hethu.
4. Upanaya: It indicates the invariable relation between Dristanta. Upanaya shows that The Dristantha sentence applies to the particular instance. Or the knowledge of the qualities of the paksha through Hethu.
5. Nigamana: Conclusion.

There are five sentences in the below Inference. They are called "Panchavayava Nyaya". Indians normally gives the following example:

1. Prathijna: Yonder mountain has fire
2. Hethu/Reason: For it has smoke
3. Udaharana: Whatever has smoke has fire, eg: an oven or kitchen.
4. Upanaya: Yonder Mountain has smoke such as is invariably accompanied by fire.
5. Nigamana: Therefore Yonder mountain has fire

In the above example, the justifiable fact is that mountain has fire. Hethu says that "It has smoke", it means it gives the reason for Prathijna which say mountain has fire. Whatever has smoke has fire suggests the invariable relation between the 'Hethu' and the 'sadhya' which means justifiable.

In the above example, what we think about is called minor term. 'Mountain' is the minor term. What we justify in minor term is called 'Sadhya'. We try to justify the mountain has fire. So fire becomes lingi means Hethu which we try to justify. On which basis we justify the fact is Sadhana or lingi or Hethu. The presence of fire, mountain is inferred from the presence of smoke on the mountain, because of vyapthi, fire is invariably present where there is smoke. All these three minor, major and middle terms are equal in western logic.

The third sentence (avayava) is major premise, second sentence is minor premise and fifth sentence of Indian logic is conclusion. The first and fourth sentences (avayava) of the Indian logic are excluded in the Aristotelian syllogism.

Ex: Where there is smoke, there is fire – major premise
Mountain has smoke – minor premise
Therefore mountain has fire – conclusion

In the above example, smoke is the middle term, fire is the major term and the mountain is the minor term. Hethu plays a significant role in the Inference (Hethu establishes that there is relation between the sadhya and paksha.) For this reason Hethu is also known as means. Sadh Hethu produces valid Inference.

According to Udyothaka Logician, three features of Sadh Hethu:

1. Paksha dharmatha – the presence of the middle (Hethu) in the minor.
   Ex: The smoke in the mountain
   The mountain has fire because it has smoke
2. Sapakshathva: the presence of the middle (Hethu) in positive instances homogenous with the proven.
   Ex: as smoke in the kitchen/ forge.
   All that has smoke has fire like a kitchen.
3. Vipakshathva: Non presence of the middle (Hethu) in negative instances heterogeneous from the proven.
   Ex: Whatever is not on fire has no smoke, like a lake.

The main features of middle term (Hethu) are that it should be free

from all conditions. The Hethu which does not have these features will be asath Hethu.

Classification of Indian Inference

Indian Logicians distinguish Inference in three different ways. Inference has divided in to three kinds.

1. Purvavat: Where we perceive the antecedent and infer the consequent Or Inference based on former experience.

   Ex: perceiving the clouds in the sky, we conceive that it will rain.

2. Sesavat: Where we perceive the consequent and infer the antecedent Or Inference of the causes from its effect

   Ex:

   1. Perceiving the wet land, we conceive that rain has come.
   2. It is indirect proof such as is sometimes met within Euclid's elements

3. Samanyatodrasta: It is based, not so much on causation as on uniformity of experience Or is that in which with the support of what is found in the sphere of sensuous objects, we reason about parallel cases in the sphere of the super sensuous.

   Ex:

   1. We know that an instrument like an axe needs a sentient agent to wield it before it can function. Assuming that manas is such an instrument (karana) we may conclude that there should be behind it an agent the self, to explain its activity though neither we neither self nor the manas is perceivable.
   2. We can reason not only from smoke to fire, but also from the cloven hoof to the horns – features which, so far as we know, are not necessarily related.

Inference has been divided in to three types on the basis of Vyapthi or Hethu.

1. Kevalanvayi: Merely positive, where we have only affirmative invariable concomitance, as in "what is knowable is nameable".

Where we can not have a negative instance to illustrate the position "what cannot be named cannot be known".

Ex: All knowable objects are nameable

The pot is a knowable object.

Therefore the pot is nameable.

This applies to the case where the means and the objects are always found going together. (Agreement on the basis of Hethu)

2. Kevala vyatireki: Merely negative, where a positive instance is not possible. Or Inference on the basis of absence through the medium of invariable concomitance.

Ex: That which is not different from other elements has no smell.

The earth has smell

Therefore the earth is different from other elements.

3. Anvaya Vyathireki: Positive and negative, where the middle is invariably concomitant with the major, as smoke with the fire, wherever there is smoke, there is fire, as in the kitchen, where there is no fire, there is no smoke as in lake.

Inference has been divided into two kinds.

1. Swarthanumana: Those which resolves a doubt in one's own mind (Swartha) or Inference for own self.
2. Pararthanumana: Inference for the sake of others or Reasoning for convincing another.

1. Swarthanumana requires three sentences (Avayava), but
2. Pararthanumana needs five sentences (Avayava).

According to Indian Inference (Nyaya Anumana) for others (Pararthanumana) consists of five statements (Avayava).

The following is a typical Indian syllogism:

1. Prathijna: Yonder mountain has fire
2. Hethu/Reason: for it has smoke
3. Udaharana: whatever has smoke has fire, eg: an oven or kitchen.
4. Upanaya: Yonder Mountain has smoke such as is invariably accompanied by fire.
5. Nigamana: Therefore Yonder mountain has fire

The syllogism stands for what is described above as "reasoning for other". This explains for instance. The statement of the conclusion at the out set is known as the Prathijna or Proposition.

Comparison between Indian Inference (Nyaya Darshan) and Aristotelian Syllogism:

1. The Aristotelian Syllogism and the Indian Inference (Nyaya Anumana) include minor term, major term and middle term. But the judgment and premises inferred using these terms are different.

2. The Aristotelian Syllogism has three sentences and the Indian Inference (Nyaya Anumana) has five sentences. (The Aristotelian Syllogism has major premise, minor premise and the conclusion, but the Indian Inference (Nyaya Anumana) has Prathijna, Hethu, Udaharana, Upanaya and Nigamana)

3. The Aristotelian Syllogism has four figures and nineteen valid moods. But the Indian Inference (Nyaya Anumana) does not have such figures and moods. This kind of analysis is not obvious in the Indian Inference. Because the justifiable fact in the Indian logic is knowledge.

4. The Aristotelian Syllogism has propositions such as A E I O. But in the Indian Inference (Nyaya Anumana) such types of propositions are not found. But in the Indian Inference (Nyaya Anumana) affirmative facts are very much apparent. The Indian Inference (Nyaya Anumana) does not have negative proposition. Negative attitude is considered as positive attitude in the Indian Inference.

Western logicians say “there is no pot here”. Instead of saying this, Indian logicians say “there is inadequacy of pot”.

5. Western logicians advocate that deductive and inductive logic are the two different methods. Considering the syllogism as deductive method, the Western Logicians advocate the three sentences Inference. In the Indian Inference (Nyaya Anumana) deduction and induction does not represent two mutually exclusive types of Inference but they should always be looked upon as inseparably connected parts of a complete process of thinking called INFERENCE (ANUMANA). The chief function of Anumana as a means of Cognition is to enable one to realize how certain facts are inseparably and necessarily connected with each other in accordance with a general proposition. According to Indian Logicians deductive and inductive methods are co-relative. The coordination of these two methods supply knowledge.

6. Both Aristotelian syllogism and the Indian Inference (Nyaya Anumana) though appear differently, if keenly observed, have the common principles. The ways in which the methods presented are different but the basic principles are the same.

7. The five sentenced Indian Inference (Nyaya Anumana) can be formed easily equivalent to the Aristotelian syllogism. Likewise the three sentenced Aristotelian syllogism can be formed easily equivalent to the Indian Inference.

   Ex. for Aristotelian syllogism:

   All human being are mortal - Major premise

   Socrates is a human being - Minor premise

   Therefore Socrates is mortal - Conclusion

From Aristotelian syllogism, if we consider the third sentence (Avyava) is the major premise, the second sentence is minor premise and the fifth sentence is the conclusion by adding Prathijna and Upanaya respectively to first and forth sentence, it will be Indian Inference (Nyaya Anumana) or “Panchavayava Nyaya”.

Ex. for Indian Inference (Nyaya Anumana) or "Panchavayava Nyaya":

1. Prathijna: Socrates is mortal
2. Hethu: because Socrates is a human being
3. Udaharana: those who are human being, they are mortal.
4. Upanaya: Socrates is a human being
5. Nigamana: Therefore Socrates is mortal

v v v v v

MODEL QUESTIONS

One mark Questions

1. Who is the exponent of Indian Logic?
2. Which is the first epic of Indian Logic?
3. How many sentences are there in Indian Inference?
4. What is Prathyksha?
5. What is Upamana?
6. What is Prathigna?
7. What is Hethu?
8. Define Panchavayava Nyaya.
9. Narrate Poorvavath Inference
10. What is Sheshavath Inference?
11. What is Samanythodrista Inference?
12. What is Kevalanvayi Inference?
13. Define Kevala Vyathireki Inference.
14. What is Anvaya Vyathireki Inference?
15. What is Swarthanumana?
16. What is Pararthanumana?

17. How many sentences are required for Swarthanumana?
18. How many sentences are required for Pararthanumana?

Two marks Questions

19. Name the Panchavayava Nyaya of the Indian Inference
20. According to the nature of Hethu, what are the kinds of Inference?

Five marks Questions

21. Which are the characteristics of Sadh-hethu according to Udyothaka? Give example
22. What is the role of Sadh-hethu in Indian Inference? Explain the characteristics of Sadh-hethu.

Ten marks Questions

23. Compare Indian Inference ((Nyaya Anumana)) and Aristotelian Syllogism, explain.

MODEL QUESTION PAPER

I. Answer ALL the following questions: 1 x 10

1. What is the subject matter of logic?
2. What is language?
3. Define judgment?
4. What is proposition?
5. What is immediate inference ?
6. What is negative definition?
7. What is conjunction ?
8. What is laws of thought?
9. What is the first epic of Indian logic?
10. What is "Prathyaksha"?

II. Answer any TEN of the following questions : 2 x 10=20

11. What is form and matter of thought?
12. Name the purposes of Language.
13. What is simple and compound term ?
14. Give an example for concrete and abstract terms.
15. Expand the word "ASEBINOP".
16. Name the basis of four-fold classification of categorical propositions.
17. Write the three terms in categorical syllogism.
18. What are the kinds of mixed syllogism ?
19. Give two examples for figurative definition.
20. What is logical definition ?
21. What is the law of excluded middle ?
22. Name the "Panchavayava" of Indian / Nyaya inference.

III. A. Write short notes on any FOUR of the following in 10 – 15 sentences :

23. Need for Rational thinking.

24. Relationship between logic and language.
25. Parts of logical proposition.
26. Three fold classification of propositions.
27. Eulers circles.
28. Truth table of conjunction.

B. Test and explain the validity of any <u>FOUR</u> of the following Arguments :

29. All doctors are honest

    All lawyers are honest.

    ∴ All lawyers are doctors.

30. If a man is deaf, he talks loudly.

    This man talks loudly.

    ∴This man is deaf.

31. All cows are quadrupeds.
    No dogs are cows.

    ∴ No dogs are quadrupeds.

32. All cold is dispelled by heat.

    His ailment is cold.

    ∴His ailment can be dispelled by heat.

33. If it rains, the ground is wet.

    It is not raining.

    ∴The ground is not wet.

34. No men are perfect.

    All men are animals.

    ∴No animals are perfect.

IV. A. Answer any <u>TWO</u> of the following questions : 2 x 5 = 10

35. Explain the rules of logical definition.
36. Explain the laws of thought.
37. Explain the characteristics of sadh-hettu with examples.

B. Answer any <u>ONE</u> of the following questions : 10 x 1=10

38. Explain the scope of Logic.
39. Explain opposition of propositions with the help of square.

V. Answer any <u>TWO</u> of the following questions : 2 x 5 = 10

40. 'Role of Rational thinking in human life. Explain.
41. Logic helps to develop the language. Give your own opinion.
42. Write five differences in between the mediate and immediate inference.

****

Scheme of Valuation

I. Answer ALL the following questions :

1. Subject matter of logic is thought.
2. Language is the media of expressing thought.
3. Judgement is the simplest unit of thought.
4. Proposition is judgement expressed in words.
5. Immediate inference is one where we draw a conclusion from only one premise.
6. Negative definition is one which states things negatively instead of affirmatively.
7. Conjunction means two statements are joined together by the word "and".
8. The principles of valid thought or validity of inferences are called the laws of thought.
9. The epic of Indian logic is "Nyaya Sutra" of Gauthama.
10. Knowledge coming out of sense organs is known as "Prathyaksha".

II. Answer any TEN of the following questions : 10 = 20

11. Form is the way of thinking, matter is the subject of thinking.
12. The purposes of language are Descriptive, Expressive, Informative and Interrogative.
13. Simple term means single worded term and composite term means many worded term.
14. Concrete term – College.
    Abstract term – Honesty.
15. ASEBINOP – 'A' distributes subject.
    'E' distributes both.
    'I' undistributes neither
    'O' distributes predicate only.

16. Relation, Quantity and Quality.

17. Major term, minor term and middle term.

18. Mixed hypothetical syllogism.

    Mixed disjunctive syllogism.

19. Figurative definition :

    Eg. : 1. Logic is the medicine of mind.

    2. Music is an expensive noise.

20. Logical definition is one which states the relation between terms which is defined.

21. According to the law of excluded middle two contradictory propositions cannot both be false.

22. 1. Pratigna 2. Hethu 3. Upamana 4. Udaharana

    5. Nigamana

III.A. Write short notes on any <u>FOUR</u> of the following ques5 x 4= 20

23. Need for national thinking –

    Man is a social animal. He lives in society and has the capacity of thinking. He is differentiated from other animals. Rational thinking makes him the superior being. Rational thinking helps us to solve the problem.

24. Logic gives knowledge about valid reasoning. We need language to express our thinking to others. Language is the media to express ones thinking, feelings and experience to others. From this logic and language are related.

25. Subject, predicate, copula – Explain with examples.

26. Three-fold classification of propositions :

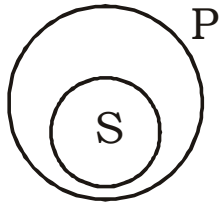
    1. Categorical – states the relation directly.

    2. Hypothetical – states the relation with a condition called "If" … "then"

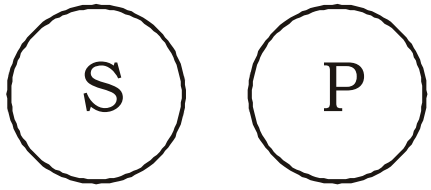
    3. Disjunctive – states the relation with alternatives "either….or".

27. Euler circles

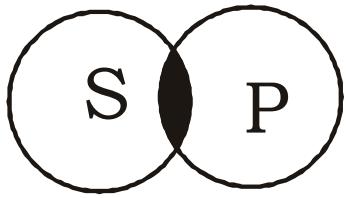
1. 'A' Proposition – All men are mortal – $\overset{\checkmark}{S}A\overset{\times}{P}$



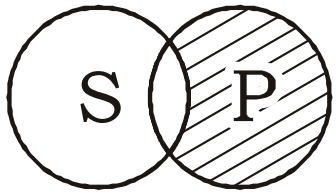
2. 'E' Proposition – No man is perfect – $\overset{\checkmark}{S}E\overset{\checkmark}{P}$



3. 'I' Proposition – some men are strong – $\overset{x}{S}I\overset{x}{P}$



4. 'O' Proposition – some men are not selfish – $\overset{\times}{S}O\overset{\checkmark}{P}$



28. Truth table of conjunction :

P	Q	P.Q
T	T	T
T	F	F
F	T	F
F	F	F

29. P M

All doctors are honest - $\overset{\checkmark}{P}A\overset{\times}{M}$

S M

All lawyers are honest - $\overset{\checkmark}{S}A\overset{\times}{M}$

S M

\ All lawyers are doctors – $\overset{\checkmark}{S}A\overset{\times}{P}$

This argument commits the fallacy of "undistributed middle" because the middle term is undistri$\overset{4}{S}A\overset{X}{P}$buted in both the premises.

(consequent)

(antecedent)

30. If a man is deaf, he talks loudly.

This man talks loudly. (consequent)

\ This man is deaf.

This hypothetical syllogism is invalid because the consequent of the mjor premise is affirmed in the minor premise and violating the rule and commits the fallacy of "affirming the consequent".

31. M P
All cows are quadrupeds – $\overset{\checkmark}{M}A\overset{\times}{P}$

S M
No dogs are cows – $\overset{\checkmark}{S}E\overset{\checkmark}{M}$

S P
\ No dogs are quadrupeds – $\overset{\checkmark}{S}E\overset{\checkmark}{P}$

This argument is invalid and commits the fallacy of "Illicit major" because the major term which is undistributed in the major promise is made distributed in the conclusion.

32. M P
All cold is dispelled by heat

S P
His ailment is cold

S P
His ailment can be dispelled by heat

This argument commits the fallacy of "ambiguous middle" because the middle term gives different meaning in the premises.

33. If it rains, the ground is wet.

It is not raining.

\ The ground is not wet.

This hypothetical syllogism is invalid because it commits the fallacy of "denying the antecedent".

34. M P

No men are perfect – $\overset{\checkmark}{M}E\overset{\checkmark}{P}$

M S

All men are animals – $\overset{\checkmark}{M}A\overset{\times}{S}$

S P

No animals are perfect – $\overset{\checkmark}{M}E\overset{\checkmark}{P}$

This argument is invalid because it commits the fallacy of "illicit minor" because the undistributed minor team is made distributed in the conclusion.

IV.A. Answer any TWO of the following questions : 5 x 2 = 10

35. Write the meaning of logical definition.

Rules

1. Logical definition should state the entire connotation of the term defined neither less nor more.

2. Logical definition should state the complete denotation, neither less nor more while defining a term.

3. While defining a term we should not use equivalent term.

4. A logical definition should always be positive.

5. A logical definition should not use comparative or difficult words.

36. 1. **The Law of Identity :** This law normally expressed as 'A' is 'A' or whatever is, 'is' or 'is' thing is what it is. Thus it means a thing is identical with itself. It remains the same amid it is a diversity of circumstances, its qualities may change. But it remains the same. Socrates, the child, the youth are different and yet it is the same Socrates. It is this fundamental identity in all changes that makes that systematic.

1. **The law of contradiction :** The principles of contradiction is very often stated and it cannot both be A and not A or nothing can both be and not be or 'A' cannot be not 'A' thus stated. The principle means that two contradictory judgements cannot both be true.
2. **The law of excluded middle :** According to the law of excluded middle, two contradictory propositions cannot both be false. If one of them is false, the other must be true. If one of them is true. The other must be false.

37. Characterisitcs of Sadh-hetu.
    1. Paksha Dharmatha
    2. Sapakshathva
    3. Vipakshathva

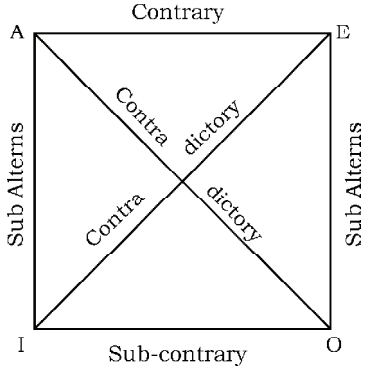
B. Answer any ONE of the following questions : 10 x 1 = 10

38. Scope of Logic

Logic deals with valid reasoning. It is defined as the science of correct thinking. It deals with terms, propositions and inferences. It's area is very vast. It deals with valid arguments and fallacies.

39. Opposition of Proposition

Two propositions having the same subject and predicate if they differ in quality or in quantity or in both is known as opposition of proposition. It is represented in a square.



1. Contrary – A and E
2. Sub-contrary – I and O
3. Sub-Alterns – A-I and E-O
4. Contradictory – A-O and E-I

V. Answer any <u>TWO</u> of the following questions : 2 x 5 = 10

40. Logic is known as science of thought. Thinking capacity differentiate from man to man. By thinking capacity he is considered as superior being.

    Students will write their own opinions.

41. Logic and language are closely related to each other. Logic develops the thinking abilities and language helps to express these ideas. Logic improve the language in arguement.

    Students will write regarding the relation of logic and language.

42. Mediate: Conslusion can be drawn from more than one premise.

    Immediate: Conclusion can be drawn from sincle premise itself.

    Students will write five points about mediate and immediate inference.

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BLUE PRINT OF MODEL QUESTION PAPER

Subject: LOGIC Year: 2013-14

Subject Code: 23 Maximum Marks: 100 Time: 3.15 Hours

Sl. No.	Objectives	No. of hours allotted	Marks allotted	Knowledge		Understanding			Application		Skill	Total No of Questions			
	Questions carrying marks			1	2	1	2	5	2	5	10	1	2	5	10
	Units / Sub units			VSA	SA	VSA	SA	LA	SA	LA	ET	VSA	SA	LA	ET
1	Nature of logic	15	12	1	1			1		1+1	1	1	1	1+1	1
2	Logic and Language	06	08	1	1			1+1				1	1	1+1	
3	Judgment sentence, and Logical proposition	15	10	1	1		1	1				1	2	1	
4	Traditional Classification of proposition	16	12	1	1	1	1	1		1		2	2	2	
5	Kinds of Deductive inference	45	30	1	1		1	2+1		2 1	1	1	2	6+1	1
6	Logical Definition	05	04	1	1		1	1				1	2	1	
7	Modern and symbolic logic	10	08	1	1	1		1		1		2	1	2	
8	Basic Elements of Indian Logic	08	06	1	1			1				1	1	1	
	General questions		10									10	12	18	2
	Sub-Total			8	16	2	8	55		35	20	10	24	90	**20**
	Total	120	100	**24**		**65**			**35**		**20**	**42**			

NOTE

PROHIBITION OF CHILD MARRIAGE

A marriage between a boy below 21 years of age with a girl below 18 years of age, even when one of them is within the age limit prescribed for marriage is considered child marriage.

ILL EFFECTS OF CHILD MARRIAGE:

- Imposes on them responsibilities beyond limits prescribed for the age.
- When a minor girl becomes pregnant before her womb is fully developed, it results in abortion, and the unnecessary weight on the womb may result in the death of the mother.
- There is a chance of the birth of deformed children.
- There is a possibility of contracting AIDS/HIV.
- There is a likelihood of dropping out of children from schools and they remain illiterate.
- Boys and girls forced into child marriage get into Mental diseases.
- It is a matter of violation of Child's Right.
- It stunts the progress of the nation.

Let the girl be eighteen before the Mangalasutra is tied around the neck.

PUNISHMENT FOR CHILD MARRIAGE

Two years of rigorous imprisonment or a fine of Rs.1, 00,000 or both.
Child marriage is a non bailable and can be tried in a court of law.

CULPRITS IN CHILD MARRIAGE:

- One who marries a minor,
- One who arranges such a marriage/ one who directs it/supports it.
- Parents, guardians, protectors and all those who participate in such a function.
- A person / an organization whose negligence results in a child marriage.
- Those who violate the order issued under law.

SPECIAL OFFICERS APPOINTED BY THE GOVERNMENT TO STOP CHILD MARRIAGE FROM TAKING PLACE.

Officers of

- Women and Child Welfare (Department of),
- Department of Education,
- Department of Family Welfare
- Department of Labour,
- Department of Social Welfare,
- Department of the Welfare for the Backward communities,
- Department of Police,
- Department of Scheduled castes and tribes,
- Department of Panchayat Raj,
- Department of Revenue.

Let us all unite to fight against child marriage

WHO TO COMPLAIN:

When one comes to know that a child marriage is going to take place in a certain place lodge a complaint in a police station or to an officer of any of the department mentioned above. The name of the person who lodges a complaint will be kept a secret.

Child marriage is a punishable offence

ADDRESS TO BE CONTACTED:

Director,
Department of women and children welfare,
II Floor, Multi stored building, Dr, Ambedkar Road, Bangalore – 1, Phone: 080-22355984.