UNIT 3 INFERENCE

Contents

3.0 OBJECTIVES

The goal of this Unit is to give an insight about one of the important sources of knowledge through which we come to cognise some new knowledge. Although the details of the logical inference are not considered in this unit, it is a very important Unit as it explains one of the sources of knowledge which is important for the course on theory of knowledge, which provides an important discussion on truth and validity of our knowledge. In this unit, we shall attempt to give a definition of inference and how they are classified and the importance of its role in the acquisition of new knowledge. We shall advance this concept both from the western as well as the Indian approaches and how they are both differently and similarly conceived by them. We shall also point out some important objections against inference and discuss whether inference can offer us new knowledge.

Thus by the end of this Unit you should be able:

- to have a basic understanding of Inference;
- to understand the different kinds of inference;
- to have an overview of Indian inference;
- to have an idea about the objections against inference
- to realize the need of inference in obtaining new knowledge

3.1 INTRODUCTION

'Inference' is, in general, a subject matter of epistemology and Logic. To have a better understanding of the concept of inference, it is essential that we comprehend the association between the two major subjects of philosophy. Epistemology is "the science of sure knowledge." It deals with the nature and validity of knowledge: that is about the *truthfulness* of our knowledge. On the contrary, Logic is interested

in the *correct* form of the argument. "Logic teaches us how to use one's mind; how to draw a conclusion from the given premises;" but it does not teach us whether what we thought or arrived at is true or false. It is outside the scope of logic to guarantee us whether the conclusion arrived at is true or false. Truth and falsity belong to the field of epistemology. Although both are concerned about knowledge, their scope is different. In this unit, we shall try to understand inference from the epistemological point of view rather than that of logic; however, it is inevitable to avoid certain logical arguments, mostly propositional logic, to have a better understanding of inference.

The Place of Inference

One of the essential discussions of epistemology is on the valid sources of knowledge: *how* or through which, one comes to the process of cognition. The principal sources of knowledge are classified into two: sensible and intellectual. The first does not belong to this unit and therefore not the scope of this unit. The second principal source is 'intellectual'.

For most part of it, we acquire new knowledge of the reality through the intellect. The Intellect gives us two types of knowledge: immediate and mediate. By Immediate, we mean that knowledge that we gain intuitively, by looking at an object. We identify a person that he/ she is somebody and he / she is not somebody else. For example, you identify that somebody is Praveen and Praveen is the son of Prakash – this is known as the principle of identity. So also there are other principles which are given to us by the intellect immediately. Mediate or reflective knowledge is acquired with "different operations of our intellect and through the secondary sources." By secondary source, we mean that the knowledge already obtained through perception, or other previous knowledge. This intellectual process is called reasoning or inference. Therefore, inference will have its place right here in the mediate / reflective knowledge in which we move from the perceptual knowledge to the new knowledge.

3.2 DEFINITION OF INFERENCE

Aristotle (384 – 322 B.C.), one of the prominent philosophers of the ancient Greece, introduced the process of inference in the western philosophical world through syllogism – a three statement propositions in which the conclusion is drawn from the previous two propositions.

Dictionary of philosophy defines inference as the process that refers to "the drawing of a conclusion." It is also called *reasoning*. Thomas Aquinas says, "to reason is to advance from one thing understood to another." That is, we pass from what is known to the unknown. We shall give an example: We are sitting in a room and the door is closed. All of us hear a 'triple knock' on the door. All that your senses tell you is that there was a sound produced on the door. It is the intellect, which does not see the person(s) knocking at the door conceives of different possibilities. It may be a single person who knocked at the door thrice: or it may be two persons, one knocked twice and the other once: or still, there were three persons who knocked at the door at regular intervals. Although it is insignificant to know how many knocked at the door, it is important to know that from what is given to us through the senses, the intellect goes through a process to have knowledge of what happened. This process of drawing conclusion is

known as inference. This process can be related to the past, present or future events and occurrences.

We apprehend an event through perception and the intellect makes a judgment and "on the basis of judgment previously made" we infer or draw a conclusion. This process of coming to a new knowledge is called inference. We shall attempt to explain this from propositional logic. In logic, "the propositions which lead up to the new truth are called the *antecedent.* They give the reasons *why* we can assert the new truth. The proposition which expresses the new truth is called the *consequent*. The consequent flows from the antecedent as necessarily caused by it." Because of the antecedents we are able to know the consequent for certain. The certainty of knowledge can be attained through this form inference.

While attempting to understand inference, it is necessary that we introduce another notion, which is apparently similar to it, but very much different from it. That notion is 'argument.' We should not misunderstand that inference is an argument. There are lot of differences between an argument and inference. "An inference can be defined as the psychological process of moving from one thought to another. An argument can be constructed that corresponds to an inference. But an inference is not equivalent to an argument. Furthermore, the premises of a good argument imply, they do not infer, its conclusion, since only persons can make inferences." For inference itself is not an argument. Arguments are constructed to correspond to the inference. Therefore "it is only correct to say that the persons make inferences and the premises of a good argument imply the conclusion." So we could say that reasoning or inference is the process of the intellect which infers a new cognition from an already known cognition.

3.3 KINDS OF INFERENCE

While there are disputes among scholars with regard to the classification of inference, we shall classify it in the most known way. Inference or reasoning is of two kinds: one is deductive and the other is inductive: the former is subdivided further into two as immediate and mediate, while the latter is divided into many kinds of which we shall discuss the important kinds in a while in this unit.

Deduction

Aristotle had held high deductive inference over induction, so much so Immanuel Kant (1724 – 1804) wrote, and rightly so, in the *Critique of Pure Reason* that Aristotle's theory of logic completely accounted for the core of deductive inference. For him certainty or being closer to the truth is attained only through deductive inference. We shall first define deduction. A deduction is defined as "a valid inference from *necessary* premises." By necessary, we mean premises that are self-evident truths or well established truths. The statement with which we begin a proposition is called major premise. In deductive inference, the major premise is true. For example: "all humans are mortal." This is a necessary premise. From this truth, you may arrive at new knowledge. You find then that Raja is a human being. Therefore you infer that Raja is mortal. The knowledge you have about the particular is true. Therefore according to him this form of inference is the best way to have new and true knowledge. Since we move from a general truth to the particular, deduction is understood as "a valid inference from more *general* premises to a less general, i.e. more specific, conclusion" (*Dictionary of*

Philosophy). In deduction it is very vital to note the very essential and basic point that if the premise is true then the conclusion must be *true*, which is not the case in induction.

Deductive inference could be divided into two: Namely, immediate inference and mediate inference, of which we shall discuss in the next subdivision.

Immediate Inference

Strictly, immediate inference belongs to the field of logic; nevertheless we include it here that we have an overall understanding of inference. In the above said example, we notice that there were three statements, of which the first two are called as antecedent and the last as consequent. Immediate inference is a different kind of deductive inference which does not need two premises (antecedent) to arrive at a conclusion but a single premise is sufficient. "Immediate inference is a kind of deductive inference, in which, the conclusion follows from *one premise*." Because we have classified it under deduction, it is important to note that the conclusion cannot be *more general* than the premise. To put it differently, it is a process in which you infer one proposition from the *given* proposition. Immediate inferences are of many kinds of which we shall see only the four.

Conversion

The first type of immediate inference is known as 'conversion.' "Conversion is a kind of immediate inference, in which there is a legitimate transposition of the subject and the predicate of a proposition." for example, from the given example of "No dogs are felines" you infer that "No felines are dogs." We shall give another example: the converse of "Some snakes are poisonous animals" is "Some poisonous animals are snakes."

Obversion

"obversion is a kind of immediate inference in which there is a change in the quality of the given proposition, while its meaning remains unchanged." For example, the obverse of "All ants are insects" is "No ants are non-insects"; the obverse of "Some musicians are males" is "Some musicians are not non-males."

Contraposition

"Contraposition is a kind of immediate inference in which from a given proposition we infer another proposition, having its subject the contrary of the given predicate." For example, the contrapositive of "All crows are birds" is "All non-birds are non-crows."

Inversion

"Inversion is a kind of immediate inference in which from a given proposition we infer another proposition, having its subject the contradictory of the given subject."

For example the inversion of "all men are mortal" is some not-men are not-mortal."

These four of them are called 'eductions.' Eductions may be defined as those forms of immediate inference in which from a given proposition, accepted as true, we derive others implied in it, though differing from it in subject or predicate or both." Apart from the above mentioned immediate inferences, there are also other

kinds, like oppositions, modal consequence, change of relation, inference by Added Determinants and inference by complex conception.

What occurs in the immediate inference is that we infer another proposition which is already implied in it. Therefore there is a discussion among scholars about 'immediate inference' whether it is an inference at all, because there is no new knowledge is arrived at through this inference; what happens is only an explication of what is implicit. We are not offering any justification to state that immediate inference is a genuine form of inference but it is good to know that when we discover what is hidden in a proposition or an object it offers us a new of knowledge.

Mediate Deductive Inference

Contrast to immediate inference, the consequent or the new knowledge is deduced from more than one proposition: that is "the conclusion follows from more than one proposition. Where there are only two premises, and the conclusion follows from them taken jointly." This form of mediate inference is called "syllogism." "The nature of syllogistic reasoning was first disengaged, as said already, by Aristotle in the *Prior Analytics* in which he undertook to lay bare the essential structure of scientific knowing." He defines syllogism as "an argument in which, certain truths having been assumed, something other than these follows of necessity from their truths, without needing any term outside" (I .1 24b 18). We could say that syllogism is "the outward expression of deductive sequence." We are probably familiar with the famous syllogism.

i) All men are mortal

ii) Socrates is a man

iii) Therefore, Socrates is mortal.

The conclusion of the syllogism rests upon the preceding two propositions (i and ii). We arrive at a specific and a particular knowledge from a more general knowledge. In this way of reasoning, one can be sure that what he knows is true. But in our ordinary life we won't be using formal syllogism to deduce certain knowledge. Aristotle is aware of this and suggests the use of what he calls as *Enthymeme*. It is a kind of syllogism in which the any of the premise will be missing. For example to try to prove the certainty of truth we say: Socrates was mortal for he was only a man. What is missing here is the Major premise that all men are mortal: but it is so obvious that it is not needed in persuasion. Mostly it is used in debates, in court rooms for the benefit of persuasion. We know that we cognise through deduction, complete or incomplete, to know and to prove that something is true.

Check Your Progress I

Note: a) Use the space provided for your answer.

b) Check your answers with those provided at the end of the unit.

1) What is inference?

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2) What is deduction?

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Induction

In the history of western philosophy from the period of Aristotle majority of them accepted deductive inference to be a valid form of inference. But From the modern period philosophers, particularly Francis Bacon (1561 – 1626) "lamented the powerlessness of deduction" because they insisted it is not a useful form of inference to advance to new knowledge. Because what happens in deduction is simply the *explication* of what is implied in the major premise and the conclusion cannot be more general than the major premise. Therefore, they propose inductive inference to be the sole inference which can offer us to have *new* knowledge.

Compared to deduction, induction moves from specific instances to have a general conclusion. The traditional definition of Induction is that it is an "inference in which the intellect moves to cognise from a finite number of particular cases to a further case or to a general conclusion." We shall give a familiar example: we observe that swan A is white, then swan B is white, and therefore we conclude that all swans are white. We make a movement from the particular to make a larger conclusion which is *not* implied in the antecedent. Bacon and J. S. Mill (1806 – 1873) did not see any problem with this conception of inductive inference. But others pose different problems with this kind of understanding of inference: namely "to categorically accept another statement on the basis of premises that are categorically accepted." The problems arise out of the uncertainty involved in this inference. That has given rise to understanding inductive inference differently by different people. We shall therefore first explain how mill and others understood induction and the other kinds of induction in the following section.

Inductive Generalization / Enumerative Induction

It is a kind of an inference, where lot of particulars are observed from which we try to generalise the conclusion. In fact the definition we gave in the last passage directly applies to the enumerative induction. The standard example of this kind of inference is the following: from all the observed ravens being black, we infer that all ravens are black. Mill argued that "inductive generalization is the only legitimate kind of induction." That is why this is called *ampliative*. But the problem with this kind of induction is, (with any kind of induction for that matter) how could we move from the observed objects to the unobserved objects. For example, all the swans observed in the 18th century Europe were white. And therefore we make a conclusion that all swans are white. But that is not true. Swans in Australia were observed to be black. Therefore the conclusion is false. This uncertainty of the conclusion in induction is a hindrance to have a true knowledge.

Statistical Inductive Generalisation

Some scholars propose therefore that induction has to be conceived differently. In their view, the conclusion has to be inferred based on the *percentage* of the observed particulars. Suppose we know by induction that 90 percentages of women in Japan are less than 5 feet; then we could infer the conclusion that the next woman from Japan will have a 90percentage chance of being less than 5 feet and make a conclusion that 90 percentage of women in Japan are less than five feet.

Probability Theory

Rudolf Carnap (1891 – 1970), Richard C. Jeffrey (1926 – 2002) and others hold that "induction should be conceived not as a process by which we pass from some accepted statements to others, but rather as a process by which we assign probabilities to various hypothesis in the light of our evidence." This type of induction involves a two-step process: the first is in identifying a broad class of possible confirmation functions and the second in identifying either a unique function in that class or a parametric family of specific confirmation functions. In Fact, the modern probability theory is influenced by Thomas Bayes (c. 1702 – 1761). There are also some problems in this view. We shall explain it with a thought experiment 'the Lottery Paradox' proposed by Henry E. Kyburg (1928 – 2007) in which we will be forced rationally to accept the contradictory propositions that one ticket wins and no ticket wins: because it is probable that any ticket can win but at the same time every ticket has more probability of losing than winning.

Predictive Inference

It is a form of inference that emphasises the prediction of future occurrences based on the past observation. It could be based on cause and effect relationship or analogy. That there is fire because there is smoke or that it will rain because there are dark clouds. The Indian scholars in fact have different names for this kind of inference.

The principle of Induction

From what we have seen so far, we could realize that everyone proposes different understanding of inductive inference to eliminate the possibility of having *false* knowledge. We could also understand that there is a principle that is operative in this form of inductive inference which is known as the principle of induction. This principle is formulated as "the assertion that events in the future will resemble events in the past, or that unobserved cases will resemble observed cases." Some even argue that this principle may be used "to reduce all inductive arguments to deductive arguments." But the question how one could really justify the principle of induction has given rise to what is known as the problem of induction, which will be discussed in final section.

Check Your Progress II

Note: a) Use the space provided for your answer.

b) Check your answers with those provided at the end of the unit.

1) What is the classical definition of inductive inference?

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2) What is the principle of induction?

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3.4 INDIAN THEORY OF INFERENCE

Introduction

Indian philosophy which is older than the western tradition had a deep philosophical outlook on the theory of knowing. They discuss in detail the sources of knowledge, particularly inference. In Sanskrit the term *Pramana* conveys the meaning of the *source* of knowledge. The chief *Pramanas* which are discussed by majority of them are two: namely perception (*Pratyaksa*) and inference which is indicated by the term *Anumana*. Of course there are also other valid sources which are accepted like Verbal testimony (*sabda*), comparison (*Upamana*) etc. In Indian philosophy, logic and epistemology were joined together and were not separated as in the western thought. "What was meant by syllogistic reasoning corresponds in India to what is known as *anumana* – inference. Inference in Indian understanding includes both 'deduction' and 'induction.'

Meaning of the Term *Anumana:*

The Sanskrit word *Anumana* is the combination of two words. *Anu* means after and *mana* means measurement. "The whole word literally means the measuring after something." According to them it is a knowledge that is obtained after proof. We know by now that knowledge derived through *anumana* is not direct "since it makes use of previous knowledge obtained" from other sources of knowledge like perception, testimony etc., and "enables one to explore further knowledge." Not all the major Indian philosophical systems accept all the *pramanas*. For example, the Carvakas – the Indian materialists who hold the theory that matter is the only reality – do not accept *anumana* as a valid source of knowledge.

Structure of Anumana

Although all the major schools accept *anumana* as a valid source of knowledge, the understanding and the explanation of each school will have certain variation according to their understanding of knowledge. In Indian philosophy inference is used for oneself and inference for others. When inference is used for oneself the propositions are not well structured since its primary aim is the acquisition of personal knowledge without error, whereas inference for others has to be well structured because it is used to convince the other of the truth. We shall in this unit concentrate mainly the understanding on Nyaya because it is well known for its logic.

Inference is defined by them as "a process of reasoning in which we pass from the apprehension of some mark (*linga*) to that of something else by virtue of an invariable relation (*vyapti*) that exists between them." *Vyapti* is essential in Indian philosophy for making a valid inference: however, it is good to know that different schools had different names for *vyapti*; For example, Vaisesikas called it *Prasiddhi* and Samkhya called it *pratibandha*.

Nyaya proposes a longer syllogism; it has five propositions. An argument according to them has five parts: Namely, *Paksa or Pratinjna, hetu, drastanta, upanaya and nigamana*. We shall give a standard example to understand this.

1.	Paksa – The Thesis / Pratijna – Proposition	= The hill has fire
2.	Hetu – Reason or the ground	= Because it has smoke
3.	Drstanta – The corroboration	= wherever there is smoke there is fire, as in the kitchen
4.	Upanaya – The application	= the hill is so
5.	Nigamana – the conclusion	= Therefore the hill has fire.

In this process, we begin asserting something, then we provide the reason / the ground for the assertion and make a universal proposition which shows the concomitant relationship between the two with an example then we apply the universal proposition to the present case and make a conclusion from the preceding propositions. This type of syllogism is said to have *anvaya vyapti* – since it denotes a positive concomitance – if there is smoke then there is fire. We shall give a specimen from the western example: 1) Ram is mortal 2) Because he is a man 3) All men are mortal like my grandfather 4) Ram is also a man 5) Therefore Ram is mortal. The purpose of giving this example is also to show how Indian philosophy combined both induction and deduction together in the same syllogism. The first 3 propositions (1 – 3) form inductive syllogism, while the last three (3 – 5) form as a deduction. The proposition 3 is the conclusion for the induction and the major premise for the deduction.

When it denotes negative concomitance it is said to have *vyatireka Vyapti*. An example of this is the opposite of what we have stated above. The hill has no smoke; because there is no fire; wherever there is no fire there is no smoke as in the lake (because water and fire are opposed substances); there is no fire in the hill; therefore the hill has no smoke.

Classification of Inference

Inference here is classified based on the nature of *vyapti* between *hetu* (smoke) *sadhya (*fire). *Vyapti* denotes a correlation between two facts of which one is pervaded and the other which pervades. E.g. Smoke is pervaded by fire and fire pervades smoke. *Vyapti* is established based on its presence of both in all such events (wherever there is smoke there is fire) and the absence of both (wherever there is no fire there is no smoke). The classification is based on the relationship (causal uniformity or non-causal uniformity) between the reason and what is inferred. There are three types of inference.

1. *Purvavat* inference

"It is that in which we infer the unperceived effect from a perceived cause." E.g. we infer of future rain from the appearance of dark heavy clouds.

2. *Sesavat* inference

"It is that in which we infer the unperceived cause from a perceived effect." E.g. we infer of the past rain from swift muddy current of water in the river.

3. *Samanyatodrasta* inference

"It is that which we infer not based on causal relation but on experience of uniformity." E.g. on seeing the different positions of the moon at long intervals, we infer that it moves although the motion might not have been perceived by us.

3.5 CRITIQUE OF INFERENCE

Having seen both Indian and western understanding of inference, it is good to evaluate them. There are quite a few objections raised by some philosophers who are suspicious about the inferential knowledge we acquire. Since this needs an elaborate study by itself we shall restrict ourselves to some important objections alone.

The first one is with regard to deduction. If one has to obtain a true cognition through inference, it is essential and necessary that the major premise as well as the minor premise be true. We can easily recognize the truthfulness of the minor premise "since it is an object of direct perception. But the problem is, "how can the major premise be recognized to be true since it is not such an object of direct perception?" we shall enumerate the following example to make it clear. Suppose we say that 'all that begin to exist must someday cease to exist' (major): you have begun to exist. Therefore you must someday cease to exist. The question regarding the major premise is this. How does one know that 'all that begin to exist must someday cease to exist' is unconditionally or necessarily true? Has anyone sense experienced all things – not only the present but also of the past and future. Therefore such a statement is a generalization which cannot be proved to correspond to facts. Scholars reply that the truth of deduction depends on self evident principles or self evident truth. Take for example the principle of non-contradiction which is a self evident principle – A being cannot be and not be at the same time under the same respect." It does not need any proof.

Another objection with regard to deduction is that it does not offer any new knowledge. As to whether inference can yield new knowledge even granting that the conclusion is implied in the major premise – the answer seems to be that to come to an *explicit awareness* of what is only logically implied in a already known truth is surely a process of every act of *understanding*. Whether is not one prepared to call this newly explicated awareness 'knowledge' depends on one's understanding of the term.

The next objection is with regard to induction. We have explained about the principle of induction. But the problem is how to justify that principle? The problem was first raised by David Hume. Hume does not use the word induction; nevertheless it has come to be known as the *problem of induction*, wherein he is stating that this form of inference cannot be justified. There are two things involved in induction.

First, What we do in inference is to generalise the properties of a class from a certain number of observed instances of that class: for example that swan A, B, C, … X are white therefore all swans are white. We apply whiteness to all swans. The next we do is to infer certain laws based on our observation in the past. How to justify these steps is the philosophical question known as the problem of induction. Some scholars try to answer that "in the past, similar things behaved similarly under similar circumstances. Therefore, all similar things behave similarly under similar circumstances." What has happened here is that an inductive argument has been used to justify the principle of induction and therefore ending up in circularity; but some claim that this circularity is legitimate which is not universally accepted. Hume raises the question that the past cannot be foundation for the future events which we infer based on their causal connections. Hume says:

For all inferences from experience suppose, as their foundation, that the future will resemble the past, and that similar powers will be conjoined with similar sensible qualities. If there be any suspicion that the course of nature may change, and that the past may be no rule for the future, all experience becomes useless, and can give rise to no inference or conclusion." (Section IV 32 in the *Enquiry*)

Let us explain the problem from the same example. I can perceive *some* things which begin to exist and then cease to exist. For example I plant a tree and I see it dying. I have seen my friend being born and dying. But the question is: how could one say that they cease to exist because they began to exist? In other words, even if decomposition was an essential characteristic of things which I sense perceived to have ceased to exist, how can I say that all things are, in this respect, similar to them? How can I form a 'class' of things characterized by the same characteristics? What I sense perceive is in this particular thing and in that particular thing, but not any 'universal.' How could I make a jump from the particular to the class of things? It cannot be merely based on the regularity of nature because there is no certainty that nature will behave the same way tomorrow. It leaves lots of uncertainty about the fact that we assert. So, many claim that inductive inference cannot give us a sure knowledge. Karl Popper (1902 – 1994) maintained that "what is called induction is a myth in as much as what passes under the title 'is always invalid and therefore clearly not justifiable." He says that only deduction has the power to prove a scientific theory. Therefore Popper proposes what is called Hypothetico-deductive method.

Hypothetico-deductive Method

Since there is a problem about making a generalisation from the observed to the unobserved, this method is suggested. This has three steps: "1) the formulation of a "hypothetical" generalisation; 2) the deduction of particular observation statements from this generalisation; and 3) the testing of the observation statements whether they confirm or falsify the generalisation." We shall explain it with the example given by Robert Baum. 1) All sea otters use rocks to crack open the sea shells. It is simply a working hypothesis. 2) Next sea otter will use rock to crack open the sea shells. We deduce the observation statements. We may deduce any number of propositions like the 23rd sea otter will crack open the sea shells. 3) The third step involves in justifying the proposition which involves the process of falsification. The more we observe the greater certainty we can have about the generalisation.

It is good to note at this juncture that there was a different response to the problem from India. While Popper suggests hypothetico method, the Indian schools propose hypothesis itself as an independent source of knowledge apart from inference. For examples, Mimamsa accepts *arthapathi* (postulation or hypothesis) as an independent response. From the western point of view, it may said to be a kind of inference. But *Mimamsikas* explain that it is not; because there are cases in which there may not be any (*vyapti)* invariable *concomitance* between *hetu* and *sadhya*. For example; a man is seen fasting during the day. Yet he is growing fat. Therefore we say that he should be eating at night – this is a hypothesis / postulation. Here there is no invariable concomitance between fatness and eating at night. Therefore *arthapathi* is an independent source of knowledge. Hypothesis as an independent source was an answer to the jump we make from the observed to the unobserved facts.

To conclude let us say that unless and until one is prepared to posit some kind of insight into the whole process – obtaining any new knowledge – including perceptually knowable – one cannot start even meaningfully about anything at all. For the critique against inference themselves fall into using categorical statements and concepts which are cognized through inference. Hence it is difficult to do away with inference. We shall conclude that as Kant in his *Critique of Pure Reason* says that "Our knowledge springs from two fundamental sources of the mind; the first is the capacity of receiving representations (receptivity for impressions), the second is the power of knowing an object through these representations (spontaneity [in the production] of concepts)." Inference then is necessary, although there are lot of problems connected with this, to obtain true and valid knowledge.

Check Your Progress III

Note: a) Use the space provided for your answer.

b) Check your answers with those provided at the end of the unit.

1) What is *anumana?*

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2) What is the problem of induction?

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3.6 LET US SUM UP

We began this unit in situating inference as one of the important sources of knowledge. We gave a definition of inference which is a psychological process in which we move from the previous knowledge to have a new knowledge. We differentiated it from argument saying that only persons can *infer* while an argument could only *imply*. We classified inference into two: deduction and induction.

Deduction is a kind of reasoning in which we arrive at a new knowledge from the given propositions or self evident principles. Deduction is divided into two as immediate inference and mediate inference. The difference between them lie in the number of propositions; while the former infers the new proposition from one proposition the latter needs at least two or more premises.

We discussed then about inductive inference which was important particularly in the field of science to arrive at new knowledge. We examined the different understanding of induction because of the problem involved in the principle of induction which is at the bottom of making any inductive inference. We then gave an overview of Indian theory of inference which unites both deduction and induction in the same syllogism. We also brought to our notice the different kinds of inference which is classified based on *vyapti*. We then discussed the problems related to inference and how we could respond to those problems. Hence at the end of the unit we know by now that inference is part and parcel of the process of cognition because it is only reasoning that helps to acquire new knowledge without which our knowledge would be always stand still. That is why with Kant we could say that "though all our knowledge begins with experience, it does not follow that it *all arises out of experience*."

3.7 KEY WORDS

Syllogism : "it is a form of mediate deductive inference, in which the conclusion is drawn from two premises, taken jointly." Syllogism consists of three propositions.

Enthymeme : "an enthymeme is a syllogism with some of its constituent propositions suppressed." Suppose I say that Socrates is mortal for he is a man, what is suppressed is the major premise "all men are mortal." It can then said to be an incomplete syllogism.

Vyapti : It denotes a correlation between two facts of which one is pervaded and the other which pervades. E.g. Smoke is pervaded by fire and fire pervades smoke. *Vyapti* is established based on its presence of both in all such events (wherever there is smoke there is fire) and the absence of both (wherever there is no fire there is no smoke).

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3.9 ANSWERS TO CHECK YOUR PROGRESS

Answers to Check Your Progress I

1. Inference is the process that refers to "the drawing of a conclusion." It could be also called *reasoning*. Reasoning or inference is the process of the intellect which moves to a new cognition from an already known cognition.

2. A deduction is defined as a valid inference from *necessary* premises. Deduction is in general understood as a valid inference from more *general* premises to a less general, i.e. more specific, conclusion.

Answers to Check Your Progress II

1. The classical definition of Induction defines induction as an inference in which the intellect moves to cognise from a finite number of particular cases to a further case or to a general conclusion.

2. The principle of induction is formulated as "the assertion that events in the future will resemble events in the past, or that unobserved cases will resemble observed cases."

Answers to Check Your Progress III

1. The Sanskrit word *Anumana* is the combination of two words. *Anu* means after and *mana*, which is the same as in the end of *pramana*, literally means measurement. "The whole word literally means the measuring after something."

2. The problem of induction is the philosophical question of inductive inference whether it leads to truth. It raises the need for justification for the two important functions that are part of the inductive inference: generalization and the belief in the causal link of events which rests on the regularity of nature.