UNIT : 9

PHONETICS
(Meaning, Definition & Functions)

:: STRUCTURE ::

9.0 OBJECTIVES

The objectives of this unit are:

- to introduce the basic concepts and terminology used in phonetics,
- to provide an understanding of how sounds are produced,
- to explore the different types of sounds that exist in human language.

9.1 INTRODUCTION TO PHONETICS

The origins of phonetics can be traced back to ancient India and ancient Greece, where scholars studied the sounds of language and developed systems for representing them in writing.

In India, the Sanskrit grammarian Panini (4th century BCE) analyzed the sounds of Sanskrit and formulated rules for its grammar, including descriptions of how sounds are produced and classified. Panini's work is considered one of the earliest examples of phonetics.

In ancient Greece, the philosopher Aristotle (384-322 BCE) wrote about the sounds of language and their classification in his work "On the Parts of Animals." He also observed and analyzed the speech sounds of different languages, including Greek and Persian.

The study of phonetics continued to develop in Europe during the Middle Ages and Renaissance, with scholars such as Johannes de Sacrobosco (c. 1195-c. 1256) and Jacobus Publicius (c. 1420-c. 1480) writing about the sounds of language and their representation in writing.

However, it was not the case until the 19th century that phonetics became a formal field of study, with the development of technologies such as the stethoscope, the ear trumpet, and the phonautograph allowed for more precise analysis and measurement of speech sounds. The pioneering work of scholars such as Alexander Melville Bell, Henry Sweet, and Paul Passy helped to establish phonetics as a scientific discipline, and their efforts led to the development of the International Phonetic Alphabet (IPA) in 1888, which is still widely used today.

Association of English phonetics with Sanskrit

There is a historical connection between the study of English phonetics and Sanskrit. This connection is based on the fact that both languages have complex sound systems that can be analyzed using similar principles.

In the 19th century, the study of Sanskrit was widespread among European scholars interested in the similarities between Sanskrit and the classical languages of Europe, such as Greek and Latin. Some of these scholars also saw parallels between the sound systems of Sanskrit and English.

One of the most prominent figures in this movement was Sir William Jones, a British judge and scholar who studied Sanskrit and other Indian languages. Jones was struck by the similarities between Sanskrit and the classical languages of Europe, and he argued that all of these languages must have a common ancestor, which he called "Indo-European."

Jones's work inspired other scholars to study the connections between Sanskrit and European languages, including English. Some scholars, such as F. Max Muller, used their knowledge of Sanskrit to develop new methods for studying the sounds of English, and they applied these methods to the study of other languages as well.

Today, the study of English phonetics is still influenced by the work of scholars who studied Sanskrit and other related languages. As a result, many of the concepts and terminology used in phonetics are based on Sanskrit or other ancient languages, and the study of English phonetics continues to draw on the insights and methods developed by these early scholars.

Influence of other languages on English phonetics

English phonetics has been influenced by a wide range of other languages throughout its history. Here are a few examples:

Latin: Latin had a significant influence on the development of English phonetics. Many English words have been derived from Latin, and English speakers have adopted many Latin pronunciations. For example, the English pronunciation of the letter "c" before "e" or "i" (as in "century" or "city") is based on the Latin pronunciation of these letters.

French: French has also had a significant influence on English phonetics. After the Norman Conquest of England in 1066, French language became the language of the ruling class in England, and many French words were adopted into English. As a result, English phonetics developed a more complex system of vowel sounds, with many of the new French words introducing new vowel sounds to the language.

Scandinavian languages: The Scandinavian languages, such as Old Norse, had an influence on English phonetics during the Viking invasions of England in the 8th and 9th centuries. Many Scandinavian words were adopted into English, and the influence of these languages can be seen in the pronunciation of English words such as "sky" and "egg."

German: German has also had an influence on English phonetics, particularly in the pronunciation of consonants. The English "th" sound, as in "think" or "bath," is derived from the Germanic languages, as is the "w" sound in English.

Native American languages: Finally, Native American languages have also influenced English phonetics, particularly in pronouncing place names. Many English place names, such as "Chicago" and "Mississippi," are derived from Native American languages, and English speakers have adopted the pronunciation of these names.

9.2 MEANING OF PHONETICS

Phonetics is the branch of linguistics that studies the sounds of human speech. It is concerned with the physical properties of speech sounds, their production, and their perception by the human ear. Phonetics can be divided into three main areas of study: articulatory phonetics, acoustic phonetics, and auditory phonetics.

Articulatory phonetics is concerned with the movements and positions of the speech organs, such as the tongue, lips, and vocal cords, in the production of speech sounds. This involves studying the various ways in which these organs can be used to create different sounds and how the sounds are produced in different parts of the vocal tract.

Examples:

The sound /p/ is produced by closing the lips and then releasing a burst of air.

The sound /s/ is produced by constricting the airflow through a narrow channel between the tongue and the roof of the mouth.

The sound /m/ is produced by closing the lips and letting the sound resonate in the nasal cavity.

Acoustic phonetics is concerned with the physical properties of speech sounds, such as their frequency, intensity, and duration. It involves studying the sound waves produced by the speech organs and how they are modified as they travel through the vocal tract and into the air.

Examples:

The sound /a/ has a lower frequency (or pitch) than the sound /i/.

The sound /s/ is louder (or more intense) than the sound /f/.

The sound /t/ is shorter in duration than the sound /s/.

Auditory phonetics is concerned with how the human ear perceives and processes speech sounds. This involves studying the physiological and cognitive processes involved in hearing and how the brain processes and interprets the information it receives from the ear.

Examples:

The sounds /b/ and /p/ are perceived as different even though they are produced in the same way because they differ in voicing (whether the vocal cords vibrate or not).

The sounds /p/ and /t/ are perceived as different even though they are both voiceless stops because they differ in aspiration (whether a puff of air is released when the sound is produced).

The sounds /b/ and /v/ are perceived as different even though they are both voiced fricatives because they differ in the place of articulation (where in the mouth the sound is produced).

Phonetics is an essential field of linguistics, as it provides insights into how speech sounds are produced and perceived by humans. It is also helpful in fields such as speech therapy, language teaching, and speech technology, where knowledge of the physical properties of speech sounds is essential.

Phonetics in India

Phonetics is an essential area of study in India, and there has been a long tradition of research in phonetics in the country. Some of the most notable contributions to the field of phonetics in India have come from the study of the sounds of the Indian languages, which have a rich and diverse set of phonetic features.

One important area of phonetics in India is the study of the phonetic properties of the Indian languages. There are a large number of languages spoken in India, each with its own set of distinctive sounds and phonetic features. The study of these sounds has led to a better understanding of the phonetic properties of the Indian languages, and has helped to develop more accurate systems of writing and transliteration.

Another area of phonetics in India is the study of the prosodic features of the Indian languages. Prosody refers to speech's rhythm, intonation, and stress patterns, and it plays an important role in the meaning and interpretation of speech. The study of prosody in the Indian languages has led to a better understanding of how these languages are used in communication and has helped to develop more accurate models of speech synthesis and recognition.

One of the most significant contributions to the field of phonetics in India is the development of the International Phonetic Alphabet (IPA) for Indian languages. The IPA is a system of phonetic notation used to represent the sounds of all world languages. The development of the IPA for Indian languages has helped to promote the study of phonetics in India and has led to a better understanding of the phonetic properties of the Indian languages.

Study of the phonetic properties of Indian languages:

Indian languages have a rich and diverse set of phonetic features. Some of the distinctive phonetic features of the Indian languages include:

Retroflex sounds:

Retroflex sounds are produced by curling the tongue tip backwards towards the roof of the mouth. Many Indian languages, such as Hindi and Tamil, have a large number of retroflex sounds.

Nasalization: Nasalization refers to the addition of nasal resonance to a vowel or consonant sound. Many Indian languages, such as Marathi and Bengali, have a large number of nasal sounds.

Tone:

Tone refers to the pitch contour of a syllable. Some Indian languages, such as Mandarin Chinese, use tone to distinguish between different words or meanings.

The study of the phonetic properties of Indian languages has led to the development of more accurate writing and transliteration systems and a better understanding of the similarities and differences between the sounds of the Indian languages.

Study of prosodic features of Indian languages:

Prosody refers to the rhythm, intonation, and stress patterns of speech. In Indian languages, prosody plays an important role in the meaning and interpretation of speech. Some of the prosodic features of Indian languages include:

Pitch accent:

Pitch accent refers to the use of pitch to mark stress or emphasis in a word or phrase. Many Indian languages, such as Tamil and Telugu, use pitch accents to distinguish between words or meanings.

Duration:

Duration refers to the length of time that a sound or syllable is produced. In Indian languages, duration is often used to mark stress or emphasis.

Rhythm: Rhythm refers to the regularity or irregularity of the timing of syllables or stress patterns in speech. Some Indian languages, such as Hindi and Bengali, have a regular rhythmic pattern, while others, such as Tamil and Telugu, have irregular rhythmic patterns.

The study of prosody in Indian languages has led to a better understanding of how these languages are used in communication and has helped develop more accurate speech synthesis and recognition models.

Development of the International Phonetic Alphabet (IPA) for Indian languages:

The International Phonetic Alphabet (IPA) is a system of phonetic notation used to represent the sounds of all world languages. The development of the IPA for Indian languages has helped to promote the study of phonetics in India and has led to a better understanding of the phonetic properties of the Indian languages.

The IPA for Indian languages includes symbols for all the distinctive sounds and prosodic features of the Indian languages. This has helped to promote accurate transcription and analysis of the sounds of Indian languages and has made it easier for researchers to compare the phonetic properties of different Indian languages.

- **Check your progress 1:**

1. Write a brief note on Phonetics in India.

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2. Discuss Articulatory phonetics with examples.

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3. Write a brief note on the Association of English phonetics with Sanskrit.

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1. What is phonetics?

a) The study of how sounds are produced and perceived
b) The study of meaning in language
c) The study of word formation
d) The study of sentence structure

2. What is the difference between phonetics and phonology?

a) Phonetics is the study of individual speech sounds, while phonology is the study of how those sounds combine to form words and sentences
b) Phonetics is the study of word meaning, while phonology is the study of sound structure
c) Phonetics is the study of grammar, while phonology is the study of syntax
d) Phonetics and phonology are interchangeable terms

3. Which of the following is an example of a vowel sound?

a) /p/
b) /k/
c) /i/
d) /s/

4. What is a phoneme?

a) The smallest unit of sound that can change the meaning of a word
b) The smallest unit of sound that cannot change the meaning of a word
c) A type of consonant sound
d) A type of vowel sound

5. Which of the following is an example of a voiced consonant sound?

a) /t/
b) /s/
c) /b/
d) /f/

9.3 DEFINITIONS OF PHONETICS

According to the **Oxford English Dictionary**, phonetics is "the study of speech sounds, including their production and variation, and their physical properties and perception."

The American Speech-Language-Hearing Association (ASHA) defines phonetics as "the study of the speech sounds used in human language, including their production, transmission, and reception."

From the Cambridge Dictionary, phonetics is "the study of the sounds made by the human voice in speech, including how they are produced, transmitted, and received."

According to **Merriam-Webster**, phonetics is "the system of speech sounds of a language or group of languages."

The Linguistic Society of America (LSA) defines phonetics as "the study of the physical properties of speech sounds and their perception by listeners."

From the **University of California, Los Angeles** (UCLA) Department of Linguistics, phonetics is defined as "the scientific study of speech sounds, including their articulation and acoustic properties, and the ways in which humans produce and perceive them."

The Encyclopaedia Britannica defines phonetics as "the study of speech sounds and their physiological production and acoustic qualities. It deals with the configurations of the vocal tract used to produce speech sounds (articulatory phonetics), the acoustic properties of speech sounds (acoustic phonetics), and the manner of combining sounds so as to make syllables, words, and sentences (linguistic phonetics)."

The International Phonetic Association (IPA) defines phonetics as "the scientific study of speech sounds and their physical properties. It is concerned with the physical properties of sounds, their physiological production, acoustic properties, auditory perception, and neurophysiological status."

9.4 FUNCTIONS OF PHONETICS

Phonetics serves several important functions in the study of language. Here are a few of the key functions:

Describing the sounds of language: One of the primary functions of phonetics is to describe the sounds of language. This involves identifying the individual sounds that are used in a particular language and describing how the human vocal tract produces those sounds. Phonetics also describes speech sounds' acoustic properties, such as their frequency, duration, and intensity.

Analyzing speech production: Phonetics also analyses how the human vocal tract produces speech sounds. This involves examining the movement of the lips, tongue, and other articulators during speech production and measuring the acoustic properties of speech sounds. By analyzing speech production, phoneticians can identify the physical processes that underlie speech sounds and gain insights into how different sounds are produced.

Studying language variation: Phonetics is also used to study language variation within and between languages. This involves examining how different dialects or accents of a language produce speech sounds differently and how different languages may use different sounds or sound patterns. By studying language variation, phoneticians can gain insights into the social, cultural, and historical factors that shape language sounds.

Developing speech technologies: Phonetics is also important in developing speech technologies, such as speech recognition software or text-to-speech systems. By understanding the acoustic properties of speech sounds, phoneticians can develop algorithms and models that can recognize and produce speech sounds accurately. These technologies have a wide range of practical applications, from assisting people with speech impairments to enabling voice-activated devices.

Teaching language skills: Phonetics is an important part of teaching language skills, particularly pronunciation. By teaching students the sounds of a language and how those sounds are produced, phoneticians can help learners improve their pronunciation and communicate more effectively in the target language. This can be especially important for learners of English as a second language, who may struggle with the complex sound system of English.

Describing the sounds of language: Phonetics plays a crucial role in describing the sounds of language. By identifying and describing the individual sounds that are used in a particular language, phoneticians can create an inventory of sounds that form the basis of that language. For example, the International Phonetic Alphabet (IPA) is a system of phonetic notation that uses symbols to represent the sounds of language and is used by linguists, language teachers, and speech pathologists to describe the sounds of speech.

Analyzing speech production: Phonetics is used to analyze how the human vocal tract produces speech sounds. This involves examining the movement of the lips, tongue, and other articulators during speech

production and measuring the acoustic properties of speech sounds. For example, phoneticians can identify the key acoustic cues that distinguish one vowel sound from another by analyzing the acoustic properties of different vowel sounds.

Studying language variation: Phonetics is also used to study language variation within and between languages. This involves examining how different dialects or accents of a language produce speech sounds differently and how different languages may use different sounds or sound patterns. For example, English is spoken in many different countries worldwide, and there are many different English accents, each with its own unique sound system. By studying these different accents, phoneticians can gain insights into the social and cultural factors that influence language variation.

Developing speech technologies: Phonetics is also important in developing speech technologies, such as speech recognition software or text-to-speech systems. By understanding the acoustic properties of speech sounds, phoneticians can develop algorithms and models that can recognize and produce speech sounds accurately. For example, speech recognition software relies on accurately identifying and transcribing speech sounds to accurately recognize spoken words and phrases.

Teaching language skills: Phonetics is an important part of teaching language skills, particularly pronunciation. By teaching students the sounds of a language, and how those sounds are produced, phoneticians can help learners improve their pronunciation and communicate more effectively in the target language. For example, English learners often struggle with the pronunciation of certain sounds, such as the "th" sound in "this" or "think." By teaching learners how to produce these sounds correctly, phoneticians can help them improve their overall pronunciation and communication skills.

Providing a foundation for phonology: Phonetics provides a foundation for phonology, which is the study of the sound systems of languages. Phonology is concerned with the organization and patterns of speech sounds within a language, and it relies on phonetic descriptions of individual sounds to analyze the sound patterns of a language. By providing a detailed understanding of individual sounds, phonetics helps build a foundation for studying phonology.

Analyzing second language acquisition: Phonetics can also be used to analyze second language acquisition, particularly with respect to pronunciation. By studying the ways in which learners of a second language produce sounds, phoneticians can identify common errors or difficulties and develop effective teaching strategies to help learners improve their pronunciation. For example, research has shown that second language learners may have difficulty producing certain sounds if those sounds do not exist in their first language or if the articulatory

movements required for those sounds are not present in their native language.

Studying the evolution of language: Phonetics can also be used to study the evolution of language over time. By analyzing sound changes in different languages or dialects, phoneticians can identify patterns of sound change, and gain insights into the historical development of languages. For example, the sound changes that have occurred in English over the past thousand years have been well-documented, and provide a window into the historical development of the language.

Improving speech therapy: Phonetics is also used in the field of speech therapy, particularly in the treatment of speech disorders. By understanding the physical processes that underlie speech sounds, speech therapists can develop effective treatment strategies to help individuals improve their speech. For example, if a person has a lisp, a speech therapist may use phonetic analysis to identify the specific sounds affected and develop exercises to help the person produce those sounds more accurately.

Providing a basis for forensic linguistics: Phonetics can also be used in forensic linguistics, which is concerned with the analysis of language in legal settings. By analyzing speech recordings or written documents, phoneticians can identify unique features of an individual's speech and use those features to determine the authorship of a document or to identify a speaker in a recorded conversation.

- **Check your progress 2:**

1. Write any two definitions of Phonetics.

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2. Define Phonetics as per the International Phonetic Association.

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3. Write a brief note on the functions of Phonetics. Discuss any two functions.

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1. What is the International Phonetic Alphabet (IPA)?

a) A system of symbols used to represent the sounds of language
b) A method of teaching reading and writing
c) A system of grammar rules
d) A type of language game

2. What is the difference between a monophthong and a diphthong?

a) Monophthongs are single vowel sounds, while diphthongs consist of two vowel sounds pronounced together
b) Monophthongs are consonant sounds, while diphthongs are vowel sounds
c) Monophthongs and diphthongs are two terms for the same type of vowel sound
d) Monophthongs consist of two vowel sounds pronounced together, while diphthongs are single vowel sounds

3. Which of the following is an example of a bilabial consonant sound?

a) /s/
b) /t/
c) /p/
d) /f/

4. What is a glottal stop?

a) A consonant sound produced by closing the vocal cords
b) A type of vowel sound produced with the tongue raised towards the roof of the mouth
c) A type of consonant sound produced with the tongue touching the teeth
d) A type of nasal sound produced with air flowing through the nose

5. What is a voiced fricative?

a) A fricative sound produced with the vocal cords vibrating
b) A fricative sound produced with the vocal cords not vibrating
c) A type of vowel sound
d) A type of consonant sound produced with the lips

9.5 Key Words

Acoustic	relating to the study of the physical properties of sound
Acoustics	the study of the physical properties of sound
Auditory	of or relating to the process of hearing
Constricting	tending to narrow or restrict freedom
Diphthong	a sound that glides between two vowels in a single syllable

Impairment	a reduction in quality or strength
Prosody	the study of poetic meter and the art of versification
Therapist	a person skilled in a particular type of care
Transliteration	the act or product of copying from one alphabet into another
Trumpet	a brass musical instrument with a brilliant tone

9.6 LET US SUM UP

The unit begins by discussing the importance of phonetics in language study and by outlining the three main areas of phonetics: articulatory phonetics, acoustic phonetics, and auditory phonetics. It then describes the different types of sounds in human language, including vowels, consonants, and diphthongs.

The unit also covers the production of speech sounds, including the role of the vocal tract and the different types of articulators involved in sound production. It then discusses the International Phonetic Alphabet (IPA), a system of symbols used to represent language sounds, and provides an overview of how to use the IPA to transcribe speech sounds.

Overall, the unit on Introduction to Phonetics provides a comprehensive overview of the field of phonetics and provides a foundation for further study of the sounds of human language.

9.6 BOOKS SUGGESTED

- Bryan Gick, Ian Wilson, and Donald Derrick. *Articulatory Phonetics*. Wiley-Blackwell, November 2012.
- Goldsmith, John. *Phonetics: Transcription, Production, Acoustics, and Perception*. Wiley-Blackwell, Henning Reetz and Allard Jongman.
- William J. Hardcastle, John Laver, Fiona E. Gibbon. *The Handbook of Phonetic Sciences*. Blackwell Publishing Ltd, 18 January 2010.
- Zsiga, Elizabeth C. *The Sounds of Language: An Introduction to Phonetics*. Routledge, April 10, 2000.

Answers of MCQs

Check Your Progress – 1 **Answers: 1-a, 2-a, 3-c, 4-a, 5-c**

Check Your Progress – 2 **Answers: 1-a, 2-a, 3-c, 4-a, 5-a**