DEDICATED TO

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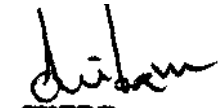
"APPA"

CERTIFICATE

This is to certify that the Independent Project entitled: GLOSSARY OF TERMS IN AUDIOLOGY has been prepared under my supervision and guidance.



GUIDE

Mysore

May 1991

CERTIFICATE

This is to certify that the Independent Project entitled: GLOSSARY OF TERMS IN AUDIOLOGY is the bonafide work on part fulfilment for the Degree of Master of Science (Speech and Hearing) of the student with Register No. M-9002.

Mysore

May 1991

Director

All India Institute of
Speech and Hearing
Mysore-6.

DECLARATION

I hereby declare that this Independent Project entitled: GLOSSARY OF TERMS IN AUDIOLOGY is the result of my own study under the guidance of Dr.(Miss)S.Nikam, Professor and Head of the Department of Audiology, All India Institute of Speech and Hearing, Mysore has not been submitted earlier at any university for any other Diploma or Degree.

Mysore

REGISTER NO.M-9002

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INTRODUCTION

INTRODUCTION

Audiology is the study of the entire field of hearing, normal and disordered. It is Concerned with the nature of hearing, conservation of hearing, identification of hearing loss in the population, assessment of hearing loss in the individual, and the rehabilitation of all those with hearing impairment.

Terminology is the science of the proper use of terms words used with a specific purpose to express a definite concept or terms. Glossary is the coining of terms in bringing oat a new dimension for comprehension of audiology and related areas. This is a very challenging task. The efficiency of a term depends on its precision, to express a concept or concepts. It is the result of scientific thinking. It imparts ideas relevant to the subject. Every subject or science uses an inventory of terms and Radiology is no exception to it.

This work aims at providing terminology which can be uniquely applied over for scientific purpose. This has been designed especially for Bachelor's degree students in Speech and Hearing, and to those who are interested in knowing about audiological science. The other allied professionals can also gain access to the scientific information. This glossary will be highly helpful to the interviewee in reviewing the subject briefly.

Audiology is an expanding field of applied science. Hence, it is to be expected that this growing area of knowledge would require a new continually changing vocabulary.

The terms used in this project work have been categorized into five sections. They are t Basic concepts in audiology, Radiological assessment. Management of aurally handicapped. Amplification devices for the hearing impaired. Noise measurement and hearing conservation, and Paediatric audiology.

The first section includes the important terms necessary to understand basic audiology.

The second section comprises of a number of tests useful for identifying and diagnosis of different auditory pathologies and also some technique of aural rehabilitation.

The third section of this work cover the terms related to Amplification devices for the hearing impaired, noise measurement and hearing conservation and paediatric audiology.

The terms have been arranged in alphabetical order for the reader's convenience. An alternate way of classifying would be in terms of complexity of the terms rather than in an alphetical order as used in this list, with the continuous feedback available from the readers, farther modifications will be carried out.

BASIC CONCEPTS IN AUDIOLOGY

1. ACOUSTIC NERVE

It is a branch of veRstibulocochlear nerve also known as auditory nerve.

Trauma, ototoxieity, viral infection may cause damage to this nerve and give rise to hearing loss.

2. ACOUSTIC NEUROMA

Acoustic nerve tumour is known as acoustic neuroma. It accounts for 8% of all intraeranial tumours and about 80% of those occuring in the cerebellO-pontine angle. It is common in female.

3. ACOUSTIC REFLEX

When a loud sound is presented results in the contraction of middle ear muscles in both ears. This is known as acoustic reflex.

Measurement of acoustic reflex aids in the diagnosis of a number of auditory disorders.

4. ACOUSTIC TRAUMA

Ref: ACOUSTIC TRAUMA (Pg. 6.1)

5. ACQUIRED DEAFNESS

Deafness resulting from trauma, bacterial and viral infections, ototoxie drugs, exposures to noise and other condition manifesting itself after birth.

6. ACTION POTENTIAL (AP)

These are generated by the nerve fibres of the IE. SynChoronous firing of a large number of fibres is necessary for the production of the AP. its magnitude is relayed to the number of fibres discharging simultaneously due to the uniformity in diameter of the nerve fibres? results in uniform conduction of velocity. From any given region, all firings arrive at the same time and summate at the recording electrode.

This is affected by Na+ free solutions; lack of Ca+ in extra cellular fluid decreases AP production.

7. ACUTE OTTERS MEDIA

Acute Otitis Media is usually taken to imply a bacterial infection which affects the mucosal lining of the middle ear and mastoid air cell system.

8. ADC-(AUDIO DEVELOPMENT COMPANY)

ADC of the several manufacturers who produced audiometers in the late 1940s or early 1950s, one of the companies was the audio development company.

9. AIR-BONE GAP

It is the difference between air conduction and bone conduction thresholds.

This helps in the diagnosis of conductive hearing loss.

10. AIR CONDUCTION

Considered to be the normal mode of hearing. Acoustic energy is directed to the inner ear via the air in the external auditory meatus and the middle ear.

11. AIR CONDUCTION MASKING

When the difference between the unmasked AC threshold of the test ear and BC threshold of the non-test ear is more than 40 dB, the non-test ear is required to be masked. (Studebaker, 1964).

12. ALPORT'S SYNDROME

Renal disorder associated with deafness and ocular anomalies. Characteristics include autosomal dominant inheritance with men more severely affected than woman, progressive nephritis with uremia, ocular lens abnormalities such as cataracts, and progressive SN hearing loss. Hearing loss is typically mild to severe, usually bilaterally symmetrical.

13. ANSI - AMERICAN NATIONAL STANDARDS INSTITUTE

Ref: ANSI (Pg.5.1)

14. ARTIFICIAL ERR

A device consisting of a 6cc coupler and a microphone for the measurement of sound levels produced by an earphone. It is used with a sound level meter in calibrating the sound levels produced by the earphones of an audiometer.

15. ARTIFICIAL MASTOID

A device that simulates the mechanical impedance of the human mastoid process. It is used with a sound level meter in calibrating the levels produced by a bone vibrator.

16. ATRESIA

Atresia exerts a greater effect upon hearing loss since it involves more than artifactual closure of the external auditory canal. It may be partial or complete. Hearing loss is most extensive in those persons whose EAM are atretic along their entire length.

17. AUDIOGRAM

The audiogram is a graph showing the hearing sensitivity for air and bone conducted sounds. The frequency of the tone in Hertz (Hz) or CPS, is represented along the abcissa, and hearing threshold level (HTL) in decibels (dB) along the ordinate.

18. AUDIOLOGY

The study of the entire field of hearing, normal and disordered; it is concerned with the nature of hearing, conservation of hearing, identification of hearing loss in the population, assessment of hearing loss in the individual, and the rehabilitation of all those with hearing impairment; within the field of study and practice. There are specialities consisting of diagnostic work, rehabilitation, research, and teaching.

19. AUDIOMETRY

Audiometry originally meant only the measurement of the auditory threshold for pure tones. It may be divided into two broad sub-fields on the basisof the type of stimulus used to elicit auditory responses: (1) Pure tone audiometry, and (2) Speech audiometry.

20. AUDIOMETER

The audiometer is an electronic device for measuring hearing ability. In its simplest form, it is a pure tone generator, an amplifier, and an attenuator. Other parts in the audiometer are frequency selector, interrupter switch, noise generator, a set of earphones, bone conduction receiver, microphone and a set of load speaker.

21. AUDITORY AREA

Broadman'S area No.41, 42, & 22, situated on the posterior part of superior temporal gyrus. The first two are responsible for reception of auditory stimulus. The last one is related to correlation of auditory impressions with past memories.

22. AUDITORY TUBE

Ref: EUSTACHIAN TUBE (Pg.2.18)

23. AUDITUS ANTRUM

A small opening on the posterior wall of the middle ear cavity through which the middle ear communicates with the mastaid cavity.

24. BACKWARD MASKING

Backward masking is the condition in whieh the masking sound is given after the presentation of the probe tone. The effect is observed if the tone is presented 100 ms earlier than the masking noise.

Ref: FORWARD MASKING (Pg. 2.21)

25. BAROTRAUMATIC OTITIS MEDIA

This condition, alternatively known as aero-otitis or otitic barotrauma, may be defined as a non-infeCtive inflammatory reaction produced in the ME cleft when the air pressure within it is considerably lower than that of the surrounding atmosphere. It occurs particularly when flying, during loss of height, and diving.

26. BASILAR MEMBRANE

Situated in the inner ear; composed of radial fibres 35mm in length; divided into two parts - parstecta and parspectineta; narrow at the base and broader at the apex; attached to the orseous spiral lamina on the inner side and ligament on the outer side.

When stimulated it moves in a travelling wave like motion which produces maximum displacement at the base for high frequency and maximal displacement after a time lag for low frequency at the apex. Made up of 24,000 individual fibres. Mainly responsible for the mechanical properties of the cochlea.

27. BING TEST

Based on the occlusion effect, this test can be used in Cases of bilateral impairment to distinguish between conductive and SN hearing loss. The vibrating fork is

placed on the mastoid as in the Riaine Test. When the patient reports that the tone has become inaudible, the examiner immediately closes the external canal by light finger pressure on the tragus while the still vibrating fork is left in place. If the patient reports that the tone again becomes audible, the ear's sensitivity to the BC sound and indicates no conductive loss or there is some SN loss.

28. B.I.S. - BUREAU OF INDIAN STANDARDS

Ref: B I S (Pg.6.5)

29. BONE CONDUCTION

Is the process through which the acoustic energy reaches the inner ear via the bones in the skull. Two types (1) Inertial bone conduction; operates at low frequency, and (2) Congressional bone conduction is seen at higher frequency.

30. BONE CONDUCTION MASKING

When the difference between the AC threshold of the test ear and BC threshold of the non-test ear is more than l0dB, the non-test ear will have to be masked while testing the BC threshold of the test ear. (Studebaker,1964).

31. BONE VIBRATOR (BONE CONDUCTION RECEIVER)

A receiver that is pressed against the skull to transmit sound through the bone to the inner ear.

32. BONY LABYRINTH

This is constituted by a group of cavities within the temporal bone; filled with perilymph; has three parts (a) Cochlea, (b) Vestibule, & (c) Semi-circular canals, (a) Cochlea is snail shaped - human cochlea 2 1/4 turns, wound round a central tone, the modiolus, (b) the vestibule is about 3mm wide and 5mm vertically and antevo posteriorly. Its lateral wall opens into the middle ear at the oval window. Anterior to it is the cochlea. The three semicircular canals open into it's posterior wall, (c) Three semicircular canals anterior(superior), posterior and lateral (horizontal); at right angles to each other.

33. CALIBRATION

It is a cheeking or correcting the scale or output of a measuring instrument, as an audiometer. It is a physical check using electronic equipment or some times a biologic check using listeners.

34. CENTRAL MASKING

A few dB increase in the threshold of the test ear

when a low level sound is presented to the non-test ear.

. Ref: PERIPHERAL MASKING (Pg.2.35)

35. CIRCUMAURAL EARPHONE

Around the ear? describing an earphone or ear muff cushion that presses against the head and encircles the pinna.

36. CHOLESTEATOMA

Cholesteatomata are squamos epithelial cysts that can arise anywhere within the temporal bone. This may be congenital or acquired cholesteatoma.

37. COCHLEA

is the medial most portion of the osseous labyrinth. It is a bony canal, about 35mm in length. It is partially divided into three ducts.

(a) Scala verstibuli or upper duct.
(b) Scala tympani or lower duct.
(c) Scala media or membranous cochlear duct.

38. COCHLEAR - ECHOES OR OTOACOUSTIC EMISSIONS

When a low level click is presented to the ear, a sound is reflected from the ear. This is detected using a microphone sealed into the ear. This is known as

cochlear echo.

This reflections are generated at various points on the basilar membrane; are non-linear. They are observed only in persons with normal hearing.

This is not found in the ear which is exposed to intense sound or oto-toxic drugs.

39. COCHLEAR FLUIDS

These fluids are found in the cochlea.

(a) Perilymph: found in bony labyrinth; extracellular, rich in sodium and poor in potassium. Disturbance in its composition affects the cochlear microphonics and action potentials.

(b) Endolymph: found in membranous labyrinth; intra cellular; rich in potassium and poor in sodium; decrease in endolymph due to degeneration of stria vescularis and increase in its volume due to infla-mmatory conditions cause congenital syphillis and meneire's disease.

(c) Cortilpmph: found in tunnel of corti; rich in sodium and poor in potassium, but composition is different from perilymph which is toxic to haircells.

Functions of cochlear fluids:

(a) deliver nutrients, (b) remove waste products

(c) provide chemical environment need for transfer of

energy from vibration(mechanical) to neural signals (electricals).

40. COCHLEAR MICROPHONIC - CM

CM are also referred as weaver-bray effect. These are the electrical activities of the cochleae measured at round window and cochlear fluids.

These are faithful reproduction of the stimuli presented. It is proportional in magnitude to the intensity of the stimulus at higher intensities. The upper limit of CM is dependent on specific frequency and electrode location.

CM does not have threshold and persists for a while after death. CM is affected if hair cells are damaged.

41. COCHLEAR NUCLEI

A pair of dorsal and ventral nuclei form the second order neuron in the auditory pathway. They receive the fibres from the spiral ganglion, These consists of six types of nerve cells known as sphenoid cells. Tear cells, multipolar cells, octopid cells, granule and fusiform cells. Respond to sound intensity and their discrimination for frequency is good.

Asphyxia causes damage to more than 45% of cells in the cochlear nuclei within two days.

42. COMFORTABLE LOUDNESS LEVEL - CLL

Ref: MOST COMFORTABLE LEVEL (MCL) (Pg. 2.30)

43. COMFORT LEVEL

Ref: MOST COMFORTABLE LEVEL (MCL) (Pg.2.30)

44. CONDUCTIVE HEARING LOSS

A hearing impairment caused by a lesion of the conductive mechanism i.e. lesion in outer ear and middle ear.

45. CONGENITAL DEAFNESS

Deafness which develops in the uterus and is not necessarily a result of heredity, literally, with birth.

46. COUPLER

1. Any device by which the portion of an acoustical system is formed to another. (An earmold coupler).

2. A cavity of predetermined shape and size used in measuring the acoustic output of earphones or receivers.

1. A 6cc coupler is used between the audiometer for calibration.
2. A 2cc coupler is used with hearing aid receivers.

47. DIFFERENCE LIMEN (DL)

It is the minimum difference in a signal in terms of frequency, intensity or time that can be detected by an individual. It is also known as the J.N.D. (Just Noticeable Difference). The D.L. value is the reciprocal of the J.N.D.

Ref: DIFFERENCE LIMEN FOR INTENSITY(DLI) (Pg. 2.14)
DIFFERENCE LIMEN FOR FREQUENCY(DLF) (Pg.2.14)

48. DIFFERENCE LIMEN FOR INTENSITY (DLI)

It is the minimum difference in intensity that an individual can detect. DLI depends on intensity and frequency. The value of DLI is leseer at high intensities. Likewise it is lower at the mid frequencies that at high and low frequencies. DLI is often used to detect the presence of recruitment.

Ref: DIFFERENCE LIMEN (DL) (Pg. 2.14)

49. DIFFERENCE LIMEN FOR FREQUENCY (DLF)

It is the smallest difference in frequency which an individual can detect. DLF is smaller at high intensities. The value of DLF is high at low frequencies.

Ref: DIFFERENCE LIMEN (DL) (Pg. 2.14)

50. DOWN'S SYNDROME

Result of a chromosomal abnormality, either as a 21 trisomy, translocation trisomy or as mosaicism. Clinical findings include a list of 50 features with varying penetrance. MR is almost universal; characteristic personality that is warm, friendly, and affectionate. Hearing loss range between 8% and 85% with implications of SN, Conductive and Mixed hearing problems. Anomalies of middle ear ossicles have been reported.

51. DYNAMIC RANGE

The useful intensity range of a sensory system or instrument, specified in decibels. The extremes are provided by the threshold or noise floor and by the maximum intensity tolerable without pain, damage or material non-linearity.

52. EAR

Is an extraordinary sound-detecting device, so sensitive it can almost hear the random BrowniaN movements of the air particles as they strike the ear drum. It consists of three divisions: the external, middle, and inner ear.

Ref: EXTERNAL EAR (Pg. 2.19)
MIDDLE EAR (Pg. 2.28)
INNER EAR (Pg.2.24)

53. ERR CANAL

Extends from the pinna to the tympanic membrane? 25mm in length; curved; divided into three parts: pars externa, pars media, and pars interna. First portion traverses anteriosuperiority. The second postero-superiorly. The third portion travelling aatero interiorly and at the tympanic membrane.

Composed of cartilage in the lateral 1/3 and of bone in the medial 2/3. Cartilagenous portion contains ceruminous glands secreting wax. This protects the middle ear and inner ear structures and helps in the condition of sound waves. The resonance frequency of the ear canal is around 3500 HB.

Pathological conditions affecting hearing are external otitis, stenosis, impacted wax and congenital deformity like atresia. The loss usually is of conductive type between 30-35 dBHL.

54. EARMOLD

Ref: EARMOLD (Pg.2.10)

55. EARPHONE (RECEIVER)

A device (electroacoustic transducer) at the ear to convert an electric signal to sound. It is a basic part of an audiometer and a hearing aid.

56. EFFECTIVE MASKING LEVEL

Effective masking level is defined as the number of dB that the total energy in the critical bond is above the threshold energy for a pure tone, whose frequency is at the centre of the band.(Sandevs, 1978).

For example, if 50 dBHL tone is masked by 60 dBHL noise i.e. when both the tone and noise are presented to the same earphone

Masking factor - noise level - tone level
- 60-50 = lOdB.

If 50dBHL noise masks 50dBHL tone, then

Masking factor = noise level - tone level
- 50-50 - 0.

If the masking factor is zero dB, then the noise level in dBHL can be regarded as effective level i.e. the dial reading of the noise attenuator indicates effective level. If the dial reading is 60dBHL, the effective level is also 60dB.

57. ENDO COCHLEAR POTENTIAL (EP)

These are produced at the striavasculan's in the inner ear, is a resting electric polarization of endolymph. It is about millivolts with respect to perilymph in scala

lymph in the scala vestibuli.

Without EP the inner ear will not perform the mechanical to electrical transduction process.

58. EPITYMPANIC RECESS

Superior portion of the ME; known as the attic; head of the malleus covers most of this area.

Middle ear infection may spread to the brain through this.

59. EQUAL LOUDNESS CONTOUR

These are the curves which show the relationship that must be maintained between SPL and frequency if tones of various frequencies are to produce the same loudness sensation for 'normal' listeners. These curves show that tones of the same SPL do not sound equally loud. This is also known as phone curve.

60. EUSTACHIAN TUBE

Extends from anterior wall of the tympanic cavity to the nasopharynx; 37mm in normal adults. Anterior 1/3 mis bony and the remaining two third (2/3) is cartilagenous. The tensor palatini muscle helps in opening of the tube at the nasopharynx.

FUNCTION: (1) ventilation (2) protection (3) clearance (4) equalization of the pressure in the middle ear cavity and atmospheric air.

The tube is always open or cannot open due to pathological conditions of the eustachian tube tissue. In children horizantal placement of eustachian tube causes middle ear infection and adenoid infections.

61. EVOKED RESPONSE (ELECTRIC RESPONSE)

When any sensory system is stimulated, action potentials are generated in the afferent neurons and propogated centrally through a number of synaptic relays. The electrical activity which accompanies these events are detectable using appropriately placed electrodes and with suitable amplification. These electrical activities in the afferent pathways are called Evoked Responses or Evoked Potentials.

62. EXTERNAL EAR

I t consists of pinna and the external auditory meatus. The pinna projects on either side of the head at an angle of 30^0.

FUNCTION: Aids in resonance, directionality, excitation and pressure distribution, and protection. Maximum acoustic

gain 1.2 to 2.6 KHz which is important for speech perception.

Ref: EAR (Pg.2.15)

63. FACIAL NERVE

Seventh eranial nerve, emerges from the pars and enters the temporal bone? occupies the facial canal and branches off to supply stapedius muscle.

Lesion of lower and upper motor neurons, acute/ serious otitis media may damage the facial nerve.

64. FACIAL PARALYSIS

It is by far the most common of all peripheral nerVe lesions. It effects upon voluntary and emotional facial expression, upon the mechanisms of mastication and speech, upon the sense of taste, and upon the protective mechanisms of the eye are grave enough in themselves.

65. FORMULAE FOR MASKING

Formula-1: Minimum EML for AC testing.

Minimum EML = unmasked AC threshold of the test ear
- 40 + AB gap of the nontest ear

(AB) Air-bone.

Fermula-2: Minimum EML for BC testing.

Minimum EML - Unmasked BC threshold of the test ear
+ Air bone gap of NTE (or occlusion effect if AB gap is absent).

Occlusion effect is 20 dB at 250 Hz, 15dB at 500 Hz, 10 dB at 1000 Hz.

NOTE: If the air bone gap is less than l0 dB, occlusion effect is considered.

Formula-3: Maximum EML for AC and BC testing.

3a) Assumed maximum EML = Common BC threshold + 40 dB
Real maximum EML * BC threshold of the test ear + 40dB

3b) Assumed maximum EML - Common BC threshold + 40dB
Real maximum EML -s BC threshold of the test ear + 40dB.

66. FORWARD MASKING

This is a phenomenon observed when the signal is presented within 100 msec of the cessation of the masking signal; that latter being presented prior to the former.

Ref: BACKWARD MASKING (Pg-2.6)

67. FREQUENCY

The frequency of a sound wave is the number of cycle that occur in a second's time. The unit for expressing

frequency is the cycle per second, abbreviated CPS. The term Hertz, abbreviated Hz is substitute for CPS. The audible range of frequencies is from about 20 to 20000HZ in humans.

68. FUNCTIONAL HEARING LOSS

Ref: PSEUDO HYPACUSIS (Pg.3.24)

69. GENERATOR POTENTIAL (GP)

The GP is the electrical activity that triggers the neural impulses in the initial segment of an axon. Its probable location is in the initial non-mylinated segment of the auditory nerve and it is still under speculation.

79. HAND-HEARING SYNDROME

Dominant inheritance. Patients manifest familiar congenital bilateral or unilateral SN hearing loss varying degrees. The congenital abnormality is seen in both normal hearing and deaf patients.

71. HAIR CELLS

Ref: OUTER HAIRCELLS (Pg.2.35) and
INNER HAIR CELLS(Pg.2.24)

72. HEARING LEVEL (HL)

The level (in dB) of a sound relative to 0 dBHL, which is equal to average hearing threshold for young, normally hearing adults. It is the dB reference in audiometers and ordinarily conforms to ANSI Standard.

73. HEARING LOSS

Ref: CONDUCTIVE (Pg.2.13)
MIXED (Pg.2.30) and
SN Hg.Loss (Pg.2.43)

74. HEARING THRESHOLD LEVEL (HTL)

Ref: HEARING LEVEL (Pg.2.23)

75. HEREDITORY DEAFNESS

Deafness resulting from inherited characteristics (recesive series). Genetic influences transmitted through generations.

76. INFERIOR COLLICULUS

Is the junction through which the efferent and afferent fibres of auditory pathways.

This receives efferent fibres bilaterally from the superior olivery complex (SOC) and contralaterally from dorsal division of cochlear nucleus.

Plays important role in auditory reflex and spacial coding.

77. INNER EAR

Consists of (1) the vestibule (2) cochlea; housed in the temporal bone.

Pathological conditions: viral and bacterial infections, ototoxicity and exposure to noise (NIHL).

Ref: EAR (Pg. 2.15)

78. INNER HAIR CELLS

The inner hair cells are about 3500; found in the inner ear; in a single row, completely surrounded by supporting cells.

Each cell is 35µm in length and lOµm in diameter, avoid with bent neck nucleus at the centre. Stereo-celia present on the superior region.

Innervation ; 95% of afferent fibres; many to one connections.

Responds when Basilar membrane is displaced. Most resistant to damage; lack of oxygen causes damage to inner hair cells.

79. INSERT EARPHONE

(Insert or button receiver; button type earphone). A small earphone that connects to an earmold that is inserted in the ear.

80. ISI - INDIAN STANDARD INSTITUTE

Ref: ISI (Pg.5.18)

81. ISO - INTERNATIONAL STANDARDS ORGANIZATION

Ref: I S 0 (Pg.6.16)

82. INTENSITY

The acoustical power passing through a unit area is defined as the sound intensity.

$I = W/A$ where W = Acoustical sound power of the source.

A = Surface area (mts^2)

A just audible sound intensity for a human ear is 10— $Watt/Cm^2$ or $lO^{-12} W/m^2$.

83. INTERAURAL ATTENUATION

The reduction in sound as it crosses from one ear to the other. It is often considered to be atleast 40dB for air-conducted sound and zero for bone-conducted sound.

84. INTERNAL AUDITORY MEATUS

I am forms a passway for the afferent and efferent fibres to pass from the cochlea. If forms site for tumors of the 8th nerve.

85. LATERAL LEMINISMS

Formed mainly by the bilateral fibres from the superior olivary complex and trapezoid nuclei and partly by the crossed fibres of the cochlear nuclei. They constitute the 3rd order neuron in the auditory pathway.

86. LOUDNESS DISCOMFORT LEVEL - (LDL)

It is the intensity level at which an individual reports that the auditory signal brings causes about a discomfort.

Ref: UNCOMFORTABLE LEVEL (UCL) (Pg. 2.56)

87. KERATOSIS OBTURANS

This uncommon disorder of the EAM that manifests as an extensive accumulation of desquamated skin debris. It is often clinically confused with a cholesteatoma of the EAM. This mass is found fitting the deep meatus.

88. MANUAL AUDIOMETRY

A technique of measuring puretone thresholds in which the examiner (a) selects frequencies and levels, and (b) presses a switch to present tones.

89. MASKING

It is a phenomenon wherein there is evaluation in threshold for one signal (the test tone) by the simultaneous presence of a second signal (the masking noise). (Sanders, 1978).

90. MASKING NOISE

There are three general types of masking noise available on commercial audiometers. They are (l)Narrow band noise (2) White noise, and (3) Complex noise.

Ref: NARROW BAND NOISE (Pg.6.18)
WHITE NOISE (Pg. 6.34) and
COMPLEX NOISE (Pg. 6.5)

91.MASTOID ANTRUM

Situated in the posterior portion of the temporal bone contains air cells. Connected to these is the tympanic antrum. Antrum communicates with epitympanic recess of the middle ear via aditasad antrum. This antrum is bordered by mastoid process (inferior) tegmen tympanum (superior) and lateral semicircular canal (medially) and squamous (lateral).

92. MAXIMUM EFFECTIVE MASKING LEVEL

It is the level of the noise in the nontest ear which

is just insufficient to mask the test tone in the test ear.

93. MIDDLE EAR CAVITY

Ref: TYMPANIC CAVITY (Pg.2.52)

94. MIDDLE EAR

Is composed of the tympanic membrane, the air filled middle ear cavity, and the structures contained within it, such as the auditory ossicles (the malleus, incus, and stapes), middle ear muscles, and the highly vascular mucous membrane.

Ref: EAR (Pg.2.15)

95. MEDIAL GENICULATE

It is a thalamic nuclei forming the junction between the fibres from interior colliculus to auditory radiations. Has three divisions- dorsal, ventral and medial. Only ventral portion is involved in relaying signals of the auditory system.

96. MEMBRANOUS LABYRINTH

This is lodged within the bony labyrinth; filled with eadolymph.

Consists of utricle and saccule; sac like structures housed in the bony vestibule? with in bony semicircular canals are the three membraneous semicircular duct and with in the bony cochlea is the cochlear duct.

97. MENIERE'S DISEASE

Distention of the endolymphatic system is a very frequent outstanding pathological feature. The symptoms of which originate in the labyrinth and typically present as a triad consisting of fluctuating deafness, tinnitus and episodes of vertigo.

98. MINIMUM EFFECTIVE MASKING LEVEL

It is the level of noise in the nontest ear which is just sufficient to mask the test tone in the nontest ear.

99. HHMHBM AHBKBLB FIELD (MAF)

Minimum Audible Field is one of the methods of measurement used for the determination of the threshold of hearing of sound waves in air.

The intensity of a sound wave is free space, which will just elicit a sensation of hearing, in aa observer who enters the space is known as the MAF.

To determine the MAF the intensity of the sound is first measured without the observer in the field and then

the observer enters the field and listens to the sound.

100. MINIMUM AUDIBLE PRESSURE (MAP)

Measuring the MAP at the eardrum is one of the methods used for the determination of the threshold of hearing of sound waves in air.

A known pressure is established at some measurable intensity well above threshold and then the amount by which the pressure must be reduced in order to reach the threshold value is determined. This is MAP.

The threshold measured by MAP are 6dB better than those measured by MAF.

Ref: MAF -MINIMUM AUDIBLE FIELD (Pg.2.29)

101. MIXED HEARING LOSS

A hearing impairment caused by a lesion of the conductive mechanism together with a lesion of the seasorineural mechanism.

102. MODIFIED RAINVILLE TEST (M-R TEST)

Ref: MODIFIED RAINVILLE TEST (Pg.3.21)

103. MOST COMFORTABLE LEVEL (MCL)

This corresponds to the level where an individual

reports that the signal being presented is most comfortable neither 'too soft' nor 'too loud'. This is around 45-55dB above threshold among normal hearing subjects.

104. NAUNTON'S DILEMA

It is a phenomenon in which AC minimum is more than AC maximum. It is usually seen in unilateral cases and it can be avoided by use of insert earphone. (Interaural attenuation is 70dB).

105. NOISE INDUCED HEARING LOSS (NIHL)

Ref: NIHL (Pg. 6.20)

106. NON-ACOUSTIC REFLEX

The middle ear muscles give a feflex response to nonacoustic stimuli, such as a tactile stimulus in the clrcumaural region. These responses are termed Non-acoustic reflexes.

107. NON-SOM[SUPPURATIVE OTITIS MEDIA]

It is used to embrace a group of conditions affecting the middle ear, which are generally considered to be of inflammatory origin but which present no evidence of suppuration. The group includes secretory otitis media, atelectasis, adhesweotitis media and tympanosclerosis.

108. NORMAL HEARING LEVEL (NHL)

In auditory brainstem response audiometry, the level (In dB) of a sound relative to OdB NHL, which is normal threshold obtained with specific equipment at a specific site.

Ref: HEARING LEVEL (Pg.2.23)

109. OCCLUSION EFFECT

An improvement in bone conduction threshold noticeable at lOOOHz and below when the ears are occluded during testing. It is observed in normal hearing subjects and in patients with sensorlneural loss and is absent in patients with conductive loss.

110. OCCUPATIONAL HEARINS LOSS

Ref: OCCUPATIONAL HEARING LOSS (Pg. 6.23)

111. ORGAN OF CORTI

Sensory organ of hearing; in the scala media of the inner ear. It is a series of neuro epithelial hair cells and supporting cells; extends from the base to the apex; lies between the osseous spiral lamina and spiral ligament.

112. OSSICULAR CHAIN

A chain of three small bones; found in the middle ear? connected to the tympanic membrane on the lateral end and attached to the oval window at the medial end. The three ossicles are malleus, incus and stapes? held in position by five ligaments and two muscles.

Transmission of sound is through lever action when loss of energy is minimised.

Conditions affecting continuity of the chain are trauma fractures? inflammation of the M.E. radiation and congenital defects.

113. OSSICULAR EROSION

Erosion of the ossicular chain is a non-specific result of the hyperaemia associated with mucosal inflammation, rather than due to ischaemia.

114. OTITIS EXTERMA

The term otitis externa covers any inflammatory condition of the skin of the external auditory meatas. It is classified according to the extend of the lesion:

(1) localized otitis externa

(2) diffuse otitis externa

115. OTOSCLEROSIS

It is a common hereditary localized disease of the bone derived from the otic capsule. Mature lamellar bone is removed by osteoclasis and replaced by unorganized woven bone of greater thickness, cellularity and vascularity.

116. OTOTOXICITY

It may be defined as the tendency of certain therapeutic agents and other chemical substances to cause functional impairment and cellular degeneration of the tissue of the inner ear, and especially of the end-organs and neurons of cochlear and vestibular divisions of the eighth craniCH nerve.

117. OVAL WINDOW

One of the two openings on the bony cochlea through which the middle ear communicates with the inner ear fluids.

118. OVER MASKING

Presenting a sound (masker) so intense in the non-test ear that it (the masker) crosses the head to worsen the threshold for the signal in the test ear.

Ref: UNDER MASKING (Pg.2.56)

119. OUTER HAIR CELLS

These cells are present laterally to the tunnel of earti and bordered by outer phalangeal cells. Outer hair cells 12,000; arranged in three rows; longer at the apex than at the base.

Each outer hair cell is slender cylindrical; placed obliquely with an upper articular surface? 45mm in length at the base and 25mm at the apex. Average diameter 6-7mm nucleus at its base. Innervation both by afferent and efferent fibres. Responds to the BM displacement.

120. PB - PHONETIC BALANCE

A distribution of speech sounds, usually withia a group of monosyllabic words, that is comparable to the distribution of speech sound in conversation.

121. PB MAXIMUM

The best possible score that an individual can attain on a test of auditory discrimination using phonetically balanced (PB) words.

Ref: PB (Pg. 2.35)

122. PERIPHERAL MASKING

The worsening of a listener's threshold for a signal

and noise (masker) are in the same ear.

Ref: CENTRAL MASKING (Pg. 2.9)

123. PHONE DEAFNESS

Ref: PHONE DEAFNESS (Pg.5.24)

124. PHONS

The unit for measuring the loudness level of a sound in comparison with a l000Hz tone. The loudness level in phons is numerically equal to the SPL of the lOOOHz tone, while the SPL at other frequencies will vary for the same number of phons.

125. PLACE PRINCIPLE

Information about the frequency of a sound may be signalled by auditory receptors in two ways:
(1) Place Principle and (2) Telephonic Principle.

In Place Principle the anatomical groups of receptor cells differes as to the characteristics frequencies.

126. PRESBYCUSIS

It means deafness of aging which is the auditory manifestation of a biological process involving all the tissues of the body. The speed of onset of degenerative change in the ear is determined by genetic factors and by physical stress to which it is subjected during a

normal lifespan.

127. PROMONTORY

is a rounded prominence projecting into the middle ear cavity. It is formed by the lateral portion of the basal turn of the cochlea.

128. PSYCHOPHYSICAL TUNING CURVES (PTC)

The procedure for obtaining psyChophysical tuning curve involves a simultaneous or forward masking paradigm using two tones. The listener's task is to detect a low intensity proble of fixed frequency.

Then a masking tone is introduced and adjusted in level until it just masks the proble. When the masking procedure is carried out across a range of frequencies, a masked threshold contour is obtained which is similar in shape to a neural tuning curve, that is, there is a low threshold narrowly tuned trip and a high threshold, broadly tuned level.

Ref: FORWARD MASKING (Pg. 2.21)

129. PURE TONE

A tone or note which has only one frequency with no harmonics or over tones.

130. PURE TONE AUDIOMETER

The basic type of audiometer. An instrument which generates pare tones of various frequencies and ranges of intensity which can be controlled to measure hearing acuity or sensitivity.

131. PURE TONE AUDIOMETRY

Audiometry based on the use of puretones of various frequencies and intensities as auditory stimuli to measure hearing. Included are comparisons of responses to pulsed and continuous tones and comparisons of results with earphones and bone vibzators.

132. REFRACTORY PERIOD

Is the recover time required for the fibre to fire to an action potential. This limits the neurons firing rate which is l000 SPIKES second.

It is two types (1) Absolute refractory period is the time required for the cell to reestablish the polarization it needs to fire again which is about 1 msec. (2) Relative Refractory Period is during which the neuron will respond provided the stimulus is strong.

133. **REISSNER'S MEMBRANE**

Adelicate cellular membrane attached to the spiral

limbus and to the spiral ligament in the I.E. It separates the scala media from the scala vestibuli and forms the roof of scala media.

Composed of mesothelial layer and mesodermal layer which have regenerative capacity? help in maintaining the haemostages of the inner ear fluids.

Acoustic trauma and ototoxic drug causes damage to the Reinssener's membrane; disrupts the ionic composition of endolymph which in turn effects tectorial membrane and hair cells causing hearing loss.

134. RESIDUAL HEARING

Auditory abilities of an individual with a hearing impairment.

135. RESONANCE THEORY

It suggests that frequency resolution is due to the stimulation of tuned tranverse fibres along the basilar membrane.

A sound with its characteristic frequency would activate the fibres tuned to that frequency signalling to the sensory cells.

136. RINNE TEST

A tuning fork test.

The purpose of this test is to differentiate between conductive loss and SN hearing loss. The audio legist sets a tuning fork into vibration (by pinching) and then releasing the times with the fingers, or by striking the fork with a soft mallet and holds it close to the patients external ear. When the patient reports that the sound produced by the fork can no longer be heard, audiologist quickly plaus the handle of the Vibrating fork against the patient's mastoid process and asks if the patient can again hear the fork, the result of the test is said to be a Rinne -ve which indicates a conductive type lesion. If the patient hears the fork longer by air (AC) conduction than by BC, the result is labelled a Rinne +ve and indicates that SN hearing loss. A normal ear will also give +ve result because normally hearing is more sensitive by AC than by BC.

137.ROUND WINDOW

It is loeated on the lateral wall of the inner ear below the promontory, covered by round window membrane (secondary tympanic membrane) which separates the middle ear from the scala tympani.

Helps in pressure releasing when the inner ear fluid is compressed.

138. SAL TEST (SENSORY ACUITY LEVEL TEST)

It was given by Jerger and Tillman(1960). IT is performed by measuring the AC threshold for a pare tone, first without any masking, and then after introducing a known level of narrow band BC noise. The noise is delivered from BC vibrator, placed on the midline of the skull. The difference in dB between the threshold obtained compared with the different produced by same noise in normal ear. This test can be used to diagnose SN hearing loss.

139. SCALA MEDIA

Found in the inner ear; triangular in shape? filled with endolymph; houses the organ of corti.

It is separated from scala vestibali by Reissner's membrane and from scala tympani by basilar membrane. Lateral side is lined by stria vascularis of which is main source of vascular supply to organ of corti.

140. SCALA TYHPANI

It is one of the passages in the inner ear; filled with perilumph; extends from the round window at the base and to helicotrema at the apex. The basilar membrane separates it from the scala media.

The oval window movement displaces the fluid, which in turn moves the basilar membrane.

141. SCALA VESTIBULI

It is another passage in the cochlea filled with perilumph; extends from the oval window at the base and to the helicotrema at the apex. It is separated from the scalamedia by Reissner's membrane and communicate with scala tympani through helicotrema.

Movement of the oval window displaces this fluid; enhances the basilar membrane movement.

142. SCHWABACH TEST

It is a tuning fork test, but a quantitative one. The examiner places the handle of a vibrating tuning fork on the mastoid of the patient and tells the patient to indicate when the tones bocomes inaudible. The handle of the fork is then placed en the examiner's mastoid who counts the number of seconds until the tone becomes inaudible. Theresults of the test are expressed in terms of seconds.

143. SEMICIRCULAR CANALS

They are three in number: (1) superior (2) posterior and (3) lalevael semicircular Canals; unequal in length.

Each has dialation at one end called the ampulla and open into the vestibule through five orifices.

The semicircular canals are lined by cristae responsible for the maintenance of kinetic equilibrium.

144. SENSATION LEVEL (SL: Level above threshold)

The level (in dB) of a sound relative to an individual's threshold of audibility for that sound. (An individual's threshold of audibility would always equal OdB sensation level). It is sometimes relative to a listener's spondee threshold, rather than his audibility threshold for speech.

Ref: HEARING LEVEL (Pg.2.23)
NORMAL HEARING LEVEL (Pg.2.32)&
SOUND PRESSURE LEVEL (Pg.2.45)

145. SENSORY CELLS

Ref: HAIR CELLS (Pg. 2.22)

146. SENSORY NEURAL HEARING LOSS (SN HEARING LOSS)

A hearing impairment caused by lesions of the hair cells in the cochlea and the neurons of the auditory part of cranial nerve VIII.

147. SIX CC COUPLER (6 m^3 Coupler: NBS -9 - A Coupler)

A metal cylinder containing a 6cc air space that represents the amount of air enclosed under an earphone and cushion on the ear. It links the diaphragm of an earphone with the diaphragm of a microphone representing the tympanic membrane.

148. SONE

The unit of a subjective loudness scale based on average human judgements of comparative loudness. One sone is the loudness heard by an average normal listener when presented with a l000Hz tone at an intensity of 40dB or .0002 dynes/cm (or 40 phons). While two sones expres ses the sensation of a sound being twice as loud as one sone, the intensity change required will vary but will represent an increase in phons of about 9dB.

149. SOUND LEVEL METER (SLM)

Ref: SLM (Pg. 6.28)

150. SOUND POWER

It is the rate at which acoustical energy is radiated from a sound source. The unit is watt.

$LW = 10 \log_{10} W1/W2$ where LW - sound power level

Wl - Acoustic power of intensity
W2 - Reference sound power level (10^{-12} watts).

151. SPL - SOUND PRESSURE LEVEL

SPL refers to a stating of reference point used to specify stimulus levels in pure tone audiometry.

It is a physical measure whose reference point is 20 N/ M^2 or 0.0002 dyne/Cm^2 i.e. when a sound is 25DBSPL it is 25 above 20 N/m^2.

152. SPEECH AUDIOMETER

An audiometer utilizing aN amplifying circuit capable of presenting speech level in graduated steps. It is used to determine individual thresholds of speech understanding - the speech reception threshold(SRT) and also used to determine the PB scores i.e. the percentage of words understood when a phonetically balanced word list (of mono syllables) is presented at a comfortable listening level.

153. SPEECH AUDIOMETRY

The technique of measuring ability to understand speech under various conditions of intensity and noise interference using sound field as well as earphones and speakers.

154. SPEECH AWARENESS THRESHOLD (SAT)

It is the lowest level at which an individual is

able to detect speech. It is determined whenever spondee thresholds cannot be obtained.

This level is called the speech detection threshold (SDT).

155. SPEECH DETECTION THRESHOLD (SDT)

Ref: SPEECH AWARENESS THRESHOLD (SAT) (Pg.2.45)

156. SPEECH DISCRIMINATION

The ability to repeat, write, etc. Words that are heard, as a list of 50 monosyllables.

157. SPEECH RECEPTION THRESHOLD (SRT)

It is the minimum level at which an individual can repeat atleast 50% of the words or speech stimuli presented. This is usually determined by presenting spondees. Hence the name spondee threshold (ST) is also said.

Ref: SPONDEE THRESHOLD (ST) (Pg. 2.46)

158. SPONDEE (SPONDAIC WORD): TWO SELLABLE word , as air plane, with each syllable stressed in pronounciation.

159. SPONDEE THRESHOLD (ST)

The ST is a means use of auditory threshold sensitivity for speech. The standard procedure in obtaining

the ST is to use spondee words. The main function of the ST is to confirm the pure tone thresholds, in addition it serves as a reference for the level at which word discrimination testing is performed. The primary frequencies used to discriminate speech sounds are between 300-3000 Hz. One three octave frequencies tested within 300-3000HZ range are 500, 1000 and 2000Hz. Together these frequencies are used to calculate the pure tone average (PTA).

160. STANDARD EARPHONE

(Standard or traditional receiver or headphone: standard earphone receiver).

An earphone, as a technieonics model TDH-50, that measures (a) about 5cm (2 inches) in diameter, (b) is usually supported by a headband and (c) is ordinarily fitted with a cushion.

161. STAPIDIUS MUSCLE

It is the smallest muscle in the body; found in the middle ear.

Arises from the wall of the conical cavity in the pyramidal eminance on the posterior wall of the middle ear, and inserts into the posterior wall of the middle ear, and inserts into the posterior surface of the neck

of the stapes and supplied by the facial nerve function; helps in stapes foot plate movement, protects the middle ear structures and inner ear being damaged by loud noise.

162. SUPERIOR OLIVE

Superior olive are a group of auditory nuclei in the brainstem just above the cochlear nuclei knwon as superior olivary complex. This constitutes of (a) medial superior olivary nucleus (MSO) , (b) the lateral superior olivary nucleus.

The SOC gives rise to the olivocochlear bundles (OCB). This has large audible range and echo location.

163. SUPP0RTING CELLS

Found in the inner ear? extends from the B.M. to the surface of the epithelium cells forming a firm flexible framework. At the surface alongwith the receptor cells they form reticular membrane.

FUNCTION: To support the hair cells and supply nutrition.
Different types of supporting cells:

(a) Inner border Cells
(b) Pillarcells,inner and outer(rods of corti)
(c) DEtter cells
(d) Hensen cells

(e) Claudius Cells

(f) Boetcher cells

(g) Inner phalyngeal cells

(h) Sulcus cells

Ref: ORGAN OF CORTI (Pg.2.32)

164. SUPRA AURAL EARPHONE

It is a earphone placed over, above or on the ear? describing an earphone cusion that presses against the ear (pinna).

165. TECTORIAL MEMBRANE

Is found in the organ of Corti; ribbon like structure, composed of 10% gel like substance and 90% of water; originates from the spiral limbus and extends upto Hensen cells. The free end is in close contact with the cilia of hair cells.

When the basilar membrane moves, even the teetorial membrane moves, but there is an important difference in their motion due to difference in their support; this creates the hearing forces on the cilia. This in tarn stimulates the nerve fibres at the base of outer haircells. Thus the mechanical energy is transduced into electro-chemical activity by the hair cells.

166. TEGME TYMPANI

It is the root of tympanic cavity. It is a thin plate of bone which separates the tympanic cavity from the cranical cavity.

167. temporal bone

Temporal bones on either side of the cranium forms the lateral walls and base of the skull.

Divided into 5 parts : (1) squamous portion (2) mastoid potion (3) petrous portion (4) tympanic and (5) Styloid process.

It houses a major portion of the hearing mechanism.

168. TENSOR TYMPANI

This is middle ear muscle found in the middle ear cavity; 12mm in length? arises from the cartilaginous portion of the eustachian tube; and adjoining part of the greater wing of spenoid and also from the bony canal in which it is housed; inserted into the handle of the malleus, near its root.

Innervation: Branch of the mandibular nerve.

FUNCTION: Ptotects the ear from loud sounds.

169. THRESHOLD OF DISCOMFORT (TD)

Ref: UNCOMFORTABLE LEVEL (Pg.5.26)

170. TOLERANCE

(For sound) A person's ability to listen to loud sound without discomfort.

171. TOLERANCE LEVEL (TL)

Ref: UNCOMFORTABLE LEVEL (Pg.2.56)

172. TRANSFORMER ACTION

The middle ear couples energy from tympanic membrane to the oval window of the cochlea. The sound is transmitted by middle ear ossicles; coupling energy from the low impedance air to the higher impedance cochlear fluids by reducing the reflection of sound energy.

This is achieved by three mechanisms:

1. Areal ratio: The area of the oval window is smaller than that of the tympanic membrane? increasing the pressure exerted at the oval window.
2. The lever action of the ossicles which gives mechanical advantage.
3. The buckling motion of the tympanic membrane increases the force and decreases the velocity. The pressure is increased bv the ratio of the two.

173. TRAVELLING WAVE

The sound is propogated in the cochlea in the form of a travelling wave in the basilar membrane. This wave travels from the base to the apex of the cochlea. The maximum amplitude of the wave occurs at a point that corresponds to the frequency of the stimulus.

174. TUNING FORK TEST

In audiology, the classic method of measuring, or more properly, describing, hearing loss is by noting the patient's responses to vibrating tuning forks. Forks of various frequencies are selected for administering the standard tests. These frequencies are octaves of C on the scientific scale, from 128 Hz through 8192Hz. The most common fork tests are the Rinne, Webber, Bing, and Schwabach, named after their nineteenth century German originators.

175. TWO C.C. COUPLER (2 Cm^3 Coupler)

Ref: TWO C.C. COUPLER (Pg. 5.32)

176. TYMPANIC CAVITY

Lies between the external and inner ears? divided into three parts: (1) mesotympanum (2) epitympanum, and (3) hypotympanum.

It measures about 15mm from above downwards and 13mm from behind forward. It has six sides (1) roof (2) floor (3) medial wall (4) anterior wall (5) posterior wall, and (6) lateral wall. This contains (1) three ossicles (malleus, incus and stapes), (2) two muscles (tensor tymsor tempaNic and stapidius), (3) chorda tympanic nerve and (4) the tympanic plexuses of nerves.

FUNCTION: Transformer action and impedanee matching.

177..TYMPANIC MEMBRANE

Separates the external auditory meatus from the middle ear cavity.

It is transluscent, greyis, oval disc whose long axis is 10mm? composed of three layers : outer(eutieular)? intermediate(fibrous)? and inner (mucous).

Lateral surface? where maximal concavity of the membrane is present. The membrane is divided into two: pars tensa and pars flaccida.

It helps in the conduction of sound waves to the M.E. Trauma, otitis media cause middle ear infection damage to the membrane.

178. TYMPANO SCLEROSIS

It is an abnormal condition of the middle ear characterized by the local deposition of plaques of collagen beneath the lining epithilium. Plaques may be laid down in the substance of the tympanic membrane where they are often referred to as chalk pathces or calcareous deposits.

179. VACUUM TUBE VOLTMETER (VTVM)

It is electronic voltmeter. In this electronic circuits used to achieve high input impedance, root mean square measurement, peak reading.

180. VESTIBULE

Is a central portion of the bony labyrinth and continuous with the semicircular canals and with cochlea. Ovoid in shape, it measures about 5mm in its antero-posterior and vertical dimensions and about 3mm across.

181. VESTIBULO COCHLEAR NERVE (8th Cranial nerve)

Found in the groove between the pons and medule oblangata.

This has two branches: (1) the anterior branch or cochlear nerve and, (2) posterior branch or vestibular nerve.

This conducts neural signals from the internal ear to the brain. This is developed from the neural crest and regard it as a modified nerve.

182. VOLLEY THEORY

This suggests that during refractory period of one set of neurons? another set is actively firing. This holds good for only frequencies upto 4000Hz.

183. VOLTMETER

An instrument for measuring in volts ; the difference in electric potential between two points.

184. VU METER - VOLUME UNITS METER

It is also called Volume Indicator (VI) meters. They enable the enemines to monitor the Inputs to the amplifiers. The output of the amplifiers must be calibrated in terms of a specific level of input signal. It is customary to monitor all inputs to an average peak reading of zero dB on the Vu meter. The input level is controlled by a potentlo meter (volume control). The examiner compensates for differences in levels of recording or for differences in vocal intensity in live noise testing by tuning the input volume control until the needle on the Vu meter is peaking on the average at OdB.

185. UNCOMFORTABLE LEVEL (UCL)

It is the hearing level at which the sound stimulus presented to the subject becomes uncomfortably loud.

The normal ear should be able to tolerate sound stimulus at hearing levels of 90-100dB without experiencing discomfort i.e. 122 dBSPL. Average UCL is around 120dBSPL.

The purpose of this measure is to find the upper limit of the patient's range of hearing so that the audiological tests can be adminsitered within that range.

Also, the UCL represents the maximum that the patient can accept in a training situation or in a hearing aid.

Ref: LOUDNESS DISCOMFORT LEVEL (LDL) (Pg.2.26)

186. UNDER MASKING

Presenting a sound (masker) too faintly in the non-test ear to obscure (mask) the signal that has eontralateralized from the test ear.

Ref: OVER MASKING (Pg.2.34)

187. WARBLE TONE

Warble tone is produced by frequency modulation which refers to a periodic modification of a base or centre frequency to valves either above or below, or around the

base frequency, while amplitude is held constant.

Warble tone varies as a function of three basic parameters: (1) the centre or base frequency ; (2) the frequency deviation (FD) $\pm$ 0.2% above the base to as high as $\pm$ 10% around base forequency, (3) the modulation rates (MR) 2 to 10%.

188. WEBER TEST

A tuning fork test, it is used only in cases of unilateral loss or in losses characterized by better hearing in ear. It is a test of lateralization. When the handle of the fork is placed on the midline of the skull, the patient reports that the tone is heard in the poorer ear, a conductive impairment is indicated. If tone is heard in the better ear, the impairment is SN. If there is no difference in sensitivity between the ears, the tone will be heard equally in the two ears.

189. WORD DISCRIMINATION

Ref: SPEECH DISCRIMINATION (Pg. 2.46)

190. ZWISLOCKI COUPLER

Reft ZWISLOCKI COUPLER (Pg. 5.34)

AUDIOLOGICAL ASSESSMENT

1. ABLB - ALTERNATE BINAURAL LOUSNESS BALANCE TEST)

It was given by Fowler(1935). It is administered to unilateral SN loss cases to measure recruitment. The tones are presented to the two ears alternatively and the subject is required to make loudness balance. When a difference of threshold sensitivity of 20dB or more is formed between a relatively normal ear and an ear having a SN impairment or when recruitment phenomenon is suspected. It is done only at 5OOHz, 1KHz, 2KHz, aad 4KHz.

2.ACCELERATED SPEECH

Recorded speech that is speeded up in playback and as a result has a higher pitch than the original speech. It is used in CAD tests.

Ref: TIME COMPRESSED SPEECH (Pg.3.32)

3. ACOUSTIC COMPLIANCE (ACOUSTIC CAPACITANCE)

Volume displacement of a sound medium, as air, when struck by sound waves.

4. ACOUSTIC IMMITTANCE

Ref: ACOUSTIC IMPEDANCE (Pg 3.1)

5. ACOUSTIC IMPEDANCE

The opposition to energy flow in most systems is called

as 'impedanee'. Acoustic impedance measured in acoustic ohms refers to the opposition to the flow of acoustic signal. This consists of two components: Acoustic reactance and Acoustie resistance. They are equal in Magnitude but are at right angles to each other.

6. ACOUSTIC INERTANCE

Inertia of the sound medium. It is a part of acoustic impedance and is measured in acoustic ohms.

Ref: ACOUSTIC RESISTANCE [Pg.3.2]

7. ACOUSTIC REISTANCE

Dissipation of energy by friction of the molecules of the wound medium. It is a part of acoustic impedance and ia measured in acoustie ohms.

Ref: ACOUSTIC INERTANCE [Pg.3.2]

8. ACOUSTIC REFLEX

Ref: ACOUSTIC REFLEX (Pg.2.l)

9. ACOUSTIC REFLEX DECAY

A reduction in the size of the acoustie reflex. It is usually measured during the first 5 or l0seC of muscular contraction.

10. ACOUSTIC REFLEX DECAY TEST

50% reflex decay time - LDT (L=50 in Reman Number).

This test is done for farther conformation of retro-eochlear pathology at l0dB above acoustic reflex threshold, at two frequencies (500HZ & 1 KHz).

Ref: ACOUSTIC REFLEX DECAY (Pg.3.2)

11. ACOUSTIC REFLEX THRESHOLD

Minimum intensity of audiometric stimulus which gives a noticeable deflection of the BM needle is the acoustic reflex threshold. In normal ear reflex is present at 8OdB above threshold in both ears.

ART is useful in clinical audiology as it helps in the detection of middle ear pathology, sensory pathology, naural pathology, central pathology, hearing threshold level (HTL) and non-organic hearing loss.

12. AMPLITUDE MODULATION

The change in amplitude of a sound wave, as the ldB increment in the carrier tone used for the SISI.

13. AUDITORY BRAINSTEM RESPONSE (ABR)

This test is carried out by placing electrodes on the scalp and mastoid of the individual being tested. The electrical activity in the auditory is thus recorded. The

latency of response, amplitude and wave form are the important points considered in its interpretation.

14. AUDITORY EVOKED POTENTIAL (AEP)

A compound action potential that occurs anywhere from the 8th cranial nerve to the cortex and that is caused by sound. AEPs are now known as the middle latency response (MLR). Latency is 8-50msec.

15. BADGE-(BEKESY ASCENDING DECENDING GAP EVALUATION)

This test is used for pseudohypocusis cases. Here the patient is required to track his threshold for fixed frequencies over a minute period under four divisions:

- continuous decending
- pulsed ascending
- pulsed descending

Combination of these four modes distorts the patients yardstick and pseudo hypocuais is revealed.

16. BEKESY AUDIOMETRY

Automatic audiometry using an instrument that provides a choice of discrete or continuously varying pure tones from 100 to 10000HZ or higher, and a choice of a pulsed or a continuous sigaal. There are 5 types of audiograms seea

in this audiometry procedures which can be used for differential diagnosing conductive (type 1) cochlear (type 2), retrocochlear(type 3,4) and also pseudo hypo cusis cases(type 5).

17. BMLD - BINAURAL MASKING LEVEL DIFFERENCE

Ref: MLD (Pg.3.20)

18. BRAINSTEM RESPONSE AUDIOMETRY(BRA)

The process whereby the brainstem responses are evoked is called Brainstem Response Audiometry.

In BRA the target and comparison electrodes are usually placed at the vertex and earlobe, respedtively, with a ground at the forehead.

Auditory stimuli used are clicks or rapid rise tone bursts and are repeated between 2 1/2 to 10 times per sec.

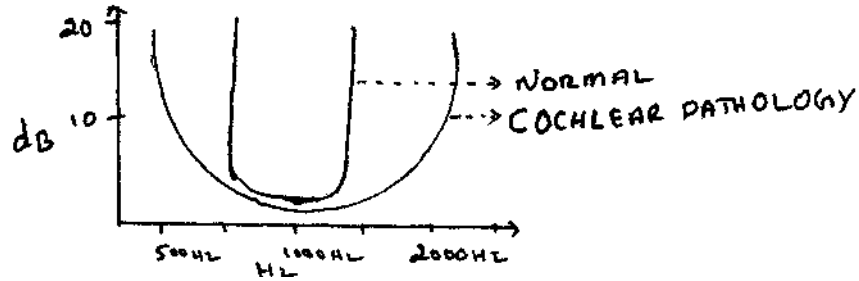
19. BRIEF TONE AUDIOMETRY (BTA)

BTA is a procedure that may be considered the Compli ment of the mere traditional Bekesy audioametry. It examines the relative threshold differences among different duration tones, or more exactly by the threshold difference between 500 and 20 msec tones, and do net take into consi-deration any other clinical findings. l0dB threshold

difference indicates normal hearing, conductive loss and 8th nerve dysfunction. 5dB or less threshold difference indicates SN hearing loss. 15dB or more threshold indicates pseudohypaeusis or temporal like dysfunction.

20. BROADLY TUNNED CURVE

It is drawn intensity Vs frequency of a fibre on a graph. When the threshold is high, the number of stimulated units will increase relatively rapidly with the stimulus intensity.



In cochlear pathology, curve is broadly tuned.

21. BSER - BRAINSTEM EVOKED RESPONSE

It may be an electroencephalography related evoked potential synonymous withthe moment of hearing.

The process whereby the brainstem responses are evoked is called Brain Stem Response Audiometry. The BSER is recorded and the evoked potential is seen to have been peaks which are of diagnostic importance and presumed source of each of these responses is given as below:

(1) The first peak is the compound 8th nerve action potential presumably arising from synchronous discharge of single units in the 8th nerve.

(2) The second peak is presumed to come from cochlear nucleus.

(3) The third from the contrlateral olivary bodies.

(4) The fourth from the ventral nucleus of the lateral lemniscus and preolivary nucleus.

(5) The fifth is presumed to come from the inferior celloculus.

The subsequent waves probably from the medial.BSER is not affected by sedation or sleep.

22. CAD - CENTRAL AUDITORY DYSFUNCTION

This is a disorder in which the following auditory symptoms are seen:

(1) Tinnitus

(2) Auditory hallucinations

(3) Hearing difficulty in highly noisy background

(4) Trouble in localizing sound sources

(5) Trouble following complex auditory directions or system.

23. CALORIC TEST

A test to detect the vestibular system which involves pouring water, either above or below body temperature, into the ear canal and measuring the involuntary eye response which results.

24. CANS - CENTRAL AUDITORY NERVOVS SYSTEM

It begins at the panto medullary functions of the brainstem where the auditory fibres terminate and continues through pons,mid brain (also called lateral laminscus), cerebellum, reticular formation, medial geneculate and primary auditory reception area of the cortex. From this point there are many connection directly or indirectly to areas in each hemisphere. This is the central auditory pathway.

25. CARDIAC EVOKED RESPONSE AUDIOMETRY(CERA)

CERA is a procedure whereby changes in the heart rate are measured following auditory stimulation.

This procedure may used in difficult to test children where routine audiometrieal procedures cannot be carried out.

26. CARHART NOTCH

A dip in the bone conduction audiogrAm of 5dB at 500 and 4000 Hz, l0dB at 1000HZ, and 15dB at 2000HZ. It results from the inability of the fluids to move freely in the cochlea when the footplate of thestapes is firmly fixed in the oval window.

27. COMPARISON OF FORWARD AND REVERSE BEKESY

This test is used to find out retrocochlear pathology by using Bekesy forward tracing (lower to higher frequen-eies) and backward tracing (higher to lower frequencies). If there is a difference between these two tracings, it is indicative of retrocochlear Pathology.

28. CONCEPTUAL AUDITORY PERCEPTUAL TEST (CAPT)

It is used to assess the figure ground discrimination against competing signals of music and speech. The tasks are made progressively difficult by varying the background distractions, the length and kind of words, the S/N ratio etc.

29. CONDUCTIVE SISI TEST

It is a test given by Oyer(1966) to find out BC threshold. Inccase of conductive or mixed loss HL at which 100% SISI results = 60+AC threshold-BC threshold

= 60 + AB gap

BC threshold = 60+AC threshold-HL at which 100% SISI results.

= 60 + AC threshold -60-AB gap

= AC threshold - AB gap

30. CONTINGENT NEGATIVE VARIATION (CNV)

One of the indirect (or mediated) procedures to assess the auditory function is to test the late, slow cortical

responses having latency of 50-300 msec.

In this signals can be either tones or speech given at rate not exceeding 1-2 per sec. CNV is subject to drugs and sleep.

The CNV can be recorded from any place on the skull. The technique requires adequate bandpass in the preamplifiers and sufficient amplification. If adequate paradigms are developed, it may be possible to use a CNV to get insight into children's ability to discriminate speech sounds, environmental noise, etc.

31. CONTINUOUS FREQUENCY TRACING

Ref: SWEEP FREQUENCY TRACING (Pg.3.32)

32. CRITICAL OFF TIME

This is a test to differentiate cochlear and retrocochlear pathology. In SN hearing loss of the codhlear type on-off time is 200 msecs. If the off time is raised then the interrupted tracing behaves like a continuous tracing.

If off time is 125 msec/less - Retrocochlear pathology.
75 msec/less - Cochlear pathology.
45 msec/less - Normal subjects.

33. CONTINUOUS TONE MASKING (CTM)

This test is used to differentiate cochlear and retrocochlear pathology by using Bekesy audiometer, (Katz, 1969). After determining threshold for a pulsed tone, a continuous tone of identical frequency and phase is added ipsilaterally at successive SLS of 10,20, and 30 dB. Thresholds for the pulsed tone are tracked again in the presence of the continuous masking tone. Lower (better) masked thresholds are observed in patients with cochlear lossess while higher thresholds are found in retrocochlear lesions.

34. DECRUITMENT

It is reverse recruitment or decruitment. Abnormally slow growth in the sensation of loudness. It is associated with pathology of the eigKh cranial nerve. It is usually observed if ABLB is administered at 2KHz.

35. DELAYED FEEDBACK AUDIOMETRY (DFA)

In this technique, the subject is asked to tap a particular pattern on a key. This results in the generation of pure tones which are presented through headphone to his ears using an electronic circuit, delays of various durations are brought about in the presentation of these tones. Such a delay in feedback is found to disrupt the rhythm or patternof tapping if the level of presentation is at or above the threshold of hearing.

DFA is used to identify functional hearing loss.

36. DIFFERENCE LIMEN (BE.)

Ref: DIFFERENCE LIMEN (DL) (Pg.2.14)

37. DIFFERENCE LIMEN FOR FREQUENCY (DLF)

Ref: DIFFERENCE LIMEN FOR FREQUENCY (DLF) (Pg.2.14)

38. DIFFERENCE LIMEN FOR INTENSITY (DLI)

Ref: DIFFERENCE LIMEN FOR INTENSITY(DLl)(Pg.2.14)

39. DIFFERENCE LIMEN DIFFERENCE TEST (DLD TEST)

It is a diagnostic test to detect cochlear pathology. The patient is asked to report if the two signals presented to him are different in terms of loudness. Difference limen is thus determined at the intensities viz. 4dBSL and 44dBSL. In case of normal hearing subjects, the difference is very small in those patients with cochlear lesions.

This test is also called the DLI test (Difference Limen for Intensity).

Ref: DIFFERENCE LIMEN FOR INTENSITY (DLI)(Pg.2.14)

40. DIPLACUSIS

It is a condition in which a listener perceives a single pure tone as having a different pitch in each ear.

It is also seen in monoaural.

41. DISCRETE FREQUENCY TRACING

Ref: FIXED FREQUENCY TRACING (PC. 3.16)

42. DOEFTER- STEWART EFFECT

It is a phenomenon described by Doefter-Stewart(1946). Most of the subjects find difficult to maintain consistent suprathreshold response to auditory signals in the presence of several levels of Noise in the same ear.

43. D.S. TEST

It was designed to detect bilateral pseudohypacusis by presenting successive levels of saw tooth noise and spondaic words through both channels of a speech audiometer. While cooperative patients continue to repeat spondees even with noise levels slightly above threshold, patients who exaggerate their thresholds for both the speech and noise become confused.

Ref: DOEFTER-STEWART EFFECT (Pg. 3.13))

44. Electro cochleography (ECOG; ECOCH G)

ECOChG is concerned with very early response. The recording of compound action potentials from the 8th cranial nerve often using an electrode on the promontory of the

cochlea. It is an electrophysiologic record of auditory function. There are two methods of recording : Intra-tympanic method and extratympanic method.

45. ELECTRODERMAL AUDIOMETRY (EDA)

It is a technique used to assess hearing by measuring changes in skin resistance associated with the presentation of an auditory stimulus.

46. ELECTRODERMAL RESPONSE (EDR)

It refers to the change in skin resistance that occurs in response to a stimulus such as an acoustical signal. This response may be conditioned to be used in EDA.

47. ELECTRO MYSTAGMOGRAPHY (EMG)

The recording of eye movements, especially nystagmus, by detecting changes in the electrical potential between the cornea and retina of the eyeball. It uses electrodes placed on the skin near the eyes, usually one pair of electrodes to monitor horizontal movement and another pair to monitor vertical movements. It is a test also for vestibular function.

48. FALL TIME

The time needed for a signal with sudden cessation to decrease from 90 to 10% of its original amplitude.

49. FALSE ENGATIVE

Passing a test that should have been failed; a negative outcome obtained on a test when the true (valid) outcome would have been positive.

50. FALSE POSITIVE

Failure on a test that should have been passed, as the failure of a normally hearing person on hearing screening.

51. FEMEERED SPEECH TEST

It was given by Becca(1954). It is a test to detect the temporal lesions. In this low pass filtered speech with a cut-off frequency of 500Hz is used. PB words ware passed through low-pass filter and presented at 45dB above SRT. Then ear contralateral to the lesion shows poor performance.

52. FISTULA TEST

It is used to find out round window fistula, using impedance audiometry. In this insert probe into the ear canal and introduce -ve and +ve pressure. If the subject experiences nystagmus and dizziness, is indicative of round window fistula.

53. FIT—FUSION INFERRED THERSHOLD TEST

It is aN alternative test for masking, it is based on Stenger principle. Here two identical stimuli are presented simultaneously to both the ears and only the intensity varied. The presentation level in the better ear is at 20dBSL and to the poorer ear at threshold level. The two stimuli are presented simultaneously and the subject is instructed to laterlize the stimulus. Since the louder stimuli laterlized, he will perceive it in the better ear (go on increasing level in the poorer ear by 5dB till he response in the center). Let this level be xdB so the threshold of poorer ear is XdB-20dB. This test is very useful in eases with assymmetrieal hearing loss.

54. FIXED FREQUENCY TRACING

A record of an individual's responses to a given pure tone. It is obtained by automatic audiometry and usually represents threshold.

55. FREQUENCY FOLLOWING RESPONSE. (FFR)

FFR is one of the direct procedures for assessing children's auditory function. It was first reported by March and Worden(1968). FFR procedure, target electrode is fixed at the vertex and different electrodes have been fixed to each ear lobe land a ground electrode to the leg of the subject. A high gain and a high frequency response

preamplifier is necessary with a lower frequency unit set, to allow for passage of the low frequency synchronous discharges. The response is most obvious to tones of 500Hz and below, and can be elicited to a tone whose rise time is as slow as 4.5 m.sec.

FFR is ascribed to frequency locked synchronous discharge of many fibres in the auditory nervous system to low stimulating frequencies.

Source of FFR is not clear but it may be closely related to the 5th wave in the BSER complex.

56. FREQUENCY INCREMENT SENSITIVITY TEST (FIST)

The FIST devised by Campbell(1970). It is similar to SISI. But in this case, unlike in SISI, the intensity is kept constant and frequency is varied.

People with normal cochlea, can detect even 1% increment whereas people having cochlear lesions require atleast 2% increment to detect the difference in frequency.

57. GALVANIC SKIN RESPONSE

Ref: ELECTRODERMAL RESPONSE (Pg. 3.14)

58. INTRA-AURAL REFLEX

Ref: ACOUSTIC REFLEX (Pg.2.1)

59. JERGER BOX PATTERNS

Jergar suggested box pattern for reflex measurement for both contralateral (crossed) and ipsllateral(uncrossed) reflex. Box always indicates probe in the ear. Four boxes used for reflex measurement. It is applicable for detecting conductive, Cochlear, retrocochlear, hearing loss. Hearing less due to intra, extra axial and facial palsy.

Fig. Rt. Lt.

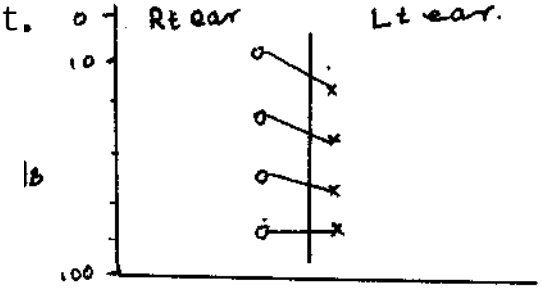
Crossed_____

Uncrossed _____ _____

60. LADDER GRAM

It is a graph in which the ABLB tests result is plotted. In plotting the threshold of both ears is marked sad joined by a line. If laddergram are parallel, then there is no recruitment. If there is adeviation or not parallel ladder gram then there is recruitment.

Fig.



61. LAMBARD EFFECT

When speaking in a noisy environment, we unconsiously increase the intensity of the voice to compensate for the masking effect. Baaed on the phenomenon teats have been used to identify functional loss which is reported in the literature.

62. LAMBARD TEST

It is a subjective test to find pseudohypacusis in bilateral hearing loss eases. Principle is that in a noise environment automatically voice will raise in order to Hear speech. It is automatic sad this effect is called Olsen effect.

63. LATENCY (LATENT PERIOD)

The interval between a stimulus and its response. It may be specified as the time elapsing between a reference point on the signal and a reference point on the response. There are four types of latency response in ERA.

(1) Early response with latency of 4-8 msec.
(2) Middle response with latency of 8-50 msec.
(3) Late response with latency of 50-300 msec.
(4) Very late response with latency of greater than 300msec.

64. LENGTHENED OFF TIME (LOT)

This is a more sensitive test than type Vth Bekesy audiogram. In normal Bekesy audiometry an off-time is 200msecs. Separation between continuous and interrupted tracing can be increased by 15dB or more by increasing the off-time to 800maecs.

65. LOGAN STIMULUS

This stimulus is produced by passing DC pulse through

narrow band pass filter. These are amplitude modulated sine wave. The amplitude is modulated using Saussian noise.

It is characterised by three peaks in a 50% negative, 100% positive and 50% negative sequence followed by a 50% +ve, 100%-ve and 50% +ve sequence reversing on each successive stimulus. These stimuli are used in BSBRA.

66. MLB - MONOAURAL LOUDNESS BALANCE

This test is adminstered to bilateral SN loss eases. Here the tones are presented alternatively to the same ear for brief intervals. The subject is required to make the loudness balance to tones, usually at 500HZ tone is used. In most of the SN loss cases, select the frequency so that there should be a normal hearing. With that frequency tone, ether frequency tone is given to make a loudneas balance (1 KHz, 2KHz, 4KHz, and 8KHz).

67. MLD -MASKING LEVEL DIFFERENCE

An improvement in a puretone or speech threshold measured binaurally in a background of noise. It occurs when the phase relationship is changed from signal and noise in phase to either the signal or the noise out of phase in one ear compared to the other ear. It is used to detect brain stem lesion.

68. MODIFIED ASCENDING BEKESY (MAB)

Frisina - Johnson(l966) developed a modified ascending Bekesy (MAB) technique which required the subject to make a single depression of the response key upon perception of the auditory stimulus. When a response key was depressed, a timer automatically attenuated the stimulus for a specified time and reinitiated the stimulus man ascending presentation. The investigator's used a step-by-procedure for acquiring stimulus control.

It was also found that once vibrotactile to auditory generalization had been accomplished, intervening instructions or generalization between frequencies was not necessary.

69. MODIFIED RAINVILLE TEST (M.R. TEST)

The MR test was a modification of the Rainville test reported by Lightfoot(1960).

Measures were made of the effects of bone conduction masking upon thresholds for an air conducted tone, white, noise, which serves as the masking agent and is presented through an oscillator that is placed upon the forehead. Measures are made of the level of noise just required to mask out the pure tone presented through an air conduction receiver. The obtained results are compared with those obtained with a format hearing group. The difference

between the two levels is the patients bone conduction : hearing loss. It is possible with this technique to obtain a measure of SN hearing loss.

In this test poorer thresholds are obtained for lower frequencies for conductive and mixed hearing loss which may be due to the occlusion effect produced by the placing of earphones over the ear while noise is being presented through the bone vibrator.

70. MODIFIED RHYME TEST (MRT)

This is a speech discrimination task making use of a closed response paradigm. Each list has 50 items of which 25 items test the discrimination in initial position, and 25 in the final position. The subject is given a choice of six rhyming words of which is the stimulus word. Subject's task is to listen and indicate which of these words he heard.

Reft RHYME TEST (Pg. 3.26)

71. NOISE DETECTION THERSHOLD (NDT)

The NDT needs to be calculated in the Doeftar-Stewart test which was developed to detect binaural pseudohypacusis where the test compares responses to speech versus noise.

NDT is determined following simple instructions to the patients such as "I am introducing a noise in your ears

again. Raise your hand as soon as you hear the aoise even if it is very faint, put your hand down when the noise goes away". The NOISE is increased from -l0dBHL in 5dB steps , and should be interrupted before each increase. After obtaining ascending, descending and ascending threshold for noise, the reading is accorded as NDT.

72. NOISE INTERFERENCE LEVEL (NIL.)

The NIL needs to be calculated in the Doefler-Stewart test which was developed to detect binaural pseudohypacusis where the test compares responses to speech versus noise. NIL is established by raising the noise level from odBHL and is brought up in l0dB steps until a level 20dB below the SRT, 5dB is reduced (which is another value calculated for the test). Then the increments may be in steps of 5dB or spondee until the patient no longer repeats spondees. The point at which he does not repeat any of the spondees is the NIL.

Ref: D.S. TEST (Pg. 3.13)

73. OLSEN AND NOFFSINGER TDT (1974)

It is a better method than Carhart's becuase it consumes less time. The patient is seated on armed chair and following instruction is given to the patient : As long as you hear the tone, keep your hand perpendicular

to the arm rest and when the tone becomes noise, bend your hand at 45^0 and place your hand at arm rest when the tone becomes inaudible.

PROCEDURE: Present the tone at 20dBSL (i.e. 20dB above the threshold) continuously for one minute. If the subject hears the tone for one minute, the test is said to be negative. If the subject hears after seconds and stops responding, increase the intensity in 5dB steps without interrupting the tone and begin the timing. Continue this procedure until 35dBSL. If the patient fails to hear for one minute even at 353BSL, the test is said to be +ve. Tone decay - Hearing level at which the subject hears for minutes-threshold less than 30dB in cochlear pathology and greater than 35dB in retrocochlear pathology. TDT is performed for 500Hz, 1KHz, 2KHz, and 4KHz. If at 500Hz, TDT is +ve, then at 1KHz, 2KHz and 4KHz also TD is +ve usually. It is most reliable test which we use in our clinic.

Ref : tone decay test [Pg:3.33]

74. PSEUDOHYPACUSIS

It is a non-organic or functional hearing loss and it is a hearing disorder that is pretended, exaggerated or Mysterical.

75. PVT - PHYSICAL VOLUME TEST

PVT test was devised by Northern and Down's(1978). When the impedance probe emits the probe tone into an ear canal with an intact ear drum, the meter will balance at a cubic centimeter value of 1.0 to 1.5cc in normal adult; the PVT reading in normal children is .7cc to 1 cc approx. If the tympanic membrane is not totally intact, the physical volume will be large or more than 5.0 cc.

76. RAPID ALTERNATING SPEECH PERCEPTION TEST (RASP TEST)

It is usual in identifying lesions in the lower brain stem usually those in pens. It is a binaural test making use of sentences. The same sentence is presented to both ears but is repidly alternated between the two ears, (once in 200 msec.). These sentences are presented at 50dB SL ref. SRT). A score of 90-95% is obtained when normal hearing subjects are tested with these sentences patients with brainstem lesions obtain very poor scores due to the difficulty in the fusion of messages delivered to the two ears.

77. RECRUITMENT

A phenomenon described by Fowler(1935). It is an abnormally rapid growth of loudness as intensity of the sound is increased. It is associated with cochlear pathology. Hence ABLB is test for cochlear pathology and also it is administered for unilateral cases.

78. REFRACTORY PERIOD

Ref: REFRACTORY PERIOD (Pg.2.38)

79. RESPIRATORY AUDIOMETRY

It was developed by Canestrini(1913). It refers to the assessment of auditory sensitivity in terms of alteration in respiratory cycle consequent to acoustic stimulation.

80. RHYME TEST (RT)

Fairbanks devised the RT which is a completion type of test requiring the subject to supply the initial consonant to a 'stem' and the subject has the list of 50 stems. He writes the missing letter as he hears the word pronounced by the speakers The words are selected so that there are atleast 5 rhyming choices the subject can make for each word. With this test, it is easy to categorize the constant errors the subject makes.

81. RISE TIME

The timerrequired for a signal of sudden onset to go from 10 to 90% of its maximum amplitude.

82. SENSORY ACUITY LEVEL TEST

Ref: SAL TEST (Pg.2.41)

83. SHIFTING VOICE TEST (SVT) OR STORY TEST

It is a test for pseudohypacusis of unilateral type. The tester narrates the story and shift the speech output right to left ear and vice versa. Sometimes presented binaurally. The tester knows which part of the story goes to which ear. The intensity is kept constant. The objective is to confuse the patient. At the end of the story, the tester asks questions related to the suspected ear. If he replies correctly, it indicates pseudohypacusis.

84. SHORT DURATION STIMULI

A stimulus of short duration refers to any stimulus whose duration is less than one second? but especially less than 200 msec. It is used in brief tone audiometry.

85. SISI -(Short Increment Sensitivity Index Teat)

It is the modification of the DL test proposed by Jerger etal (1959). Principle of thistest is patient with cochlear pathology can detect ldB increment at 20dBSL, whereas normals cannot detect ldB increment at 20dB SL. It is adminsitered for 500Hz, 1 KHz, 2KHz and 4 KHz frequencies.

86..SOCIAL ADEQUACY INDEX (SAI)

The social adequacy index is a measure developed at the Central Institute for the Deaf, which is based on speech audiometry and represents the degree of handicap

as far as hearing and understanding speech are concerned.

The SAI is computed from the results of the SRT and articulation test. It can be found by means of a table in which the two dimension are SRT and discrimination loss. In the original research on SAI, each patient was given three PB tests. One at a level of 33dB, one at 48dB, and at 63dB all levels in relation to zero SRT. These three hearing levels had been empirically defined as the average levels of faint, average and loud conversational speech respectively. The scores made by the patient en these 3 tests were averaged and the resalt was called the SAI.

87. SPAR -SENSITIVITY PREDICTION WITH THE ACOUSTIC REFLEX

This test was given by Jerger et al (1974a) to predict the degree of hearing loss using acoustic reflex by impedance audiometry. He stated that noise tone difference (NTD) is more in normals i.e. threshold difference for noise and tone. If the NTD > 20 indicates normal hearing, NTD 10 — 20 indicates mild to moderate hearing loss and NTD=10 indicates severe SN hearing loss. Reflex threshold for pure tones are at higher level than those for noise.

88. SPEECH INTELLIGIBILITY IN NOISE (SPIN)

It is a complete and rationalized sentence test developed by Kalikow, Stevens & Elliot(1977). The SPIN

test tests the listener's ability to utilize both the linguistic situational information contained in sentences with the acoustic phonetic discriminations which must be made to identify lew probability words embedded in sentences.

89. SSI - SYNTHETIC SENTENCE IDENTIFICATION

It is a test of CAD. This test makes use of third order approximation to real sentences. The number of words and the sentence length in the list to approximately equal. The patient's task is to identify the sentence and indicate the number (usually by pushing appropriate button or switch).

As this test is observed to be very easy and quiet, it is usually presented with ipsilateral competing message (ICM). Scores on the SSI - ICH is observed to be useful in detecting SN hearing losses.

90. SSW TEST - STAGGERED SPONDAIC WORD TEST

It is a test of CAD designed by Katz. The items in this consist of binaurally competing spondaic words. The second half or monosyllable of the first word and the first half of the second word overlap. The patient's task is to repeat both the spondees in the same sequence as during the stimulus presentation.

C-SSN - The Corrected SSW (C-SSW) accounts for lowered discrimination scores.

A-SSW - The adjusted SSW (A-SSW) offers compensation for non-auditory errors (such as response bias).

91. STATIC ACOUSTIC IMMITTANCE

The volume of air that is equivalent in acoustic compliance to that of the M.B. It is expressed in milli liters or cubic centimeters.

Ref: ACOUSTIC IMMITTANCE (Pg. 31)

93. STATIC COMPLIANCE (Cs)

$Cs = C_2 - C_1$

C_2 = large volume of air = vol. of air in EAM + compliance of tympanic membrane.

C_1 = volume of the air in EAM.

REF: STATIC ACOUSTIC IMMITTANCE (Pg. 3.30)

93. STAT (SUPRATHRESHOLD ADAPTATION TEST

Jerger and Jerger (1975).

PROCEDURE: Present the tone ll0dBSPL to the test ear and noise at 90 dBSPL to the non-test ear. If the subject hears for 1 minute, the test is said to be -ve. If not the test is +ve. NO need of increasing the intensity.

To cheek the reliability, the pulsed tone to the test ear is presented for 1 minute with noise in the NTE. If the subject does not hear, that means he has understood the instructions. If there is decay of pulsed tones, repeat the test.

1000HZ at 105 dBHL - 110 dB SPL
500 & 2000Hz at lOOdBHL - 110 dBSPL.

This test is not reliable for higher frequencies above 2KHz and also if the hearing loss is more than 80dB.

94. STERGER PRINCIPLE (EFFECT)

When two tones of same frequency and of different intensity are introduced simultaneously into both ears, only the louder tone will be perceived? used to identify unilateral functional hearing loss. Even speech can be made use of.

95. STENGER TEST

It is a subjective test to find out pseudohypacusis and is done in unilateral hearing loss cases. It is based on the lateralization phenomenon, i.e. when two tones of same frequency but at different intensities are presented simultaneously to a normal hearing subject, the subject hears only in the ear which receives higher intensity.

Present a higher intensity tone to poorer ear (ldB difference).

96. SWAMI - SPEECH WITH ALTERNATING MASKING INDEX

Here, PB words are presented simultaneously to both ears at 40 dBSL(Ref: SRT) . 0.5sec bursts of white noise is presented at 20dB above speech level and this is alternated between the two ears.

A normal hearing individual can easily discriminate the words, as it is lateralized to the centre, while noise is heard alternately at the two ears. On the other hand an individual with CAD performs poorly as he experiences difficulty with spatial separations of the signal from noise.

97. SHEEP FREQUENCY TRACING

A record of an individuals responses puretone as they gradually change in frequency as from 100 to 10000HL.

98. TIME-COMPRESSED SPEECH

Recorded speech that is speeded up electronically or electroMechanically, but with no change in pitch. It is used in CAB tests.

Ref: ACCELERATED SPEECH (Pg.3.1)

99. TOM TEST - THRESHOLD OCTAVE MASKING TEST

This is a test to determine the susceptibility of the subject to NIHL.

Tow may be explained using an example. Introduce a 2KHz tone at threshold level. Then introduce to the same ear a 1KHz tone and find the intensity required to mask the 2KHz tone. This identify is the Tom value for 2KHz. The 1KHz tone will be able to mask the 2KHz by producing harmonics.

Thus the normative data can be collected by finding average TOM values for normal subjects. If a given subject's TOM value is less than the average TOM value [50dBHL] it would be said that he is more susceptible to NIHL.

100. TONE DECAY (AUDITORY ADAPTATION OR FATIGUE)

The decrease in hearing sensitivity caused by exposure to a tone and followed by rapid return to normal sensitivity.

101. TONE DECAY TEST (TDT)

This is a test for retrocochlear pathology (area between cochlea and dorsal cochlear nucleus). There are many methods like Carharts TDT(1957); Resenberg TDT(1958); Owens TDT(1964); Jerger and Jerger(1975)(STAT); Green's modified TDT (MTDT)(1960) and Olsen's and Noffsingers TDT (1974).

Ref: Olsen & Noffsinger TDT(1974) (Pg.3.23)

102. TYMPANOGRAM

A graph showing compliance, impedance, etc. of the middle ear as a function of air pressure against the eardrum membrane, it provides valuable information for detection, identification and differential diagnosis of ME disorders.

103. TYMPANOMETERY

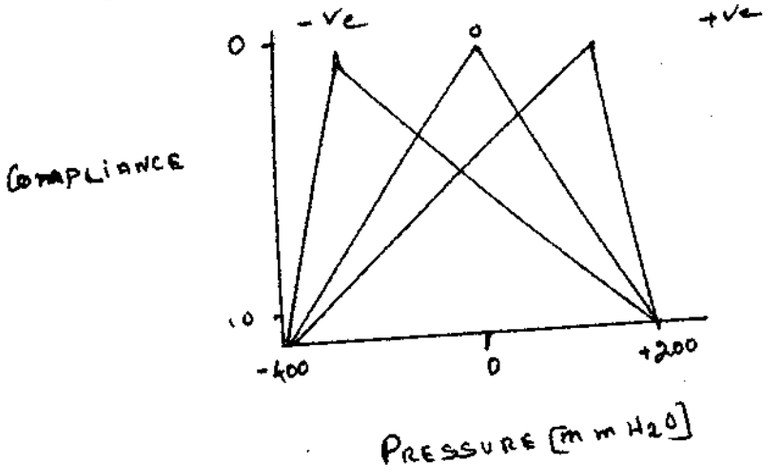
The term tympanometry was coined by Terkildsen V (Feldman, 1976c). The measurement of the ease with which sound flows through the eardrum membrane While air pressure against the membrane is varied, it deals with pressure compliance relationship (Harford, 1975). It tells how the compliance of the eardrum changes canal. (10 - lowest compliance; 0 - most/max, compliance).

104. WILLIAMS PRESSURE SHALLOW TEST

A test for assessing eustachian tube function by using tympanometry. First obtain the tympanogram using the usual procedure. Then introduce +200MM H_2O Pressure into the ear canal and ask the subject to swallow water 3-4 times. Then obtain the tympanogram. This will give a shift to me -ve side as -ve pressure is created in the ME. Adjust the pressure to zero and ask the subject to swallow water 3-4 times. ET opens and pressure is

equalized. Now introduce -400mm H_20 and do the same procedure. Obtain tympanogram. It will be shifted towards the +ve side as +ve pressure is created in the ME. In normal, above changes occur, if ET is blocked, the tympanogram remains in the same position.

Fig.



MANAGEMENT OF AURALLY HANDICAPPED

1. ACOUPEDIC METHOD OR APPROACH

A technique of teaching hearing impaired children to speak and use their hearing, it emphasises auditory training begun early and used alone rather than combined with visual training (speech reading instruction) and tactile training.

2. AMERICAN SIGN LANGUAGE (ASL)

This includes the signs used by deaf for communication. Each sign is characterised by a specific hand shape, position movement and orientation associated with it. The signs of ASL are observed to be closely related to the French sign than the British sign.

3. **AMERIND - AMERICAN INDIAN SIGN LANGUAGE**

It is a kind of sign language used by the community of American Indians.

4. AMESLAN

Ref, AMERICAN SIGN LANGUAGE(pg.4.1)

5. ANALYTIC METHOD OR APPROACH

A technique of teaching speech reading that emphasises the visual recognition of individual speech sounds.

6. AND PROCEDURE - ADMISSION, REVIEW AND DISMISSAL PROCEDURE

It is the process by which a child's diagnostic reports are reviewed and appropriate educational placement is recommended. In addition, the child's individual educational plan is written.

7. AUDITORY TRAINING

Teaching a hearing impaired individual to make the best possible use of his residual hearing by structured practice in listening, hearing aid use, learning to modify communicative situations, etc. It is ordinarily integrated with other training, such as speech reading instruction, vocabulary development, etc. as needed.

8. AUDITORY TRAINERS

It is an amplification system used in auditory training and it is a completely portable unit that can be taken into almost every situation that a child or adult may encounter. There are different types, hard wire trainers, desk-type trainers, wearable trainers, loop induction system, and Fm systems.

9. AURAL - ORAL METHOD OR APPROACH

(Oral - aural method or approach)

A technique of teaching hearing impaired children that uses speech, speech reading and hearing, but not

signing and finger spelling.

10. AURAL REHABILITATION (AUDIOLOGIC HABILITATION)

Therapy for a hearing impaired person that can include auditory, visual and other sense training; speech and language therapy; and counselling and guidance.

11. BARRY'S SLATE METHOD

This method used 5 different slates for different parts of the sentences. Each slate would have one part of the sentences. First subject, second verb, Third (direct) object, fourth preposition, fifth (preposition) object.

12. COCHLEAR IMPLANTS

Ref: COCHLEAR IMPLANTS (Pg.5.7)

13. COUPLED Fm SYSTEM

The combination of an Fm amplification system (for mobility) with a loop amplification system (for inconspicuous ear-level hearing aids). It routes the signal picked up by a student's Fm receiver to a wire loop around his neck, where the signal is then picked up by the telecoils of his ear-level hearing aid.

14. CRITICAL AGE CONCEPT

It was proposed by Leninberg ia 1967. Language is innate and learat progressively with maturation. There is an optimum time during which it will develop. Once this age is crossed language cannot be learnt.

15. CUE

A signal, as a speech sound or lip movement that communicates a message to a listener.

Any nonverbal signal that evokes a response.

16. CUED SPEECH

The use of speech accompanied by hand position(Cues) near the mouth. The hand positions convey in formation about voicing, etc. of speech sounds, but by themselves they convey no message.

17. DEAFNESS MANAGEMENT QUOTIENT (DMQ)

This is used to predict as to which of the children would learn best through auditory oral approach, and which of them would do better with total communication. This may be considered while integrating the deaf children into normal schools. This quotient is calculated by taking into account the factors of residual hearing, central intactness, intellectual ability, the family constellation

and socio-economic status.

18. EARLY IDENTIFICATION

It involves a number of procedure to detect hearing loss at an early age. It is useful because it is easier to teach at an early age, early intervention will lead to better speech and language abilities and have social development.

19. ELECTEC METHOD APPROACH

A technique of instruction or therapy that uses procedures, materials, etc. selected from various other methods.

20. ELECTRONIC HAND WRITER

Ref: ELECTRONIC HAND WRITER (Pg.5.11)

21. ELEMENTARY AGE FULL INTEGRATION (EFI)

There are children of elementary age who have moderate hearing losses who are candidates for integration into a regular classroom either on a full-time or part-time basis.

The minimum requirements for full integration of the elementary level were (1) no greater than a moderate (70dB HL) pure tone average hearing loss, (2) no greater than a severe (90dBHL) high frequency average (HFA, the average

of the thresholds at 4000HZ and 8000Hz). (3) aural functioning of 62% or better correct response to a test of sentence and paragraph understanding, (4) oral functioning of 78% or better on a test similar to that cued to assess aural functioning (5) an English background (6) parents who had a high school education and more (7) good parental contact with the school (8) an IQ's of no less than 90 and (10) diagnosis of hearing impairment no later than age 7, with a hearing aid being fitted to later than age 8.

22. ELEMENTARY AGE WITH INITERANT HELP (EIH)

These are the hearing impaired children of elementary age who are to be integrated but who need initernat help side by side. There are some criteria for partial integration of the elementary age children.

(1) Severe hearing losses in the case of PTA.
(2) Profound higher frequency average.
(3) Slightly lower aural functioning (58%).
(4) Slightly lower IQ.
(5) Slightly younger age (5.5 years) for a hearing aid fitting.

23. EPSDT - EARLY PERIODIC SCREENING, DIAGNOSIS AND TREATMENT

The EPSDT, established in 1967 under title XIX of the Social Secutiry Act, is a federally sponsored medicaid enactment. It is administered by each state in which

medicaid eligible families may volunteer to participate and may be managed by the helath department or the Welfare Department. The program is intended to provide a comprehensive range of health care services to children of medicaid eligible families. The program provides basic health screening and treatment. Hearing testing is included in the screening and also in the treatment scheme.

24. FINGER SPELLING

A form of manual communication in which each letter of the alphabet is represented by a different position of the fingers, some times accompanied by a movement, visual speech.

Ref: SPEECH READING (Pg.4.13)

25. FITZGERALD'S KEY

Fitzgerald(1929) proposed this method which makes use of question forms as well as symbols to teaCh language to the hearing impaired children.

26. FM AMPLIFICATION SYSTEM

A system in which the teacher wears a microphone and an Frequency Modulated (FM) transmitter that broadcasts his voice to students who wear combination FM receivers and hearing aids. It can be used inside or outside the classroom.

27. FRICTION INDICATOR

Ref: FRICTION INDICATOR (Pg. 5.13)

28. HARDWIRE SYSTEM

Ref: HARDWIRE SYSTEM (Pg. 5.14)

29. HEARING AID

Ref: HEARING AID (Pp.65.15)

30. HEARING PROBLEMS INVENTORY - ATLANTA

This was a self-assessment instrument developed by Hutton(1980). The inventory consists of 51 items, many of which were selected from other instruments and modified to fit the HPI - A format.

31. INDUCTION LOOP AMPLIFICATION SYSTEM

A system that uses a teacher's microphone, an amplifier and a wire loop strung around the classroom. It allows hearing impaired students anywhere in the room to wear hearing aids that pick up (a) the teacher's voice by magnetic induction using a telecoil and (b) airborne sound with an environmental microphone.

32. INTENSITY INDICATOR

Ref: INTENSITY INDICATOR (Pg. 5.17)

33. JENA METHOD

It was given by Bunger(1952). Jena is the name of a place, it is a method of speech reading, and emphasises on three aspects - rhythm, imitation and kinesthesia. Main activity is similar to shadowing called vocal or sub-vocal imitation. Rhythm training is also given to the person. It starts with syllables from non-meaningful to meaningful then move on to speech, words and sentences.

34. JOHN-TRACT CLINIC

A clinic in Los Angeles which specializes in deaf children of preschool age and concentrates on training parents to help their own deaf children.

35. MAGNETIC INDUCTION

The genration of electric voltage in an induction coil by aa alternating magnetic field. For example, a telephone or a loop amplification system creates an alternating magnetic field that produces an electric signal in the telecoil of a hearing aid.

36. MULTISENSORY APPROACH

A technique of teaching hearing impaired children to speak and use their hearing. It emphasises auditory training begun early and combined with visual training (speech reading) and tactile training.

37. NASALITY INDICATOR

Reft NASALITY INDICATOR (Pg.5.22)

38. NATURAL METHOD

This method proposed by Father VanVolen, is also called maternal reflective method. It makes use of natural ways which parents use to communicate with their child, in this method the goals, therapy are not structured.

39. PIDGIN SIGN ENGLISH (PSE)

It includes the intermediate sign language varietie s on the continuous between sign (Ameslan) and English. Pidgin English shares some of the characteristics of Ameslan and some of English, although the grammar of each language is reduced to a certain extent.

40. ROCHESTER METHOD OR APPROACH

A communication system used with deaf children that combines finger spelling with speech.

41. PROGRAMMED METHOD

This is a structured approach in which specific goals are planned, implemented and executed in controlled environmental setting. Grammatical method, wing's symbol, Barry's five slate system and Fitzgerald key comes under this method.

42. REHABILITATION

Helping a handicapped person to restored or partially restored function by means of therapy, prostheses, etc. (Rehabilitation and habilitation are often used interchangeably, although rehabilitation implies that the person concerned had normal function and lost it while habilitation suggests that the person never functioned normally).

43. REVERBERATION

The prolongation of sound by reflections, usually from hard surfaces such as walls and time taken for a signal to reduce by 60dB is called Reverberation Time.

44. REVERBERATION TIME

Ref: REVERBERATION TIME[Pg:6-27]

45. 'S' indicator

Reft FRICTION INDICATOR (Pg. 5.13)

46. SAFA - SELECTIVE AUDIO FILTER AMPLIFIER

Ref: SAFA (Pg. 5.27)

47. SECONDARY AGE FULL INTEGRATION (SEI)

There are the hearing impaired children of secondary age groups who are candidates to be considered for full

integration.

The minimum requirements for candidates for SFI are: (1) higher oral functioning (86%) , (2) slightly older age for hearing aid fitting (9 years), (3) profound high frequency average losses.

48. SECONDARY AGE PARTIAL INTEGRATION (SPI)

There are the hearing impaired children who are candidates to be considered for partial integration into a regular classroom.

The minmum requirements for these candidates are:

(1) severe hearing loss in the ease of PTA.
(2) profound MFA losses for the four groups.
(3) high oral functioning (86%).
(4) higher IQ (IQs of 95).
(5) later age of diagnosis(9 years) and for hearing aid fitting (age of 9 years).

49. SECONDARY AGE WITH INITERANT HELP (SIH)

There are the hearing impaired children from secondary age groups who are candidates to be considered for integration with initerant help side-by-side.

The minimum requirements for candidates for SIH are:

(1) Profound high frequency average losses.
(2) Slightly higher oral functioning (86%)
(3) High 10 (IQs of 97).
(4) Slightly later age of diagnosis (9 years)
(5) Slightly higher age of hearing aid fitting (9 years).

50. SIGN LANGUAGE

A form of manual communication in which words and concepts are represented by hand positions, movements, facial expression, etc.

Ref: AMERICAN SIGH LANGUAGE (Pg. 4.1)
AMERIND (Pg.4.1) AND
PIDGIN SIGN ENGLISH (Pg. 4.10)

51. SPEECH READING

Lip reading, in the broad sense; recognition of a speaker's words by watching his lips, facial expressions, gestures, etc. as well as using closure, rules of language, contextual cues etc.

52. SYNTHETIC APPROACH

It was advocated by Edward Bartlett. He advocated that the use of synthetic techniques is dedicated to the concept that the ability to predict meaning, rather than identifying individual speech component, should be the

paramount aim in visual communication training. The exponents of this approach recognize the value inherent in linguistic and situational constraints.

53. VIBROTACTILE AIDS

Ref: TACTILE AIDS (Pg. 5.30)

54. TADOMA METHOD

It was method named after two deaf blind students 'Tad' and'Oma'. In this speech reading method, thumb is placed on the speaker's lips and the rest of the fingers fanned on the cheeks, coming towards the jaw.

55. TELETYPE WRITER

Ref: TELETYPE! WRITER (Pg. 5.31)

56. VERBOTONAL METHOD OR APPROACH

A technique of teaching speech and language to hearing-impaired individuals. Its uses: (a) amplification of the frequencies a person hears best, delivered auditorily through headphones and tactitely by a vibrator, and (b) practice in phonation combined with physical movements that exemplify each phoneme in tension and words that are heard, as a list of 50 monosyllables.

57. VISIBLE SPEECH

Audible speech patterns which have been transformed by electronic apparatus into visual patterns which may be read by the deaf.

58. VOISCOPE

Ref: VOISCOPE (pg.5.34)

59. UNISENSROY APPROACH

Ref: ACOUPEDIC APPROACH (Pg.4.1)

60. WING'S SYMBOLS

It was given by Wing(1833). The letters, words and clauses are represented by numbers and symbols. This method gives information regarding syntax various part of the sentences.

AMPLIFICATION DEVICES FOR THE HEARING IMPAIRED

1. ACOUSTIC GAIN

The acoustic gain of a hearing aid is the amount in decibels, by which the sound pressure level developed by the hearing aid earphone in a specific coupler exceeds the SPL at the mic opening of the hearing aid. According to ISI, Hearing aid may be classified as hearing mild gain, moderate gain, and strong gain if they have a gain of 45dB, 55dB, and 65dB respectively.

2. AIR CONDUCTION HEARING AID

Is a type of hearing aid designed to present amplified sound pressure waves directly from the earcanal to cochlea through middle ear.

3. ALL-IN-THE-EAR MOLD

It is used in ITE hearing aids. There are two styles; mold is designed with all instrumentation contained within the earmold itself and other is modular in that it inserts into a specially designed mold.

4. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

It publishes specifications for the manufacture of instruments and for test procedures. Relavent ANSI standards for speech and hearing are those related to audiometers, hearing aids, background noise levels, calibration, procedure

for obtaining articulation curves. These documents are priced publications.

5. AMERICAN SPEECH AND HEARING ASSOCIATION (ASHA)

This was founded as the American Academy of Speech Correction in 1925. The name ASHA was adopted in 1947. In late 70s the new name ASLHA (American Speech Language & Hearing Association) was coined. It publishes the following journals:

J.S.H.D. Journal of Speech and Hearing Disorders.
J.S.H.R. Journal of Speech and Hearing Research.
J.S.H.A. Journal of American Speech and Hearing Association.

These are available to the members. Different types of membership are available. In accredits training programs and clinical services. It has a certification program for clinical services in Speech Pathology and in Audiology separately.

The goals of ASHA are : (1) to encourage research in relation to speech, hearing and language, (2) to promote investigation of communication disorders, (3) to improve clinical procedures used with these disorders , and (4) to stimulate exchange of information among individuals and organizations engaged in these activities.

6. AMPLIFIER

An electric amplifier is a system with electric signals at both input and output designed and used properly. The amplifier of a hearing aid will be relatively linear and its self-noise will be low. The weak electric signal generated at the mic is coupled to the amplier which increase its amplitude (Voltage). There are different types:

(1) Class A or 3-5 Single-ended amplifier consists of amplifier stage,

(2) Class B or push pull amplifier, etc.

7. ANECHOICE CHAMBER

It is a specially designed room which has reverberation time of '0' sec. and the cut off frequency at least 10-15% lower than the desired cut-off frequency for the room.

This chamber provides free field conditions that are required in speech and hearing research.

Also used in calibration of microphones, loud speakers and measurements of hearing aids.

8. ASSISTTVE LISTENING DEVICES (ALD)

ALDs are products designed to solve one Or more specific listening problems created by a hearing loss. ALD are grouped into (1) listening device eg. personal ALDs and

and group ALBs which use the auditory mode only (2) telephone devices eg. TTYs (3) Alert/alarm devices eg. vibro alarm, burglar etc.

9. AUDITORY TRAINERS

Ref: AUDITORY TRAINERS (Pg. 4.2)

10. AUTOMATIC GAIN CONTROL (AGC)

The automatic reduction in the output of a hearing aid, a few milli seconds after a certain input sound level has been reached. It helps to prevent user discomfort from loud sounds and does not distort the input.

11. AUTOMATIC VOLUME CONTROL (AVC)

Ref: AUTOMATIC GAIN CONTROL (Pg.5.4)

12. BATTERIES

It is a reservoir of energy. This electrical source of power possesses a large number of electrons at one point and considerably fewer at another and is an electrical storage cell. The energy is stored in the chemical state and is transformed into electrical energy through electro chemical conversion when needed. Mercury cells, silver oxide cells and zinc air cells are commonly used in hearing aids.

$$\text{Battery life(hours)} = \frac{\text{Battery capacity(milliampere-hrs)}}{\text{Battery current drain(Milliampere)}}$$

13. B.C. HEARING AID

Is a type of hearing aid designed to present amplified sound pressure waves to the inner ear through a bone receiver (bone oscillator or bone vibrator) held against the bone behind the ear (mastoid process).

14. BEHIND THE EAR HEARING AID (BTE HEARING AID)

A hearing aid that hangs behind the ear and usually attaches to the tube leading into the ear canal. Example: BTE Arphi EBO Super; BTE Elkon AMB Model.

15. BICROS HEARING AID (BILATERAL CONTRALATERAL ROUTING OF SIGNALS)

A hearing aid with two microphones, one at each ear, that lead to a single amplifier and receiver. It is for a person with usable hearing in only one ear.

16. BINAURAL HEARING RIDS

Two complete hearing aids, one for each ear and binaural amplification bringing improvement in speech discrimination and also allows better understanding of speech in the presence of background noise. It is used for who have asymmetrical hearing loss.

17. BODY BAFFLE EFFECT

Is a phenomenon referred to by Erber(1973). The effect on the response of a conventional hearing aid when it is worn on the body especially under clothing. The greatest attenuation is in the l000Hz - 2500Hz frequencies. (5-15 dB decreased).

18. BOBY LEVEL HEARING AID

A hearing aid with a microphone, amplifier and battery worn on the chest and a cord connected receiver worn at the ear. Example: Arphi, Elkon BM 79, Alps etc.

19. BOHA - BINAURAL HEARING WITH ONE HEARING AID

This term was coined by Harford and Musket(1964). They reported improved discrimination in 3 of 8 aided unilaterals when PB lists were directed towards their aided ears, in comparison with an identical unaided condition.

They attributed their findings to restoration of binaural hearing. Raster and Tillman(1964) concluded that binaural superiority was primarily attributable to the reduction of head shadow effect afforded by that position as opposed to nonaural listening. This advantage results in a substantial improvement in discrimination.

Disadvantage is that it cannot be used in cases of unilateral losses where the poor ear is rendered unfit

for hearing aid use.

20. BORE (SOUND BORE)

The hole in an earmold through which amplified sound passes into the ear canal.

21. CANAL HEARING RED

A hearing aid that fits mostly in the ear canal with a small part of it extending into the concha. It has a case molded to fit the user's ear.

22. CANAL MOLD

It consist of the canal portion and can be used for mild or moderate gain instruments. It is comfortable to wear, and has maximum cosmetic appeal.

23. COCHLEAR IMPLANT

It is a device in which an electrode or electrodes placed in the cochlea and attached to an induction coil buried under the skin near the ear. In association with a unit worn on the body, it provides limited hearing to those who cannot benefit from conventional hearing aids. It works in this way: A sound is first picked up by a microphone mounted near the ear; then the signal is routed to a body worn unit for amplification and amplitude modulation, sent to an induction coil against the skin over

the buried coil, picked up through magnetic induction by the buried coil, and conveyed to the electrode (s) in the cochlea that electrically stimulate(s) neurons of the eighth nerve.

24. COMPARATIVE PROCEDURES

Ref: SELECTIVE PROCEDURES (Pg.5.27)

25. COMPRESSION AMPLIFICATION

The use of automatic gain control to limit the maximum power output of a hearing aid. it does not distort the wave form of the input.

26. CORDS OF A HEARING AID

The cords of a hearing aid are tight, flexible, insulated wires that carry the current from the amplifier to the receiver. Cords are to bade light, flexible and some time mechanically strong. There are different types of cords: (1) Two wire cords or Three wire cords; (2) TWO pin cords, Three pin cords, and Single pin cords.

27. COUPLED FM SYSTEM

Ref: Coupled FM System (Pg. 4.3)

28. CRICROS

A cross hearing aid. It is used for the same reason as power cros, but by those who want binaural amplification.

The microphone located on the left side of the head feeds on earphone on the right while the microphone on the right side routes its signal to the left ear.

Ref: POWER CROS (Pg.5.25)

29. CHOS

Contralateral routing of signals. An amplifying system which provides a microphone to pick up signals (sound pressure waves) on the side of the impaired ear and send them electrically to the normal ear in cases of unilateral hearing loss. Sometimes known as across-head fitting.

30. DEAD ROOM

Ref: ANECHOIC CHAMBER (Pg. 5.3)

31. DIGITAL HEARING AID

An instrument that converts the electric signal from the microphone to digital valves: modifies them according to rules stored in a microcomputer and converts them back to an electric signal fed to the earphone.

32. DISTORTION

A change in a sound or wave form causing unfaithful or inexact reproduction.

Ref: HARMONIC DISTORTION (Pg. 5.15)
INTERMODULATION DISTORTION (Pg. 5.18)and
TRANSIENT DISTORTION (Pg.5.31)

33. EAR MOLD

It is a plastic or silicone insert designed to conduct the amplified sound from the hearing aid receiver to the ear and provides an acoustic seal to minimize the possibility of feedback. The earmold and its related tabes and cavities are an integral determinant of the hearing aid's acoustic output.

The function of an earmold is:

- to provide a sound channel from the hearing aid receiver to the tympanic membrane.
- to modify the acoustical signal after it is transduced by the receiver.
- to serve as an anchor for ear level hearing aids, affording retention of the aid to the ear.

34. EFFECTIVE GAIN

The difference between a person's aided and unaided thresholds for speech.

35. ELECTROACOUSTIC CHARACTERISTICS

The changes affected in signal as it is transduced from acoustic to electric to acoustic energy are known as

electroacoustic characteristics. There are different types of standards for measurement of hearing aid electroacoustic characteristics.

1. HAIC Standard
2. ANSI Standard
3. ISI Standard

36. ELECTRONIC HAND WRITER

It is used with the telephone or direct wire connection is used to send or receive hand written messages across the distance. This system is mainly used in hospitals, industry, and business to speech communication.

37. EYE GLASS HEARING AID

A hearing aid built into one or both temples of eye flass frames. The greater distance from the mic to receiver in an eye glass aid as compared to an ear level aid which permits the use of greater amount of amplification without feedback, as in the CROS aids. Example: Alps 078549, Danavox 29791. There are both AC and BC types of eyeglass hearing aids.

38. F.M. AMPLIFICATION

Ref: F.M. AMPLIFICATION (Pg. 4.7)

39. FOCAL CROS

It is a CROS type aid in which the microphone was placed in the ear canal of the wearer's poor ear and this placement was important to utilize the sound collecting and the orienting properties of the outer ear. From the microphone signals wave transmitted electrically across the head to feed a bone conduction receiver on the side of the good ear. This arrangement left the good ear open to receive unamplified signals.

40. FREQUENCY RANGE

The frequency range of an aid refers to the useful range of frequency response. According to ISI shall be in 250 Hz to 3150 Hz.

41. FREQUENCY RESPONSE

It is an expression of the relative gain across frequency.

Ref: FREQUENCY RESPONSE CURVE (Pg.5.12)

42. FREQUENCY RESPONSE CURVE

A graph of frequency by intensity with respect to given reference level. For example, a graph of how faithfully a hearing aid reproduces input frequencies of 200 to 5000HZ at 60dB sound pressure level.

43. FREQUENCY TRANSPOSITION

It is a rehabilitative tool introduced by Perwitzchky (1925). It is useful for those hearing impaired individuals who have response only in low frequency. The information content in high frequency is trsnposed into low frequency., so that it becomes audible. This is frequency transposition and is attained by using an electronic device, called as frequency transposition hearing aids.

44. FRICTION INDICATOR

It is also a part of the Kostics apparatus. This device consists of a microphone, a filter which cuts off signals below 2KHz and a visual display. This help the deaf individual monitor the intensity of friction. His task is to produce friction eg. sound, and maintain the pointer within a specified limit.

45. FROS - FRONT ROUTING OF SIGNALS

FROS stands for Front Routing of Signals. In this mic places on the eye glasses somewhere near the midline of the patients head or atleast near the front of the temple bar on the same side as the hearing aid thereby some separation achieved between mic and receiver. It is used by those who require more amplification.

46. FULL-ON ACOUSTIC GAIN

At a specified frequency and under essentially linear input - output conditions, the acoustic gain obtainable from the hearing aid. Measured with the gain control at maximum (Full-on) and at stated setting of the other hearing aid controls.

47. FUNCTIONAL GAIN

The difference between a person's aided and unaided thresholds, as for pure tones.

48. GAIN

The amount in dB, a hearing aid or other amplification system increases an input sound.

Gain : Output - Input

49. HALF SHELL

It is a variation of the shell mold. The base of the mold covers only about half of the concha bowl, that portion of the lower concha covering the canal opening, fillings the tragus and antitragus areas. It is a good mold for mild to moderate losses.

50. HARDWIRE SYSTEM

It is one of the oldest auditory training devices in which an audio signal is distributed to the student

by direct electrical wiring.

51. HARMONIC DISTORTION

Frequencies in the output, as of a hearing aid, that are whole number multiples (greater than one) of the input frequency.

52. HERD SHADOW EFFECT

Is a phenomenon described by Tillman, et al(1963). The difference in reception at each ear created by the interposition of the head especially when sound waves come from the side i.e. the signal intensity will be lower at the ear farthest from the source (far ear) than at the ear closest to the source (near ear). This effect is greater for high frequencies (15-30dB above 2KHz) than low frequencies (6 to 7dB below 2 KHz). The near ear SRT will be 6.4DB better than that of the far ear.

53. HEARING AID

It is an electronic amplifying device to make sounds audible to the individual with a hearing loss. Sound pressure waves are converted into electricity by a micro-phone. The electric impulses are then amplified through controlled electronic circuitry. Theamplified electric impulses are then reconverted by a receiver to pressure

waves at a much more intense level to be presented to the impaired ear.

54. HEARING AID EVALUATION

A procedure used to choose suitable amplification for an individual. It is based on history, test findings, observations and other considerations.

55. HEARING AID INDUSTRY CONFERENCE (HAIC)

The HAIC has specified methods for the measurement of electroacoustic characteristics of hearing aids, such as gain, maximum power output, frequency response has also given definitions of terms related to the same.

56. HEARING AID ORIENTATION

One or more sessions in which an audiologist or other person teaches an individual the proper use of his new hearing aid(s).

57. HEARING AID SELECTION

Ref: HEARING AID EVALUATION (Pg. 5.16)

58. HICROS - HIGH FREQUENCY CROS

Ref: POWER CROS (Pg. 5.25)

59. HORN

A tapered sound tube used with a hearing aid. It has as its largest diameter the opening into the ear. In this the low frequency resonance points of the horn are shifted upward in frequency.

60. INDUCTION LOOP SYSTEM

Ref: INDUCTION LOOP SYSTEM (Pg. 48)

61. INSERTION GAIN

This is the difference between the SPL at the eardrum of a subject using a hearing and and the SPL at the eardrum of the same subject without the hearing aid.

62. IN SITU GAIN

This is the difference between the SPL at the eardrum of a subject using a hearing aid and the SPL in the free field at the position of the subject in the anechoic chamber room when subject is not present.

63. INTENSITY INDICATOR

This device is a part of the Kostics apparatus. This display consists of five light bulbs. The extreme bulb on the right is marked "too loud" and the extreme on the left is marked "too soft" and middle three bulbs normal. By speaking into a microphone attached to the device, the

Child receives direct visual feedback of the intensity level of his voice.

Ref: KOSTICS APPARATUS (Pg. 5.20)

64. INTERMOCULATION DISTORTION (IMD)

Frequencies in the output, as of a hearing aid, that are not in the input, but are sum and difference tones of the input frequencies. For example: 1MB of input frequencies 300 and 500Hz would produce a sum tone of 800Hz and a difference tone of 200Hz.

65. IN-THE-EAR HEARIGN AID (ITE HEARING AID)

A hearing aid that fits entirely in the concha of the ear. It has a case molded to fit the user's ear and an overall shape like a standard(receiver) earmold.

66. ISI - INDIAN STANDARD INSTITUTE

The Indian Standard Institute was established in 1947 by a resolution of the Government of India with the active support of industry, and scientific and technical organi-sations. It is an autonomous body. The functions of ISI are to prepare standards relating to products, commodities, Materials and processes and the promotion of their general adoption on national and international level, to promote standardization, quality control and simplification in

in industry and commerce; to coordinate the efforts of producers and users for the improvement of materials, products, appliance, processes and methods? to provide for the registration of standardisation marks applicable to undertake circulation of statistics and other information relating to standardisation. The publications of ISI are annual report, ISI Bulletin(1949), ISI Hand Book, Sectional lists of Indian Standards, Standards monthly addition.

67. IROS - Ipsilateral Routing of Signals

IROS stands for Ipsilateral routing of signals. It is an earlevel hearing aid used with an open mold. It is usually selected for a person with a mold, high frequency loss of hearing sensitivity. Otherwise feedback becomes a problem.

68. KEMAR

KEMAR stands for Knowles Electronics Manikin for Acoustic Research. A model that simulates the acoustic properties of an average adult head and torso. If incorporates a Zwislocki coupler and is used in the measurement of hearing aid performance.

69. KOSTICS APPARATUS

Kostic designed an equipment which consisted of devices to provide visual, tactile and auditory feedback. The Kostics apparatus are: SAFA, intensity indicator, friction indicator, nasal indicator, and tactile aids.

70. LYBARGERS FORMULA

It was proposed by Lybarger(1953). It is one method of prescriptive procedure of hearing aid selection. It is based on a one half gain rule for hearing aid fitting based on the unaided average hearing threshold level using the following formulae:

Maximum gain = Operating gain + Reserve gain

$$\text{Output gain} = \frac{\text{PTA(500Hz, 2K)}}{2 + \text{Correction factor for AB gap + 5dB.}}$$

71. MAGNETIC INDUCTION

Ref: MAGNETIC INDUCTION (Pg. 4.9)

72. MASTER HEARING AIDS

It is an instrument which simulate some of the operating characteristics of hearing aids. In this the maximum gain, maximum power output, and some frequency response characteristics can be varied. It has been used in clinical evaluation in two ways: (1) with optimal

settings, to establish a baseline against which actual hearing aids are compared to find an appropriate hearing aid; and (2) by varying characteristics of the master hearing aid until best performance by the patient is secured, and then seeking an actual hearing aid which reflects these characteristics.

73. MAXIMUM ACOUSTIC GAIN

This is the highest possible acoustic gain that can be obtained from the hearing aid at the specified frequency.

74. MAXIMUM POWER OUTPUT (HPO)

Ref: SSPL (Pg. 5.29)and

SSPL90 (Pg.5.29)

75. MICROPHONE

It is an acoustic mechanoelectric transducer in that it converts acoustic energy to mechanical energy which, in turn, is converted to electrical energy. Example: Carbon mic, Ceramic mic, electret mic, etc.

76. MIRRORING OF THE AUDIOGRAM

It is a one method of prescriptive procedure and was described by West in 1937. This method is based on hearing the frequency gain characteristic of a hearing aid mirror and the hearing loss as indicated on the pure tone audiogram.

77. MONAURAL HEARING AIDS

It is a hearing aid in which only one ear is stimulated. Such aids are used in cases whose one ear has some residual hearing and the other ear is profoundly affected.

78. MULTI CROS

It is CROS for the sophisticated user. It is achieved by putting an Off-On switch on each microphone of a Bi CROS aid. In this aid, by manipulating these on-off switches, the user can change the aid from CROS to BiCROS to conventional monoaural aid at will.

79. NASALITY INDICATOR

This is a part of the Kostics apparatus. The two bands of frequencies are extracted and amplified through an amplifier i.e. around 1 KHz. The resultant signal triggers a light bulb when it reaches a certain level.

80. OBJECTIVE TECHNIQUE

It is a one method of hearing aid selection. These technique (i.e. those requiring no active participation) are those utilising the middle ear acoustic reflex and the auditory evoked potentials.

81. OPEN EAR GAIN

This is the difference between the SPL at the ear

drum of a subject and the SPL in the freefield at the position of the subject in the anechoic room when the subject is not present.

82. OSPL-90

The output SPL for an Input SPL of 90dB at a specified frequency is the SPL produced in an acoustic coupler with an input SPL of 90dB at specified frequency and the gain control being in the full-on position. The OSPL-90 curve is the OSPL 90 expressed as a function of frequency.

The average OSPL-90 is the average of 1KHz, 1.6KHz, and 2.5 KHz values of OSPL-90.

83. PEAK CLIPPING

It is a form of output limiting. It is characteristic of all simple amplifiers and occurs when the output stage of the amplifier is driven beyond its power handling capability (past overload or saturation points). The peak clipping level can be fixed or variable. The saturation level described earlier utilizes peak clipping. If variable, the peak clipping level can be set below the saturation point to prevent intensities beyond tolerance limits from reaching a recruiting ear.

84. PERSONAL HEARING AID

A hearing aid belonging to a student and used by the student outside the classroom. If worn in the classroom, it is sometimes used in conjunction with a group hearing aid.

85. PHONE DEAFNESS

This describes the condition of a person's hearing aid which serves well in all situations except in a particular situation when the aid is incompatible with the telephone.

86. POGO:I

It stands for prescription of gain output. It is a one method of prescriptive procedure of hearing aid selection and was given by McCandless and Lyregaord(1983). This is mainly based on the half gain rule of Lybarger and includes an additional reduction of the gain at low frequencies (at 250Hz, ½ HTL - l0dB, at 500Hz, ½ HTL-5dB). This method is restricted to the SN hearing loss cases with recruitment.

Ref: LYBARGER'S FORMULA (Pg. 5.20)

87. POGO:II

It is modification of POGO-1 given by Berger(1977). In this method the long term aided speech spectrum is placed between

the listener's most comfortable level(MCL) and his londness discomfort level.

Formula for POGO-II :

(a) For hearing loss 65dB

Insertion gain - ½ HL-C ;

where C = l0dB at 250Hz and 5dB at 500HZ.

(b) For hearing loss 65dB

Insertion gain = ½ HL-C+½ (HL=65)

where C = lOdB at 250 Hz and 5dB at 500Hz.

This formulae is supported only for patients with mild to moderate SN hearing loss.

Ref: POGO - I (Pg. 5.24)

88. POSITIVE VENTING VALVE (PVV)

It is a cup shaped plastic insert that is pierced at the thin bottom wall with holes of varying diameters. It is widely using vent. It offered more low frequency attenuation below 400Hz.

89. POWER CROS

A CROS hearing aid for a person who gets excessive feedback from a conventional ear level aid. It reduces feedback by interposing the head between the receiver and microphone. It is used in unilateral hearing loss cases.

90. PRESCRIPTIVE PROCEDURES

It is a one method of hearing aid selection given by Ross(1978). This prescriptive refers to the tailoring of frequency response curve of a hearing aid in performance with the client's audiogram.

91. PSEUDOBINAURAL HEARING AIDS

It is an arrangement in which the sounds are collected and transduced through one microphone and supplied to two receiver (or ears).

92. REAL EAR GAIN

Ref: FUNCTIONAL GAIN (Pg.5.14)

93. RECEIVER

Ref: Earphone Receiver - Both AC(pg 2.16) & BC (Pg.2.9)

94. REFERENCE TEST GAIN (RTG)

The acoustic gain of the hearing aid at the reference test frequency with the setting of the gain control to the RTG control position.

The RTG control position is the setting of the hearing aid gain control which provides an output SPL in the coupler of ± 15dB less than OSPL-90 for an input SPL of 60dB at the reference test frequency.

95. 'S' INDICATOR

Ref: FRICTION INDICATOR (Pg. 5.13)

96. SAFA - SELECTIVE AUDIO FILTER AMPLIFIER

This apparatus consists of 27 independent units processing a segment of the frequency specturm from 95Hz-10KHz. The instrument is adjusted to match the Childs audiogram. The selectors produce eight different patterns of amplification for groups of children with mild to severe hearing loss. The total signal is amplified by 40dB and the flexible parts of each pattern can vary by 40dB.

97. SELECT-A-VENTS (SAV)

The SAV, like the variable venting valves(VVV) also allows for modified venting size. This procedure requires a selection of one of six plastic Inserts of the following diameters: 3.96mm , 3.18mm ; 2.38mm , 1.59mm ; 0.79mm ? and an occluding plug. The desired vent size is then inserted into a 4.62 mm diameter vent which is drilled into the earmold. A study by Svng, Sura, & Hodgson(1975) reported increased low frequency attenuation as SAV vent size was increased.

98. SELECTIVE PROCEDURES

It was developed by Charhat(1946). Selective means that from the already preselected hearing aids (may be three to four hearing aids). From that select the appro-

priate one using the following criteria.

(1) Effective gain

(2) Tolerance limit

(3) Efficiency in noise

(4) Word discrimination

99. SHELL MOLD

It is used with BTE and eyeglass temple aids. It offers maximum occlusion of the ear as the earmold fills the concha completely and yet has excellent cosmetic qualities and is used to great advantage in fitting more severe losses where higher levels of gain and output are needed. It is useful for patients of severe and profound hearing loss who require tight fitting mold.

100. SIX C.C.COUPLER

Ref: SIX C.C. COUPLER (Pg.2.44)

101. SKELETON MOLD

It is used with BTE and eyeglass hearing aids. It is style as the shell mold with the centre of the bowl portion removed, leaving instead a 'ring' around the posterior perimeter of the concha for retention. It is used with mild and moderate gain hearing aids. The skeleton mold and its variations are the most widely used earmolds today.

102. SSPL

The Saturation Sound Pressure Level (SSPL) valve represents the maximum root mean square 9rms) SPL obtainable in the coupler from an earphone of a hearing aid. This maximum output limitation may be used as a safety factor against sounds that might be harmful or uncomfortable.

Three step procedure to measure: (1) gain control is turned full on and aid is placed in test position, (2) at a given frequency, the freefield SPL is increased until additional increase results in no increase in the coupler SPL(the hearing aid output), (3) the procedure is,step 2 may be repeated at enough frequencies across the range 200-5000HZ to define the shape of the saturation curve. _

103. SSPL-90 SATURATION SOUND PRESSURE LEVEL-90

The SSPL will not be measured using the point-by-point manual method. Instead the hearing aid gain will be set to full-on and a saturation curve will be obtained in the range from 2200 to 5000Hz using a constant input SPL of 90dB. Average saturation sound pressure level will be calculated from the valves at the frequencies of 1000, 1600, and 2500Hz. The resultant figure shall be referred to as high frequency (HF) average SSPL-90. The tolerance

applied to HF average SSPL-90 is such that the value shall be within ±4dB of the manufacturer's specified value for the model.

104. STANDARD MOLD / REGULAR MOLD

It is a fall, solid mold with a metal or plastic snapring for the appropriate size nubbin to hold an external receiver directly to earmold. It is used in body level and ear level hearing aids. It is used when the least amount of acoustic modification of the signal is desired or when a high gain is needed.

105. TACTILE AIDS

A device was developed by Boothroyed(1981) which consisted of a hand worn bone Conduction vibrator attached to a mitt. The vibrator is connected by means of a cord to the output of a powerful wearable hearing aid. The vibrotactile sensations received in addition to the limited sound stimulation through the hearing aid enhanced the speech reading abilities of the ease. This aid can also be used in natural conditions of speech.

106. TELECOIL.

It is a part of hearing aid in which a different mode of input is accommodated in hearing aids by a telephone coil, more commonly called a telecoil. The purpose is to

allow a hearing impaired person to utilize their hearing aids to amplify signals transmitted via telephone. The principle of operation is the induction of current flow by magnetic lines of force cutting across a conductor.

107. TELE TYPEWRITER

Equipment that permits a deaf person tO send and receive printed messages by telephone.

108. TONE CONTROL

It is a complicated arrangement of condenser and resistance. It may be placed ahead of the first stage or between stages. It changes the relative strength of the high and low frequency tones in the signal that passes through it.

109. TRANSIENT DISTORTION

It occurs whenever the hearing aid is unable to duplicate the initial sharp attack (rise time) or the sudden decay (fall time) of a sound.

110. 3/4 SKELETON MOLD

It is a variation of skeleton mold. In this the central portion of the concha rim has been removed. Some ear have little or no under cuts in the outer portion of the concha, thus affording no retentive features. The

3/4 skeleton mold also called as phantom or 'phanto' mold.

111. TROUBLE SHOOTING HEARING AED

It refers to tracing and correcting faults in machinery. Trouble shooting of hearing aid is therefore the process of tracing and rectifying defects in hearing aid. By learning to trouble shoot a hearing aid, the user can detect the sources of defect and rectify them, to a certain extent

112. TUBING

It is used in the ear level and eyeglass hearing aids. These hearing aids are required a plastic tube from the receiver nozzle or elbow to the ear mold. The NAEL(197O) adopted standard tubing size designations. The specifications' for this tubing are 0.062x0.125. 'ID' refers to the inside diameter in 1000s of an inch and 'OD' is the outside diameter.

113. TWO C.C. COUPLER ($2cm^3$ coupler)

A device that couples a hearing aid receiver to the microphone of a sound level meter. It has a hard-walled 2cc cavity as specified by ANSI Standard3.3.1960.

114. VARIABLE VENTING VALVE (VVV)

It was described by Griffting and Shields(1972).

In this venting arrangement allows a continuously variable adjustment of the vent diameter by use of a screw type knob located on the face of the earmold. In this vent the frequency response can be altered to suit the individuals needs. In this vent, there is a considerable reduction in low frequencies.

115. VENTING

It is a hole drilled from the face of an earmold to its sound input channel, or parallel to this channel, intentionally producing a sound leak. Hearing response can alter depending upon length and diameter of the vent.

FUNCTIONS:

(1) It releases sound pressure in the EAM
(2) It improves the quality of sound heard by the user.
(3) It changes the response of the aid. So it is used to obtain better speech discrimination and user comfort.

There are two types of vents based on the locations: (1) parallel vent,and (2) diagonal vent.

116. VIBROALARM

This Assistive Listening Device (ALD) is beneficial for the deaf. The alarm which usually uses sound stimuli is replaced by vibratory stimuli. The vibratory device can be worn on the wrist and the vibration act as an alarm.

117. VOISCOPE

It was developed by King Sparker(1981). The Voiscope is a visual display of certain speech patterns which can be used to help hearing impaired children and adults to improve their speech perception and production. It is based on a piece of equipment called the Laryngograph.

118. VOLUME CONTROL

A volume control or gain control makes it possible to adjust the overall gain for a hearing aid to inter-mediate valves. It is usually a resistance that is provided with a sliding contact. It is usually located between stages of the electric amplifier.

119. ZELNICK FORMULA

It is one method of prescriptive procedure, Zelnick (1982) has suggested formulae for gain for the following:

(1) Average HAIL gain = MCL+20dB-65dB+10dB

(2) Average high frequency(HF)gain = MCL+20dB-55dB+10dB

(3) Reference Test Gain(RTG) = MCL+20dB-55dB

Based on this Hearing aid is selected.

120. ZWISLOCKI COUPLER

A device that couples a hearing aid receiver to the microphone of a sound level meter. Its acoustic impedance is more like that of a human ear than is the 2cc coupler.

NOISE MEASUREMENT AND HEARING CONSERVATION

1. AAOO-AMERICAN ACADEMY OF OPTHALAOMOLOGY AND OTOLARYNGOLOGY

AAOO's method of computing percentage hearing impairement is used extensively in medicolegal cases. It is calculated by considering the loss in speech frequency.

2. ABSORPTION

The concept of absorption in acoustics refers to the loss in energy occuring when a sound wave stikes and is reflected off of a given surface.

3. ACCELEROMETER

Is used to measure vibrations produces on electrical signal with its voltage proportional to acceleration of the device. In this instead of mic, transducer is used. This helps in picking up vibrations during noise measurements. It is connected to a preamplifier which is connected to the SLM and octave band filter set. It converts vibrations into electrical energy.

4. ACOUSTIC TRAUMA

Damage to hearing from a sudden, high intensity sound such as an explosion.

5. ADAPTORS

These are the electroacoustic actuators. They make it possible to use microphones with different diameter

diaphragms namely ½", ¼", 1/8" with SLM and gives better frequency response and omnidirectivity.

6. AFR - AIR FORCE REGULATION

The U.S. Air Force began a hearing conservation program including monitoring audiometry. The procedure to carry out this program is specified in the AFR-160-3. The aim of this program is to ensure that no individual sustains a hearing loss and 15dB for pure tones at 500, ± 1000 and 2000HZ. It also recommends ear protection when sound pressure level exceeds 85dB at any of the form oetave bands in the range of 300HZ to 4800Hz. Ear protection is mandatory when the level exceeds 95dB at any of these bands. These recommendation apply to continuous exposure of 8 hours deviation.

7. AMA — AMERICAN MEDICAL ASSOCIATION

AMA had prescribed a specific method of calculation of percentage of hearing loss. This was modified by AAOO.

8. AMBIKNT NOISE

It is the background noise present in the environment. Same times this may also be present in the instrumentation in the form of hum or hiss.

9. AMPLIFIER

REF: AMPLIFIER (Pg.5.3)

10. AMPLITUDE - SENSITIVE DEVICES

They are special types of ear protectors. These are designed in such a way that they attenuate load sounds more than quiet ones.

Ref: EPD (Pg. 6.10)

11. ANNOYANCE

It is a general feeling of displeasure or aversive-ness towards a noise source believed to have a harmful effect upon a person's health and well-being.

12. ANSI - AMERICAN NATIONAL STANDARDS INSTITUTE

Ref: AMERICAN NATIONAL STANDARDS INSTITUTE(Pg. 5.1)

13. ARTICULATION INDEX

It is a measure used to assess the intelligibility of speech in the presence of noise. Noise levels at l/3rd octave intervals are plotted on a graph with the frequency on the X-axis and the intensity on Y-axis. This is compared with the upper carve of the reference graph. The number of dots between this curve and the graph drawn

for a given noise is divided by 100 to calculate the AI.

An AI of 0.3 indicates an unsatisfactory condition for communication. An AI of 0.5 to 0.7 is considered to be good and above 0.7 is said to provide a very good condition for communication. The minimum limits for AI are 0 and 1 respectively.

14. ASHA - AMERICAN SPEECH AND HEARING ASSOCIATION

Ref: AMERICAN SPEECH & HEARING ASS0CIAT10N (Pg.5.2)

15. 'A' WEIGHTING NETWORK (dB'A')

This is one of the four weighting network available on measuring instruments which are used to assess the magnitude of acoustic signals such as noise. This scale is used when the interest is in knowing the response of the human ear to the stimuli of interest.

The frequency response of the 'A' weighting network is similar to the 40 phon curve. However, it does not mean that this weighting network is to be used only while measuring noises of this level.

16. BEH - U.S.BUREAU FOR THE EDUCATION OF THE HANDICAPPED

This came into being in 1967. It protects the interest of handicapped children from random and arbitary

periodic administrative reorganizations. It is responsible for the total program for the education of the handicapped children. It has established a national advisory committee for the handicapped to assist the bureau in its development.

17. BIS - BUREAU OF INDIAN STANDARDS

Ref : ISI (P_9 :5.18)
INDIAN STANDARDS INSTITUTE

18. BROAD-BAND NOISE (compley noise)

A sound in which energy is present over a wide range of frequencies. The energy per cycle is equal and it is used for masking in speech audiometry.

19. 'B' WEIGHTING NETWORK (dB'B')

It is the unit of intensity measured on the 'B' scale. The 'B' weighted network has a frequency response similar to the 70 phon curve. The 'B' weighting network is not commonly used.

20. CAOHC - COUNCIL FOR ACCREDITATION IN OCCUPATIONAL HEARING CONSERVATION.

It conducts training programs for personal taking part in hearing conservation. This program meets the guidelines of the inter society committee on audiometric technician training.

These training programs are directed by a professional holding an instructer's certificate issued by CAOHC. All personal conducting industrial tests should have accreditation as occupational hearing conservationists from the CAOHC.

21. CEQ - COUNCIL ON ENVIRONMENTAL QUALITY

This is an advisory body in the Office of the U.S. President. Its purpose is to advise the President on the impact of various federal activities on the national environment and to maintain continued supervision on such activities. It is required to establish a system for monitoring indicators of environmental quality, maintenance of comprehensive records on the status of the environment and ensuring the maintenance of comprehensive data which may be required for taking decisions on environmental problems.

22. CHABA- COUNSEL ON HEARING BIOACOUSTICS AND BIOMECHANICS

This was established as a result of a request by the Office of Surgeon General of U.S. Army to reevaluate the damage risk criteria based on new information available. CHABA established the basic criteria of the acceptability of noise exposures that would result in NIPTS. after 10 years of almost daily exposure. The NIPTS values were 10dB at 1KHz, and below 20dB at 2KHz, 30dB at 3KHz and above. A series of damage risk contours from which the maximum allowable time per day for exposure to steady state intermittent noise could be determined.

23. 'C' WEIGHTIN NETWORK (dB'C)

It is the unit of intensity measured on the 'C'scale. The 'C' weighted network has a flat frequency response. This network is used to measure ambient noise levels in sound treated roam, in calculating the sound level correction.

24. DAMAGE RISK CRITERIA (DRC)

It specifies the maximum level of noise to which an individual may be exposed for a given duration and length of time without the risk of requiring hearing loss. The values specified vary depending upon the type of noise whether continuous or interrupted etc. For every 3dB increase in aoise level, the duration of exposure must be halved.

25. DRY NIGHT EQUIVALENT SOUND LEVEL (Ldn)

Ldn is the Leq(equivalent level) for a 24 hours period with a correction of lOdB added to the single event noise level occtiring in the night time (10pm - 7am).

26. DER - DEPARTMENT OF ENVIRONMENTAL REGULATIONS

Daring the period from 1973 to 1978 the Florida Department of Environmental Regulation carried out a program where in the DER funded six of the state universities to assist communities and countries in the development of noise control programs.

Included in these activities were noise ordinance development surveys to support ordinances training, some equipment loans and support a particular problem. This program organised by the DER proved to be an interesting model in the preparation of the nationwide effort.

27. DIFFRACTION

It is any deviation of wave motion away from straight line propagation.

28. DIFFUSE SOUND FIELD

It is produced by multiple reflections from obstacles or barries in which the acoustic energy per unit volume is essentially constant through out.

29. DIRECTIONAL MICROPHONE

A microphone that is more responsive to sound approaching from a certain direction.

30. DOSIMETER

It is aa electronic instrument used ia noise measurement. It was designed to successively accumulate a weighted sound energy over durations of 10 seconds. The weighting function was essentially flat from SOOHz to 1000HZ. There are 3 types of sound level dosimeter. They are: (1) Stationery noise dosemeter

(2) Ear borne dosemeter

(3) Pocket size personal noise dosemeter.

31. 'D' WEIGHTING NETWORK (dB'D')

It is the unit of intensity measured on the 'D' Scale. The 'D' weighted network has a frequency response similar to the 40 PN dB carve. This network is employed while measuring air craft noise.

32. EAR MUFFS

A pair of hard, dome shaped coverings worn over the ears to protect hearing against noise damage.

Ref: EPD (Pg. 6.10)

33. EAR PLUGS

Devices inserted into the ear canals to protect hearing against noise damage. Types of ear plugs are: (1) prefabricated earplugs, (2) disposable and (3) malleable ear plugs.

Ref: EPD (Pg. 6.10)

34. EAR PROTECTIVE DEVICES - EPD

EPDs are personal hearing protective devices which when worned appropriately by an individual,provide the most effective means of eliminating a potential hazard to hearing. They are capable of reducing the noise level at the ear by 10 to 50dB. Types of EPDs: ear plugs, ear muffs, helmets and Special types: (1) Frequency selective devices (2) Amplitude sensitive devices.

Ref: EAR MUFF (Pg. 6.9); EAR PLUG (Pg. 6.10)
FREQUENCY SELECTIVE DEVICE (Pg.6.13)
AMPLITUDE SENSITIVE DEVICE (Pg.6.3)

35. EPA - ENVIRONMENTAL PRODUCTION AGENCY

This agency is primarily concerned with the noise omitted by machines and vehicles. The EPA is expected to publish regulations and noise emission standards which must be performance standards. Once these are published

the manufacturers must inform the customers that the products meet the federal noise standards. The products must be labeled so that the prospective customers are advised of the level of the noise the product will emit. The product on sale for noise reduction properties must be labeled to describe the effectiveness. Also, in importing equipment conformity to the specifications must be ensured. The requirements of the EPA have been published as the noise control act, 1973. In case of violation, legal action may be taken by private individual.

36. EPNL - EFFECTIVE PERCEIVED NOISE LEVEL

This measure is used for estimating the effective noise of a single noise event such as an aircraft flyover.

It is derived from the instantaneous PNL values by applying corrections for any pure tons that may be present and for the duration of *the* noise EPNL=PNL+C+D. Where 'C' is the tone correction and 'D' is the duration correction.

The unit is EPN dB. EPNL evaluates four factors of the aircraft noises absolute level, broadband frequency distribution (spectrum) maximum tone and flyover duration.

37. EQUAL LOUDNESS CONTOUR

Ref: EQUAL-LOUDNESS CONTOUR (Pg. 2.18)

38. FAR FIELD

The far field is that region beyond the near field where the inverse square law is obeyed.

Ref: INVERSE SQUARE LAW (Pg. 6.16)

39. FDA - FOOD AND DROG ADMINISTRATION

The FDA has proposed regulations on hearing aids. They cover four aspects: (1) the types of information to be included in labelling, to provide the professionals and patients into adequate directions for safe and effective use of hearing aid, (2) the technical performance data to be included, (3) sale of hearing aids restricted only to those patients who have undergone medical evaluation with in the past six months, (4) cancellation of purchase with in 30 days of sale.

40. FEDERAL AVIATION REGULATION (FAR)

FAR is comprised of 5 significant noise control regulations which have been prescribed by the Federal Aviation Association and have a substantial influence on the design, development and operation of aircraft. The part numbers of the 5 noise control regulations of the FAR are: FAR36, FAR 9-55, FAR 21-183(e), FAR 36 amended, and FAR 21.

41. FREE FIELD

Ref: FREE FIELD (Pg. 7.7)

42. FREQUENCY ANALYZER

(1) The combination of a sound level meter and an octave band or 1/3 octave band filter used to determine the level of each band of a complex sound.

(2) A system that instantaneously displays on a screen (cathode ray tube) a graph of amplitude versus frequency of the signal input.

There are three types of noise analyzers:

i. Octave, half octave and third octave band widths.
ii. Constant band width.
iii. Constant percentage narrow band.

43. FREQUENCY – SELECTIVE DEVICES

It is a special type of ear protector. In this an acoustic low pass filter is usually fitted with these type of devices ensuring relatively small attenuation below 2KHz. This filter allows the lower speech frequencies to be passed.

Ref: EPD (Pg. 6.10)

44. FTC - FEDERAL TRADE COMMISSION

Established in 1949, this commission evaluates the franchise system of hearing aid, industry. The FTC has been putting out 'cease or desist' orders to companies for false advertising, misinterpretation, false claims, 'bait' advertising etc.

45. GAUSSIAN NOISE

It is a continuous sound with equal amplitude at all frequencies. It has a wide band width.

46. GRAPHIC LEVEL RECORDER (GLR)

It is designed to convert sound signal input to static sound pressure indication on a time basis. It records an electric signal over a period of time. It will record sound level when used with a SLM.

47. HAIC - HEARING AID INDUSTRY CONFERENCE

Ref: HEARING AID INDUSTRY CONFERENCE (Pg.5.16)

48. HEARING CONSERVATION

The prevention or reduction of hearing problems in a population through a program of hearing screening, follow up testing, referral protection and education.

49. HEARING CONSERVATION AMENDMENT (HCA)

This amendment was issued by OSHA in 1903. It requires that all workers receiving noise exposures at or above the action level must be included in a hearing conservation. This program composes of two components: which are exposure, monitoring, audiometric testing, hearing protection, employee training and record keeping. The requirements of the standard are primarily performance oriented.

50. HEARING CONSERVATION PROGRAM

It includes plant noise surveys, pre-employment and periodic hearing tests, interpretation of hearing tests and official record keeping of noise exposure and hearing tests.

51. IMPULSE NOISE

It refers to transient acoustical events of short duration (usually less than 0.5 see) and involves a change in pressure level above some minimum reference value (usually 40 dB). Examples of impulse sound are sonic booms produced by aircraft and gun shots.

52. INTERNAL NOISE

(1) In the nervous system; the random, spontaneous

firing of neurons, (2) In an amplifying system, any sound not related to the input signal.

53. INVERSE SQUARE LAW

Consider a point source of power[W] periodic waves in three dimensions. Energy from the source is assumed to be transmitted equally in all directions . At a distance 'r' from the source, the energy is uniformly distributed over a sphere of area $4\pi r^2$. The intensity I at this distance from the source will be :

$$I = \frac{W}{4\pi r^2}$$

The intensity thus decreases as $1/r^2$ This result is called Inverse Square Law for the wave intensity.

54. ISI - INDIAN STANDARD INSTITUTE

Ref: ISI (Pg. 5.18)

55. ISO - INTERNATIONAL STANDARDS ORGANIZATION

This Organization behaviour represents from various countries, attempts at the development of international standards. ISO has published a number of Standards related to audiometer, its calibration, measurement of characteristics of ear protective devices etc.

56. ITTS

ITTS stands for Integrated Temporary Threshold Shift. It is a measure for the physiological stress on hearing. An individual's ITTS is a measure of an inviduals susceptability to noise induced hearing loss.

ITTS=TTS,dt. where 't' is time period of noise exposure and 'd', the time period of recovery.

57. LONGITUDINAL WAVE

When the vibrations of the particles are oscillate parallel to the direction of propogation, this wave is called longitudinal.

58. LOUDNESS EQUIVALENT QUOTIENT (Leq)

Often individuals are exposed to noises whose levels vary with time (eg. environmental noise). The level of such a noise may be quantified using a single measure known as the Leq. The Leq. concept is based on the equal energy principle.

It is the level of a continuous 'A' weighted noise that would cause the same sound energy to be experienced in a given day as that resulting from the actual noise exposure.

It is used primarily to assess exposure to continuous

noise although some opine that it could be used for estimating the exposure to impact noise.

It must be noted that there are other single number measures but Leq. is the most commonly used.

Leq. could be considered as a measure of noise dose.

59. LOUDNESS LEVEL

It is estimated from the sound level of a standard pure tone of specified frequency, which is assessed as the modal value of the judgements of normal observers, as being equally loud.

60. MICROPHONE

Ref: MICROPHONE (Pg. 5.21)

61. NARROWBAND NOISE (NBN)

It is a noise whose energy constant is restricted to a narrow frequency range, and is produced by the selective filtering of white noise. The difference inHZ between the upper and lower frequency limits of the noise represents the noise band width.

62. NEAR FIELD

The near field is that region where the source cannot

be treated as a point source of acoustic energy and is a region in which the inverse square law does not apply.

Ref: INVERSE SQUARE LAW (Pg.6.16)

63. NIOSH - NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH, U.S.A.

NIOSH publishes materials related to occupational health such as reports on health hazard evaluation, technical assistance, educational and training materials etc. Many of NIOSH's activities are concerned with ear protective devices.

U.S. Department of Health and Human Services, Public Health Service, Centre for Disease Control.

64. NOISE

It is : (a) an unwanted sound, (b) a sound not wanted by recepient, (3) the wrongsound, in the wrong place, At the wrong time.

65. NOISE CONE

It is a protection grid to reduce wind noise or also dynamically induced noise during outdoor measurement and it gives a least possible resistance. It also improves omnidirectivity.

66. NOISE EXPOSURE FORECAST

Guidelines for use in connection with airports are prepared by means of this scale. The basic measures of magnitude for individual noise events is EPNL expressed in EPNdB. Effect of duration per event is also included.

67. NOISE IMMISSIOH LEVEL (NIL)

NIL's were derived from acoustic measurement and from estimates of exposure duration from the patient's ease histories.

68. NOISE INDEX

It is the average on an energy basis of tone corrected A-weighted sound level modified for duration, time of day and season of the year.

69. NIHL - NOISE INDUCED HEARING LOSS

A sensory or SN impairment of hearing sensitivity, usually greatest around 3000HZ to 6000HZ caused by long term exposure to high levels of aeise.

70. NOISE INDUCED PERMANENT THRESHOLD SHIFT (NIPTS)

It is the difference between the total shift PTS. and the age conditioned shift PTS. (NIPTS-PTS. - PTS).

a t a

NIPTS is also defined as the hearing loss produced by the effects of noise as a result of accumulation of noise exposure which are repeated on a daily basis over a period of many years.

Ref: PTS (Pg.6.25)

71. NOISE INSULATION CLASS [NIC]

It is a single number rating derived in a prescribed manner from the measured values of noise reduction. It provides an evaluation of the insulation between two enclosed spaces that are acoustically connected by one or mere paths.

72. NOISE NUMBER INDEX

It is a measure based on PNL and with factors added to account for the number of noise events. It is used for rating the noise environement near airports.

73. NOISE REDUCTION (NR)

Noise reduction between two areas or two rooms is the numerical difference in dB of the average sound pressure level in those areas or rooms.

A measurement of NR combines the effect of transmission loss, performance of structures separating the two areas or rooms - plus the effect of acoustic absorption present in the receiving room.

74. NOISE REDUCTION COEFFICIENT (NRS)

It is a measure of the acoustical absorption performance of a material calculated by averaging its sound absorption coefficient at 250, 500, 1000, & 2000HB expressed to the nearest integral multiple of 0.05.

75. NOISE REDUCTION RATING (NRR)

It is a single number descriptor of a hearing protective device. To obtain NRR several procedures are employed. The key point to remeber is that the NRR is subtracted from the measured unprotected weighted sound level to yield an effective.

76. NON-AUDITORY EFFECTS

It refers to all the effects of noise not directly related to hearing loss, usually

- physiological responses and health outcomes other than hearing loss.
- performance and behavioural effects.
- sleep disturbance.
- communication interference are considered non-auditory effects.

77. NON-DIRECTIONAL MICROPHONE

A microphone that picks up sound almost equally from any location.

78. NOISE CONE

Ref: NOISE CONE (Pg. 6.19)

79. NOY

It is a unit of perceived noisEness, A sound is said to have a noisiness of noy when it is judged to be subjectively equal in noisiness to an octave band of random noise centered around 1KHz with a sound pressure level of 40dB.

80. OCCUPATIONAL HEARING LOSS

A hearing loss that is causally related to one's occupation? may be termed as an occupational hearing loss.

81. OMNIDIRECTIONAL MICROPHONE

Ref: NON-DIRECTIONAL MICROPHONE (Pg.% 6.22)

82. ONAC - OFFICE OF NOISE ABATEMENT AND CONTROL

Since its beginning, the ONAC along with EPA, has carried out a continuing program of assessment and documentation of the noise control problems in the U.S. In 1977, 1974, 1978 comprehensive studies of state and local needs were carried out which were useful in defining both noise problems as well as the types of assistance which they needed.

It seeked to provide effective noise control measures, noise program guiddiness, instrumentation and enforcement procedures.

83. OSCILLOSCOPE

An electronic instrument that displays a signal on a cathode ray tube usually with signal voltage as the vertical axis and time as the horizontal axis.

84. OSHA - OCCUPATIONAL SAFETY AND HEALTH ACT

One of the functions of OSHA is to ensure compensation for workers suffering from occupational hearing loss.

85. PERCEIVED NOISE LEVEL

It is obtained by having same subject's listen to two stimuli. One is the reference sound which is a pink noise with a bandwidth of one octave with a centre frequency of 1KHz. The other stimulus is noise which is compared with the reference sound. The temporal characteristics such as rise decay time and the duration must be identical. The subject's task is to judge whether the noisiness of the two stimuli is the same in which case the PNL (judged) of the noise is numerically equal to the maximum overall SPL of the reference signal.

86. PERCEIVED NOISINESS IN dB (PNdB)

A sound is aaid to have a noisiness of 40PNdB when its nosiness is equal to that of narrow band noise centered at l000Hz presented at 40dBSPL.

87. PERMANENT THRESHOLD SHIFT (PTS)

It refers to the hearing loss following noise exposure from which recovery is not possible.

Ref: NOISE INDUCED PERMANENT THRESHOLD SHIFT (NIPTS) (Pg.6.20)

88. PINK NOISE

Is a type of noise in which equal energy per octave is presented. The spectrum of noise falling off at a rate of 3dB per octave, is inversely proportional to the signal frequency.

89. PISTON PHONE

It is an instrument used in the calibration of a SLM. It usually provides calibration at only one frequency 250 Hz. The intensity of the sound is 124dB. This high level allows correct calibration even in very noisy surroundings.

90. PREFERRED SPEECH INTERFERENCE LEVEL (PSIL)

Here noise levels are measured only at preferred bands. The average of the levels of noise bands centered at 500, 1000, & 2000HZ is computed.

PSIL - SIL+3

91. PROBE MICROPHONES

A microphone with an attached tube that is used to measure sound pressure levels at the open end of the tube. It is used when it is not feasible to place the microphone itself at the measurement site, such as beside the tympanic membrane.

92. REAL WORLD

When ear protective devices are tested for their performance in actual industrial environment, the results are considered to be indicative of real worl performance.

93. REFLECTION

Whenever an advancing wave front encounters an obstructing barrier or surface, the wave front's path is altered in a way that is termed reflection.

94. REFRACTION

When an advancing wave train travelling in one medium impinges upon the smooth boundary surface of a

Second medium, part of the wave is reflected and the Remainder refracted (or bent) into the second medium.

95. RESONANCE

Whenever a system capable of oscillating is acted on by a series of impulses having a frequency equal or nearly equal to one of the natural frequencies of oscillation of the system, the system is set into oscillation with a relatively large amplitude. This phenomenon is called resonance.

96. REVERBERENT

Ref: REVERBERENT (Pg.4.11)

97. REVERBERENT TIME

It is the time taken for the intensity of a sound to decrease by 60dB from its initial value, after the cessation of the stimulus with increase in RT. Intelligibility of speech decreases.

98. ROOT MEAN SQUARE (RMS)

It is a special kind of mathematical average value. It is of importance in sound measurement because the RMS value is directly related to the amount of energy in the sound signal. second medium, part of the wave is reflected and the remainder refracted (or bent) into the second medium.

99. SAW TOOTH NOISE

A broad band noise having a fundamental frequency (1st harmonic) at 60Hz or 120Hz and having greater energy at the harmonics than at the intervening frequencies so that a graph of intensity as a function of frequency has a jagged appearance like teeth of a saw. Overall it has greater intensity below l000Hz than above.

100. SIGNAL-T0-NOISE RATIO

The main physical determinant of or descriptor of the accuracy of performance of an information transmission system, measured in decibels, abbreviated as S/N, this quantity provides a standard metric in terms of which other qualitatively diverse effects may be expressed. (Eg. signal bandwidth, context, effects in materials, resolving power of the listener etc.). Once equivalences for maintaining a given accuracy of performance have been established.

101. SLM - SOUND LEVEL METER

A sound level meter is generally a combination of a microphone, an amplifier with controlled frequency weighting and a detector-indicator with controlled time weighting characteristics (IS:9779-1981). It is used to determine sound levels. The term sound level is in turn defined as the weighted sound pressure level in decibels and is

20 times the logarithm to the base ten of the ratio of a weighted sound pressure to the references sound pressure (18:9779-1981).

Commercially available sound level meters are designed to meet specific needs. They may be classified as:

Type 0 : It is for use as a laboratory reference standard.

Type 1 : This is for use in laboratories and in field where the acoustic environment can be controlled/ is specified.

Type 2 : It is designed for general field applications.

Type 3 : A type 3 sound level meter is used for noise surveys carried out to determine if a specified limit is exceeded (IS:9779-1981).

It consists of the following components:

(1) Transducer
(2) Preamplifier
(3) Weighting networks
(4) Attenuator
(5) Meter to display the measured level.

102. SPEECH INTELLIGIBILITY IN NOISE (SPIN)

Ref: SPEECH INTELLIGIBILITY IN NOISE (SPIN) (Pg.23.27)

103. SPEECH INTERFERENCE LEVEL (SIL)

It is a measure of the handicap/difficulty experienced in perceiving speech in the presence of noise. It may be obtained as follows:

The average sound pressure levels at various frequencies at octave intervals is obtained. Frequency in the range of 350 to 2850 Hz are considered.

104. SOUND FIELD

An area containing sound waves, such as a sound-treated room.

105. SOUND LEVEL CALIBRATOR

It has a built in oscillator which produces a precisely known sound pressure level (114dB) at five USASI preferred frequencies (125 HL, 250HL, 1KHL,& 2KHL).

106. SOUND POWER

Ref: SOUND POWER (Pg.2.44)

107. SOUND TRANSMISSION CLASS (STC)

It is a single figure rating that is employed to give an estimate of the sound insulation properties of a partitions or a series of partitions, it is intended for use when speech or office noise is the principal source.

108. SOUND TRANSMISSION LOSS (STL)

It is a measure of sound insulation provided by a structural configuration. It is equal to l0 $\log_{10}$ sound transmission coefficient of the configuration.

109. SPECTRUM ANALYZER

Ref: FREQUENCY ANALYZER (Pg.6.13)

110. TEMPORARY THRESHOLD SHIFT (TTS)

It is a temporary elevation in the threshold of hearing following exposure to noise. The hearing functions then recover gradually.

111. TIME WEIGHTED AVERAGE (TWA)

An 8 hours time-weighted average sound level is the sound level that would produce a given noise dose if the individual were to be exposed to that sound level continuously over an 8 hour work day.

112. TOM TEST (THRESHOLD OCTAVE MASKING TEST)

Ref: TOM TEST (Pg.3.33)

113. TOTAL NOISE LOAD

It is used while measuring aircraft noise. It is the average of 'A' weighted sound level (taken on a modified energy basis) taking into account the number of fly-over events and the time of day. ^

114. TRANSMISSION CLASS (TC)

Ref: SOUND TRANSMISSION CLASS (Pg. 6.3)

115. TRANSMISSION LOSS (TL)

Ref: SOUND TRANSMISSION LOSS (Pg. 6.31)

116. TRANSVERSE WAVE

When the vibrations of the particles are at right angles to the direction of travel of the wave. This wave is called transverse wave.

117. VIBRATION

To and Fro motion of a body about a mean position is called vibration.

118. VU METER

Ref: VU METER (Pg.2.55)

119. WAVE

Wave is any disturbance from an equilibrium condition that travels or propagates with time from one point in space to another.

120. WEIGHTING NETWORKS

This networks of SLM provide a degree of frequency analysis of sounds. They give certain weight or importance to sounds in certain frequency range than in order frequency ranges. The frequency response of a SLM is controlled by the weighting networks. There are four types of weighting networks:

(1) A-Weighted network - 40dB phon contour.
(It is used in indoor and outdoor noise measurement)

(2) B-Weighted network - 70dB contour.

(3) C-Weighted network - l00 dB contour.

(4) D-Weighted network – It is used in aircraft noise measurement.

Ref: 'A' WEIGHTED NETWORK (Pg. 6.4)
'B' WEIGHTED NETWORK (Pg. 6.5)
'C WEIGHTED NETWORK (Pg. 6.7)
'D' WEIGHTED NETWORK (Pg. 6.9)

121. WHITE NOISE

A noise in which the amplitude is independent of frequency; that is the amplitude of each frequency is nearly the same. It is often used for masking speech. It is also called WBN (Wide Band Noise) or BBN(Broad Band Noise). The band width of white noise is limited to between 6000-7000Hz.

PAEDIATRIC AUDIOLOGY

1. ACCELEROMETER

It was developed by Altman et al(1975). This is an automated procedure of recording the response of the neonates to stimulus. This was basically developed to improve efficiency of mass screening programme. This device comprised of a sound souree,eradle,vibration pickup, analyzer system and recorder.

2. APGAR'S SCORE

APGAR score was introduced by Virginia Apgar in 1952. A total score ranging from 0 to 10 is assigned. The more vigorous the infant the higher the score. This method provides a grossly quantitative expression of the infants condition at birth. A score of 0 to 2 is assigned to each item. The total of 5 individual items is the total score. A score of 0-2 represents severe distress, 3-6 signifies moderate difficulty and 7-10 indicates absence or minimal stress.

APGAR includes the following:

Signs-A-colour(Appearance), P-Heart rate/miss(pulse), G-reflexes response to stimuli (a) catheter in nose or sneeze, (b) flicking sole or slapping.
A - muscle tone (Activity)
R - Breathing (Respiration).

3. AUROPALPARABLE REFLEX (APR)

RBf: APR TEST (Pg. 7.2)

4. AUROPALPARARLE REFLEX (APR) TEST

It refers to a rapid and distinct closing of the eyelids in response to tones of high intensity under standard conditions. APR was used mainly for differential diagnosis between cochlear and retrocochlear. As in retro-cochlear and conductive loss cases, the APR will occur at levels as in the case of normals. The stimuli used is puretones from 500HZ to 4000Hz at SPLs between 105dB and 115dB. re. 0.0002/v.

5. AWAKENING TEST

It was proposed by Wedenberg(1956). He suggested the presentation of tone pulses at 3KHz at 75dBSPL to awake from light sleep. The criteria of response wave movements of eye lids, changes in heart rate, and general body move-ments. The rationale for using 3KHz is that, adequate hearing at 3KHz predicts the audibility to speech normally given normal intelligence.

6. BC SPEECH AUDIOMETRY

It is a test to measure SRT and speech discrimination through bone conduction testing, both in children and adult. But in children, this was more useful in clinical evaluation of hearing.

7. BEHAVIOURAL OBSERVATION AUDIOMETRY (BOA)

This is used to test young difficult to test children and infants. The use of this technique required a calibrated sound field system and a diagnostic audiometer. The child is placed in a chair or in the mother's lap in a sound treated room and the stimuli are presented through calibrated loud speakers. The level of stimuli that elicit various behavioural responses are noted. Reinforcement may be given for correct responses.

8. BRANCHIAL ARCH

In human embryo, around fourth week, series of branchial grooves appear in the lower head and neck region en the outside of embryo. Only first and second arches are to relevance to the auditory system.

Tragus, body structure of malleus and incus, anterior area of middle ear cavity and tensor tympani develop from the first arch. The second arch gives rise to auriele, venticular process of the incus, handle of malleus and stages? posterior portion of middle ear cavity and stapedius.

9. CLASSICAL CONDITIONING

In this the behaviour elicited by a stimulus is considered as a respondent behaviour, which includes the

unconditional and conditional reflexes.

10. CONDITIONED RESPONSE

Trained or taught (conditioned) by a reward, shock or punishment to do something (respond) when a stimulus, such as a sound, is presented.

11. CONDITIONS AUDIO-VISUAL RESPONSE (CA-VR)

A plastic toy is illuminated whenever a signal is presented. The child is conditioned to respond to the signal by turning to the toy. Correct responses are reinforced. The child's hearing thresholds are thus obtained by observing these conditioned responses.

The technique is also known as VRA or Visual Reinforcement Audiometry.

12. CORA - CONDITIONED ORIENTATION REFLEX AUDIOMETRY

This test procedure was developed by Suzuki and 0giba(1960). This method is used to evaluate hearing in children. The child's localization responses are observed. Whenever the child correctly locates the loudspeaker through which the signal is presented, the response is reinforced by illuminating.

13. CRIB-O-GRAM

This was developed by Simmens(1976). This is a machine which records the response following the presentation of stimulus. This device consists of motion sensitive transducer attached to a bassinet and a graphic recorder which records the measured motion as well as timing signal generating equipment.

14. CRITICAL AGE CONCEPT

Ref: CRITICAL AGE CONCEPT (Pg.4.4)

15. DELAYED FEEDBACK AUDIOMETRY (DFA)

Ref: DELAYED FEEDBACK AUDIOMETRY(Pg. 3.11)

16. D.I.P TEST - DISCRIMINATION BY IDENTIFICATION OF PICTURE TEST.

This is a test to assess the auditory discrimination. It does not require a 'same' or 'different' response. Instead it involves a picture pointing response to stimulus words.

This test, the pictures represent words that are phonetically similar. These word pairs are presented orally and the child must demonstrate the ability, bear the differences in words. The test includes two pictures plates showing bear/pear; fan/man; pup/cup, etc.

17. EARLY IDENTIFICATION

Ref: EARLY IDENTIFICATION (Pg. 4.5)

18. ECTODERM LAYER

It is a germ layer which is generally responsible for development of the outer Skin layers and also gives rise to the nervous system and the sense organs.

Ref: GERM LAYERS (Pg. 7.7)

19. ELECTRO CARDIOGRAPHY

Ref: CARDIAC EVOKED RESPONSE AUDIOMETRY (Pg.3.8)

20. ELECTRO COCHLEARGRAPHY

Ref: ELECTRO COCHLEARGRAPHY (Pg. 3.13)

21. ELECTRODERMAL RESPONSE (EDR)

Ref: ELECTRODERMAL RESPONSE (Pg.3.14)

22. ELECTRODERMAL RESPONSE AUDIOMETRY

Ref: ELECTRODERMAL AUDIOMETRY (Pg.3.14)

23. ELECTRONYSTAGMOGRAPHY (ENG)

Ref: ELECTRONYSTAGMOGRAPHY (Pg. 3.14)

34. ENDODERM LAYER

It is responsible for development of the digestive canal and respiratory organs. Ref: GERM LAYERS(Pg.7.7)

25. FREE FIELD

An area without boundaries containing a homogeneous medium, in practice, an area, such as anedhoic chamber, whose boundaries are negligible for the frequency of interest.

26. FREE FIELD TESTING

A method of measuring auditory sensitivity by reducing sound intensity to the threshold of perception and measuring the actual intensity of the sound after the subject has been removed from the field in order to eliminate the effeet of absorption, reflection and diffraction by the body.

27. GERM LAYERS

It is one of the earliest organizational developments in the embryo. In this the embryo is the differentiation of cells into three superimposed, cellular plates called germ layers. There are three layers: (1) ectoderm, (2) mesoderm, & (3) endoderm layers. These germ layers are actually not specific in their function.

Reft ECTODERM LAYER (Pg.7.6)
MESODERM LAYER. (Pg. 7.8)
ENDODERM LAYER; (Pg. 7.6)

38. HARD OF HEARING (HOH)

Applied to those whose hearing is impaired bat who have enough hearing left for practical use.

29. HEAROMETER

Is an instrument used in neonatal hearing testing by Griffiths(1965). Here a loud speaker is placed over the sleeping infant and interrupted pure tones of varied frequencies and intensities are delivered from it. The satisfactory response is the awakening of the infant from sleep. This cannot be used for the determination of threshold.

30. HIGH RISK REGISTER (HRR)

A list of individuals with a greater than average chance of having disease or impairment. It has entry criteria, as low birth weight, and is kept to facilitate follow-up evaluation and early treatment.

31. LAMBARD TEST

Ref: LAMBARD TEST (Pg.3.19)

32. MESODERM LAYER

It is responsible for the development of the skeletal, circulation structures, kidneys, and reproductive organs.

Ref: GERM LAYERS (Pg.7.7)

33. OPERANT CONDITIONING

A procedure whereby desired behaviours (operants) are immediately rewarded (reiaforced) to increase their frequeacy. For example, the behaviour of pressing a button when a sound is heard may be increased by rewarding the behaviour with a token, smile or a view of an in animated joy.

34. PEABODY PICTURE VOCABULARY TEST (PPVT)

The PPVT is a receptive vocabulary test that has been standardized on the normally hearing population. In this test a word is spoken, and the examine is expected to select the appropriate corresponding picture. When administered to hearing impaired children in the prescribed fashion, the test becomes as much a test of speech reading and auditory processing as a test of vocabulary.

35. PIWI TEST

PIWI stands for Puppet in the Window Identification test. It was developed by Hang et al(1967). This technique was modeled on the principle of CORA. But in this earphones are used and a 90^0 localization response to the window is required. It involves gross head turning responses to the sound source and which if correct is rewarded by an illuminating the puppet.

36. PLAY AUDIOMETRY

This technique was advocated by Barr(1965). It is a technique for measuring the hearing of children by recording a correct response to an auditory stimulus by allowing the child to see a picture, or to activate a mechanical toy, or do something equally interesting.

37. REFLEX

A movement performed involuntarily as a result of the stimulation of a sensory nerve to a nerve center and then to a motor nerve? this functional unit of the nervous system is called as a reflex arc.

38. RESPIRATORY AUDIOMETRY

Ref: RESPIRATORY AUDIOMETRY (Pg.3.26)

39. RHYME TEST (RT)

Ref: RHYME TEST (Pg. 3.26)

40. SCREENING

It is the process of applying to large number of individuals certain rapid, simple measurement that will identify these individuals with a high probability of disorders in the function tested.

41. STENGER TEST

Ref: STENGER TEST (Pg.3.31)

42. TROCA - TANGIBLE REINFORCEMENT OPERENT CONDITIONING AODIOMETRY

It was developed by Lloyd (1965). This technique employed in the assessment of hearing in children; employs operant conditioning principles. Correct responses are reinforced with tangible items such as a candy, trinket, etc. Appropriate reinferer should be determined for a given child before the procedure is begun.

43. TOURCH - CONCEPTS

TORCH is an acronym for the various pre and post natal infections that give rise to similar symptoms in the prenatal stage. It may be expanded as follows:
T - Toxoplasma, R - Rubella, C - cytomegalovirous,
H - Herpes simplex types, and II and 0 - others (Eg.Syphlis).

44. VERBAL AUDITORY SCREENING FOR CHILDREN (VASC)

It consists of 4 lists of spondees each consisting of two words. They cover a range from 15dB to 51dB attenuated at the rate of 4dB per three words. The child has to respond by pointing to a picture that represents the test word. In order to pass the test,the child has to identify atleast 2/3 words at 15dB.

45. VISUAL REINFORCEMENT AUDIOMETRY (VRA)

This technique was developed by uden and Kankkuna (1979). This is a non-directional technique which takes into consideration, 4 types of response to tone stimulation, that is reflexive, investigatory, orientation and spontaneous responses. In this picture slides were used.

Ref: CONDITIONS AUDIO-VISUAL RESPONSE
(Pg. 7.4)

46. WIPI

It stands for word intelligibility by picture identification. This is a speech discrimination test used with children. Twentyfive monosyllabic words which can be presented through pictures constitute each list. The child is provided with alternative pictures for each stimulus word. The child responsds by pointing to the picture.

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