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Department of Biomedical Engineering

Vision Tit 2

Vision Title 3

Course Name: 19BMB301 Diagnostic & Therapeutic Equipment

III Year : V Semester

Unit IV – SENSORY EQUIPMENT

Topic : Audiometer



AUDIOMETER

- An audiometer is an electronic instrument used by an audiologist to quantify hearing. An audiometer produces pure tone of various frequencies, attenuates them to various intensity levels and delivers them to transducers.
- An audiometer is for the measurement of hearing activities and specifically to measure the hearing threshold.



AUDIOMETER





TYPES OF AUDIOMETER

- Diagnostic or clinical Audiometer
- Screening Audiometer
- Computer based Audiometer
- Automatic Audiometer



DIAGNOSTIC OR CLINICAL AUDIOMETER

A diagnostic audiometer is an instrument capable of performing a variety of hearing tests, including pure tone audiometry and must conform to certain standard of operations, as specified bt ANSI for diagnostic audiometers.

- Available from a variety of manufactures
- Come in a variety of shape and size
- Some are designed for limited space or for portability.



SCREENING AUDIOMETER



A Screening Audiometer is typically used for doing hearing screening in the field or in other situations in which a patient cannot be tested in the clinics

- Smaller in size, portable and only uses pure tone to assess hearing
- The ranges of frequencies and intensities are more limited with a screening audiometer than a diagnostic audiometer



COMPUTER BASED AUDIOMETER

With computer based audiometry there is the capability of having the computer generate and control the sounds, as well as the ability to store the patient's response, automatically analyze and print the results and track patient database

AUTOMATIC AUDIOMETER

An automatic audiometer has the capability of automatically changing the signal level based on the response of the patient.



PARTS OF AUDIOMETER

- Oscillator
- Attenuator
- Interrupter switch
- Frequency dial
- Stimulus or Tone switch
- Output selector
- Input selector
- Talk back



Oscillator

The oscillator produces pure tone at discrete frequencies in octave and mid octave, controlled by a frequency selector switch, with variations ranging from + to -3%.

Attenuator

The attenuator regulates signal intensity, typically in 5 dB steps, with maximum output levels varying by frequency and transducer type.

Interrupter switch

The tester uses a spring-loaded interrupter switch to present the tone to the patient, allowing the tester to decide when and duration of the presentation.



Stimulus or Tone Switch

It is used for presenting continuous tone. Eg - Warble tone / Pulse tone

Output selector

Using this switch, the tester can select left earphone, right earphone or bone vibrator for presenting tone.

Input selector

It is used to select speech /tone / noise.

Talk – Back

Selection of switch to present sound through mike



WORKING PRINCIPLE OF AUDIOMETER

An audiometer is a device used to evaluate hearing acuity by presenting controlled sounds through headphones or speakers. It operates on the principle of varying the intensity and frequency of auditory signals to determine the quietest sounds a person can hear at different pitches. The audiometer generates pure tones or noise, which are delivered through earphones or speakers, and the listener responds when they hear the sound. The results are plotted on an audiogram, which helps in diagnosing hearing impairments and assessing hearing function.



Advantages of an Audiometer

- Accurate Hearing Assessment
- Standardized Testing
- Immediate Results

Disadvantages of Audiometer

- Equipment Cost
- Calibration Requirement
- Requires Skilled Operation



APPLICATIONS

- Diagnosing Hearing Loss
- Hearing Conservation
- School Screenings
- Research.
- Hearing Aid Fitting.
- Pre-employment Evaluations
- Legal and Insurance Assessments