

# **A QUIZ ON AUDIOLOGICAL INSTRUMENTATION**

**Reg. NO. M. 9116**

*An independent project submitted as part fulfilment for the first year*

*M.Sc (Speech and Hearing) to the University of Mysore*

**All India Institute of Speech and Hearing  
MYSORE - 570 006  
MAY 1992**

**DEDICATED TO:**

***SAMU***

***APPA, AMMA***

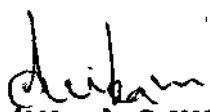
***THAMBI & THANGAI***

***whose distinct love is the foundation stone of my achievements***

## **CERTIFICATE**

*This is to certify that the Independent Project entitled "A QUIZ ON  
AUDIOLOGICAL INSTRUMENTATION" is a bonafide work, done in part  
fulfilment for the First Year Degree of Master of Science (Speech and  
Hearing), of the student with Reg.No. M 9116.*

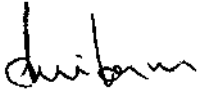
**MYSORE  
MAY 1992**

  
**Dr.(Miss). S.NIKAM**  
**DIRECTOR**  
**All India Institute of  
Speech and Hearing**  
**MYSORE - 6**

# CERTIFICATE

*This is to certify that this independent Project entitled*  
**"A QUIZ ON AUDIOLOGICAL INSTRUMENTATION"** *has been prepared under*  
*my supervision and guidance*

MYSORE  
MAY 1992

  
**Dr. (MISS) S. NIKAM**  
GUIDE  
PROF. HEAD OF THE DEPT. OF  
AUDIOLOGY  
AIISH  
MYSORE

## **DECLARATION**

*I hereby declare that this Independent Project entitled- "A QUIZ ON AUDIOLOGICAL INSTRUMENTATION" 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  
MAY 1992**

**Reg.No. M.9116**

# ACKNOWLEDGEMENT

**"GRATITUDE IS THE HARDEST OF ALL  
EMOTIONS TO EXPRESS  
THERE IS NO WORD CAPABLE OF CONVEYING  
ALL THAT I FEEL"  
"BUT NOW I HAVE ONLY ONE WORD TO SAY"  
THAT'S  
" THANK YOU"**

*First and foremost, I extend my heart full gratitude to my teacher and guide, Dr.(Miss).S.NIKAM, Professor and Head of The Department of Audiology and Director, AltSH, Mysore.*

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**CHAPTER-I****INTRODUCTION**

The term "audiology" was coined by Norton Canfield. It is a relatively new field dealing with the various aspects of hearing. In India the advent of this field was even later, in the 1960's. And from then onwards it has been moving smoothly to provide services to the group of people who are in need. The development of this profession is both in terms of sophistication and in terms of the extent of its application.

With the rapid growth, a large number of instruments are used in the field of audiology. Also there is a whole new landscape of information on tools, instruments, techniques and tests. Thus the professionals must upgrade their knowledge for getting a better idea as to the requirement of this profession.

An instrument is that by means of which we can quantify and measure a particular kind of data. There is a vast range of instruments in the field of audiological sciences. As days are passing by, more and more instruments are being made available due to technological advance and increasing knowledge regarding the auditory system. With the help of new instruments, the field of audiology is marching towards the path of progress, by leaps and bounds. While today's instruments are often much more complex, much more accurate and more reliable than the devices of past, they are nonetheless

easier to use. It has taken a while for changes brought by technological advance to be applied to clinical need in audiology. But where do we professionals lie? Do we really know all the instruments in this field? Most of us may not have a thorough knowledge and it's time to just brush up with our existing knowledge and discover some outlooks of the new instruments which have come on the scene in recent years.

Here in this project an attempt has been made to collect and give a concrete body to the vagueness, confusion and queries arising regarding instruments.

There are different audiological instruments, like hearing aids, sound level meters, audiometers, etc. We need to know in detail about their usage, applications, working principles etc. There is no particular source of information. On these to which the hearing aid technician, the rehabilitation officer, or anyone else may turn for helpful information. So it is hoped that the necessity will be cleared by this "QUIZ" programme.

This work is also intended to provide information on the aspects of "instruments in audiology" i.e., in short it is the QUEST for knowledge so that it may be helpful for students during their examination, for professionals while attending interviews and for the interested readers as a manual for "Audiological instruments". It also would help when we wish to have a quick glance at the lot of information in seconds, then a quiz becomes an essential part.

Hope this quiz adds to the resource material available to the newcomers in the field of audiology. This task is made simpler by taking the reader into a whole new world of puzzles, brainteasers, riddles and word games all on

I-N-S-T-R-O-M-N-T-A-T-I-O-N.

So, roll up yoursleeves, get set and slog your mind.

HERE WE GO!!

This project is categorized into fine categories.

- 1) Hearing measuring instruments.
- 2) Noise measuring instruments.
- 3) Amplification instruments.
- 4) Cross words.
- 5) Abbreviations.

CHAPTER-II  
HEARING MEASURING INSTRUMENTS

- 1) AUDIOMETERS
- 2) IMPEDANCE AUDIOMETER
- 3) BEKESY AUDIOMETER
- 4) EARPHONES
- 5) EAR CUSHIONS
- 6) EVOKED RESPONSE AUDIOMETERS
- 7) COUPLERS
- 8) MISCELLANEOUS

**I) AUDIOMETERS**

- 1) What is an Audiometer?
- 2) Classify audiometer? General?
- 3) Classify audiometer according to ANSI - 1969.
- 4) Classify audiometer according to IEC 1976.
- 5) IS Classifies audiometer as . . . . .
- 6) What are the differences between automatic, manual and microprocessor audiometer?
- 7) Who was the 1st person to develop an automatic audiometer and when?
- 8) What are the parts of an audiometer?
- 9) What is V-D meter?
- 10) How much is the warm up time for an audiometer?
- 11) Why do we need two room set up in pure tone audiometry?
- 12) What is the need for an observation window in a audiometric test room?
- 13) What is the purpose of a screening audiometer?
- 14) Generally the range of an audiometer is starting from . . . . . Hz to \_\_\_\_\_ Hz.
- 15) What is the use of speech audiometer?
- 16) According to American National Standards the speech audiometer should cover a range of . . . . .
- 17) In speech audiometry speech testing materials can be introduced in 2 ways. They are:
  - 1)
  - 2)

- 18) What are the instruments required for the calibration of an audiometer?
- 19) When an audiometer is new, how should it be calibrated?
- 20) What are the two methods of calibration of an audiometer?
  - 1)                    2)
- 21) What is the other name for digital free field audiometer?

2) **IMPEDANCE AUDIOMETER**

- 1) What are the three measures obtained in an Impedance Audiometer?
- 2) . . . . . is the frequency probe tone value in most Impedance Audiometer?
- 3) Two approach of tympanogram interpretation they are:
  - 1)                    2)

3) **BEKESY AUDIOMETER**

- 1) What is a Bekesy Audiometer? How is it different from other audiometers?
- 2) What are the modification of conventional Bekesy Audiometer?
- 3) What are the two types of frequency tracings in Bekesy Audiometry?
- 4) Maximum intensity in a Bekesy Audiometer is . . . dB.
- 5) The four type of tracings in Bekesy Audiometry are:
  - 1)                    2)
  - 3)                    4)

#### 4) EAR PHONES

- 1) Define an Ear phone?
- 2) Name few earphone types?
- 3) What are the two types of earphones?
  - 1)
  - 2)
- 4) Whether there is any difference in earphones if so, how do they differ?
- 5) Can earphones be exchanged from one audiometer to another?
- 6) . . . . is the frequency response of TDH - 39 .. and TDH 49.
- 7) . . . . ohms is the impedance value of TDH-39 earphone.
- 8) Can a TDH-39 housed in Mx 41/AR earphone be used to stimulate a free field source?
- 9) What is the threshold variation between insert receiver and earphone?
- 10) Define a head set?

#### 5) EAR CUSHIONS

- 1) What is an ear cushion?
- 2) What are the types of ear cushion?
- 3) What is the use of an ear cushion?
- 4) Three types of ear cushions are:
  - 1
  - 2
  - 3
- 6) Where are the insert type of ear cushions used?
- 7) Name some examples of supraaural ear cushions?
- 8) Name some examples of circumaural ear cushions?
- 9) How is an insert type of ear cushion mounted?
- 10) How is an external type of ear cushion mounted?





19) What are the two types of very late response in Electro Encephalic Audiometer?

20) The four type of Electro Encephalic Response are:

1                      2                      3                      4

21) Can ECOCHG and BSER be used with neonates.

22) Uses of TA-1000 clinical E.R.A? .

23) Does Brainstem Evoked Response Audiometer use a preamplifier?

24) What is the significance of using a preamplifier in B.E.S.R.A.?

7) COUPLERS

1) What is a dummy head?

2) The two couplers which appropriate more closely to human ear are . . . . and . . . . .

3) What is a K.E.M.A.R?

8) MISCELLANEOUS

1) The common tuning fork tests are:

1                      2                      3                      4

2) The reverbration time of an anechoic chamber is . . . . sec.

3) What is a signal conditioner?

4) What is an Oscilloscope? Where is it present?

5) What is a patient stimulator?

6) What is the work of a plotter?

7) Define an ear muff?

8) Is Cochlear microphonics an instruments?

9) Master hearing aid, What is it?

**CHAPTER-III**

**NOISE MEASURING INSTRUMENTS**

1. MICROPHONES
2. SIGNAL GENERATOR
3. CALIBRATORS
4. SOUND LEVEL METER
5. DOSIMETERS
6. SPECTRUM ANALYZER(OCTAVE FILTES SET)
7. FREQUENCY ANALYZER
8. TAPE RECORDER
9. RECORDERS.
10. READ OUT DEVICES
11. OSCILLOSCOPE
12. ACESSORIES

**I) MICROPHONES**

- 1) What is essential to use SLM?
- 2) How do you calibrate noise, measuring instruments?
- 3) How can the directional property of a microphone be increased?
- 4) Why is unidirectional microphone called so?
- 5) How much is the loss in sensitivity that results when we change from 1" to 1/2" microphone?
- 6) What are the uses of 1" microphone?
- 7) What are the characteristics of 1" condenser microphone?
- 8) Why is a condenser microphone preferred for noise measurements?
- 9) Where is a pressure microphone commonly used?
- 10) How is the pressure microphone useful in measurement carried out in reverberation chamber, traffic noise etc?
- 11) Why do we use pressure microphone for traffic noise measurements?
- 12) What is the frequency response of 1/2" and 1/4" condenser microphones 1"?
- 13) What is the dynamic range of condenser microphones - B&K 4144, 4115, 4146.
- 14) Is a crystal microphone suitable for noise measurements?
- 15) What is the frequency response of a crystal microphone?
- 16) What are the limitation of a gun microphone?
- 17) What is a throat microphone?
- 18) What is a hydrophone?
- 19) What are the uses of hydrophone?

**2) SIGNAL GENERATOR'S**

- 1) Why do we need signal generating instruments?
- 2) Define an Oscillator?
- 3) Classify Oscillators depending upon the design or application?
- 4) What is random noise generator?
- 5) What types of noise is generated by a random noise generator?
- 6) On what principle does BFO works?
- 7) What are the use3 of BFO?
- 8) What is DSASI Noise?

**3) CALIBRATOR S**

- 1) How is the sound level.calibrated?
- 2) What are the different methods of sound level calibration?
- 3) How many types of calibrations are there?
- 4) Define a piston phone?
- 5) What is the synonym of piston phone?
- 6) Why piston phone is called so?
- 7) On what principle does it work?
- 8) When is a piston phone used?
- 9) What are the applicationof piston phone?
- 10) How many batteries are used in a piston phone?
- 11) How the piston phone is checked? What are the different steps?
- 12) What is the safe operating temperature of a piston phone?

- 13) What is the level of the signal generated in a piston phone?
- 14) With what type of microphone can a piston phone be used?
- 15) Can the piston phone be used with any type of microphone?
- 16) Name some of the companies which manufacture piston phones.
- 17) At what level does an acoustic calibration generate signal?

#### **4) SOUND LEVEL METER**

- 1) Name one basic instrument to measure sound pressure?
- 2) What is measured using a SLM?
- 3) Define sound level
- 4) List the basic components of a SLM.
- 5) What should be the minimum distance between the microphone and an observer?
- 6) How are the sound level meters classified?
- 7) What is the significance of the shape of SLM?
- 8) What are the two essential steps to be taken while using an SLM?
- 9) What is the warm up time of a SLM?
- 10) What is the dynamic range of SLM?
- 11) In how many ways can a SLM be calibrated?
- 12) What is the attenuator range of SLM of different types?
- 13) Specify when input and output attenuators are used?
- 14) When is the AC or the DC output used?
- 15) What is the reference level of a SLM?

- 16) To what duration can a SLM be used?
- 17) What are the limitation of a SLM?
- 18) List the accessories which can be used with SLM?
- 19) What are the factors to be taken into consideration while using sound level meters for noise measurement?
- 20) What is the purpose of having peak and impulse hold in a SLM?
- 21) What are the limits of the 'B' scale?
- 22) When is the 'C' scale in the SLM to be preferred?
- 23) What are the different types of weighting network?
- 24) Who proposed Do, D1, D2 and D3 weighting network?
- 25) When is a weighting network used?
- 26) Which is the most commonly used frequency network?
- 27) What is an alternative far frequency weighting network?
- 28) What are the different time weighting networks?
- 29) What is the basic instrument for vibration measurement?
- 30) What does the accelerometer measure?
- 31) How is accelerometer calibrated?
- 32) What adjustments are made an SLM for vibration measurements ?
- 33) What does an integrator measure?
- 34) What measurements are possible with an integrator?

#### **5) DOSIMETER**

- 1) Which instrument is used to measure fluctuating sound as unsteady sound level?
- 2) Who described the 1st personal pocket borne dosimeter?

- 3) What is the purpose of using a dosimeter?
- 4) How many types of dosimeters are there?
- 5) What are the advantages of using a dosimeter?
- 6) When is a earbrone dosimeter used?
- 7) What is a minidosimeter?
- 8) Name 3 basic components of a dosimeter?
- 9) With what do you calibrate a dosimeter?
- 10) Can you calculate damage risk criteria using a dosimeter?
- 11) What is the source of power supply to the dosimeter?
- 12) What is the material used in the housing of Dosimeter?
- 13) Describe the dosimeter you are familiar with.
- 14) What is the safe operating temperature and humidity range to which it can be exposed to?
- 15) Give the dimensions of a pocket size dosimeter?
- 16) What is its weight?
- 17) When is "P" and "B" displayed on a dosimeter?
- 18) To what does 100% noise dose correspond to?
- 19) What is the sound level range for short and long term measurements?
- 20) How is the battery checked?
- 21) Where is the microphone placed in pocket type dosimeter?

## **6) SPECTRUM ANALYZER**

### **(OCTAVE FILTER SET)**

- 1) Can you define an analyzer?
- 2) What are the different types of frequency analyzer  
Currently used?

- 3) What are the different types of constant percent bandwidth analyzer's and constant bandwidth analyzer?
- 4) On what basis are analyzer's classified?
- 5) When is a percentage bandwidth analyzer to be preferred?
- 6) One Octave and 1/3 octave band analyzer are used depending on...
- 7) When is constant or fixed band- width analyzer used?
- 8) Define octave filter set?
- 9) Under which type of analyzer does octave filter set be classified?
- 10) Can an octave filter set work independently?
- 11) Apart from the SLM, what other instruments can the be octave filter set be connected to directly?
- 12) when is weighting potentiometer used?
- 13) What are the uses of the octave filter set that you are familiar with?
- 14) With what other instruments can an octave filter set be used?
- 15) Name more manufacturing companies of octave filter sets?

#### **7) FREQUENCY ANALYZER**

- 1) Define a frequency analyzer.
- 2) What are the different types of frequency analyzers currently used?
- 3) What are the uses of frequency analyzers?
- 4) How are analyzer s calibrated?
- 5) How many types of percentage analysis is possible?



- 6) How many types of frequency analyzer are you familiar with?
- 7) What are the uses of a frequency analyzer? That you are familiar with?
- 8) What is the specified warm up time for frequency analyzer 2120 B&K?
- 9) What is the safe operating temperature and humidity range of a frequency analyzer?
- 10) What is the real time analyzer?
- 11) Why is it called as a real time analyzer?
- 12) What are the uses of real time analyzer?
- 13) What other instruments can it be connected to?
- 14) What is the alternate for time analyzer?
- 15) What are the different types of analyzer possible with F.F.T?
- 16) What are the applications of F.F.T?

#### 8. TAPE RECORDERS

- 1) Define a tape recorder
- 2) What is magnetic tape recording?
- 3) Who invented magnetic tape recording procedure?
- 4) List the different types of tape recorders?
- 5) How many types of tape bases are generally available?
- 6) Which type is used for audio recording?
- 7) Which type of tape recorder is used in noise measurement and analysis?

- 8) On what is the frequency response of a tape recorder based?
- 9) What factors are significant in the purchase of a tape recorder for noise measurement and analysis?
- 10) How many sizes of tape width are available?
- 11) What are requirements of a tape recorder used for noise measurement and analysis?
- 12) Can a tape recorder be used for vibration measurement and analysis?
- 13) What is direct input and FM input in the tape recorder?

#### **9) RECORDER S**

- 1) What is a graphic level recorder?
- 2) What are the different types of recorders?
- 3) What is the purpose of a level recorder?
- 4) What are the basic elements of a graphic recorder?
- 5) What is the purpose of a strip chart recorder?
- 6) What are the different mediums and recording methods?
- 7) Define a strip chart recorder.
- 8) How many types of recording is possible by GLR in terms of parameters?
- 9) What are the application of a GLR?
- 10) Name the companies which manufacture GLR instruments?
- 11) How many types of GLR are there?
- 12) How many paper types are there in GLR?
- 13) What are the two chart widths?
- 14) When is wax paper used in a GLR?

- 15) When is ink paper preferred in a GLR?
- 16) Can the same paper type be used for different types of recordings?
- 17) What is the frequency range of pre - calibrated paper commonly used?
- 18) What are the ink colours available for recording?
- 19) When is black colour ink preferred for recording purpose?
- 20) List the accessories provided with any GLR?
- 21) What is the Number of the GLR you have in your center?

**10) READ OUT DEVICES:**

- 1) What is an electronic counter?
- 2) What are the different types of electronic counter?
- 3) What is the difference between electronic counter and a frequency meter?

**11) OSCILLOSCOPE:**

- 1) What is an oscilloscope?
- 2) Who was the first to design and fabricate an oscilloscope?
- 3) What are the functions of an oscilloscope?
- 4) Which is the most distinctive component of an oscilloscope?
- 5) How are oscilloscopes classified?
- 6) What are the commonly used screen materials?
- 7) What are the functions of an oscilloscope?
- 8) What is a spectrum analyzer?
- 9) What are the portable oscilloscope used for?

- 10) What is the use of an oscilloscope?
- 10) List the companies which manufacture oscilloscope?
- 12) What guidelines would you use while purchasing an oscilloscope?

## **12) ACCESSORIES**

- 1) What are the accessories used with a microphone during noise measurement?

### **Windscreen:**

- 1) What is a wind screen?
- 2) What material is the wind screen made of?
- 3) What is the use of a wind screen?
- 4) What is the purpose of a wind screen?
- 5) How do you clean a wind screen?
- 6) How many companies manufacture wind screen?
- 7) When is it used?
- 8) When is wind screen preferred to nose cone?
- 9) Can 1/2" windscreen be used with 1" mic?
- 10) Do wind screens correspond to mic size?

### **Random Incidence Corrector:**

- 1) What is a random incidence corrector?
- 2) What are the properties of RIC?
- 3) when is a R.I.C. used?
- 4) What are the different types of R.I.C?

### **Nose Cone:**

- 1) What is a nose cone?
- 2) What is the use of a nose cone?
- 3) What is the shape of a nose cone?
- 4) How many types of nose cones are there?

**Pre-Amplifier:**

- 1) Define a pre amplifier?
- 2) When is a pre amplifier used in noise measurement?
- 3) Name the companies which manufacturer preamplifiers?
- 4) What are the special features of B&K 2619 pre amplifier?

**Adaptor:**

- 1) Define an adaptor?
- 2) When is an adapter used?
- 3) Howmany types of adaptors are you familiar with?
- 4) What are the instruments that can be connected with the help of an adaptor?
- 5) Is there a need for an adaptor in the calibration and in vibration measurments?
- 6) Can a SLM be connected directly on tripod?
- 7) What are B&K adaptor number used with SLM B&K type 2209 and 2203
- 8) What are the different types of adaptor?

**Tripod:**

- 1) Define tripod.
- 2) Why is it called so?
- 3) What instruments can be mounted on a tripod?
- 4) Which are the companies which manufacture tripods?
- 5) What is the max height to which it can be raised?
- 6) What is the advantage of using a microphone boom?
- 7) What is the body of a tripod made of?
- 8) Why is a tripod used in noise measurements?
- 9) Can other tripods be used for noise measurements?
- 10) What are the advantages of using a tripod?

**CHAPTER-IV**

**AMPLIFICATION INSTRUMENTS**

1. HEARING AIDS
2. CROS AIDS
3. AID S & CLASSROOM AMPLIFICATION
4. EAR MOLDS
5. EAR PROTECTIVE DEVICES
6. HEARING AID CORD S
7. BATTERIES AND CELLS
8. COCHLEAR IMPLANTS

**I) HEARING AIDS:**

- 1) What is a hearing aid?
- 2) What are the two types of hearing aids?
- 3) What are the two ways of achieving an amplifications?
- 4) How can amplification be achieved through mechanical way?
- 5) Name an example of mechanical amplification hearing aid.
- 6) What are the types of electrical hearing aids?
- 7) What are the current hearing aid styles?
- 8) Specify the classification of hearing hearing aids based on the gain out (as proposed by ISI)?
- 9) The two types of hearing aids based on th mode of sound conduction are ..... and .....
- 10) Three types of hearing aids on the basis of gain are ..... and .....
- 11) The three main components of the hearing aid are ....., ..... and .....
- 12) Name the different controls of an hearing aid?
- 13) Name any three essential controls and acessories in a hearing aid?
- 14) What is the permissible distortion for body level hearing aids as specified by ISI standards.
- 15) Markings on the tone control are .....
- 16) What are the dimensions and weights of a hearing aid according to IS 3725 1966?
- 17) What are the additional electronic circuities incorporated in body level and ear-level and eye-glass hearing aids?

- 18) Name two types of compression amplifiers used in hearing aids?
- 19) Name the types of amplifier circuits used in hearing aids.
- 20) The two types of output limitings used in hearing aids are . . . . and . . . . .
- 21) What is AVC? What is its function?
- 22) Name any three types of ear level hearing aids?
- 23) The 3 hearing aid selection procedures are  
           1                           2                           3
- 24) What is WMHA?
- 25). . . . . and . . . . . are the two types of adaptors used with BTE hearing aids?

## 2) **CROS AIDS**

- 1) What are CROS hearing aids?
- 2) Name some variations of CROS - type aid
- 3) What is IROS hearing aid?
- 4) What is a BICROS hearing aid?
- 5) What is open BICROS hearing aid?
- 6) What is HICROS hearing aid?
- 7) What are FOCAL CROS hearing aids?
- 8) What is a POWER CROS hearing aid?
- 9) What are MULTI CROS hearing aids?
- 10) What do you mean by MINICROS hearing aids?



**3) ALD S AND CLASSROOM AMPLIFICATION**

- 1) What are assistive listening devices?
- 2) Name some of the assistive listening devices?
- 3) The three types of ALD s depending on the different modes used are
  - 1
  - 2
  - 3
- 4) The two systems in ALD s that uses the tactile mode are:
  - 1
  - 2
- 5) Name the systems in ALD s that uses the visual mode?
- 6) Out line the evolution of auditory trainers?
- 7) What are the types of classroom amplification systems?
- 8) Do you know a loop induction system? What is it?
- 9) What is a EFFM system?
- 10) Expand the acronym MESA?

**4) EAR MOLDS :**

- 1) Name some materials for the manufacture of ear molds?
- 2) Name the accessories of an ear mold?
- 3) What are the different types of earmolds?
- 4) . . . . . and . . . . . are the two types of earmold rings?

**5) EAR PROTECTIVE DEVICES :**

- 1) Define ear protective device protection?
- 2) What is an ear plug?
- 3) What are disposable ear plugs? Give examples?
- 4) Define a helmet? How is it useful in noise control?
- 5) Definition of a lot?



**CHAPTER-5                      CROSS                      WORDS**

1. FIND OUT THE NAMES OF THE MICROPHONES HIDDEN HERE?

C	C	O	R	C	U	T	T	N
A	O	O	U	I	N	G	E	U
R	H	N	S	T	U	S	R	G
B	O	R	D	L	I	O	T	N
O	B	M	O	E	L	T	C	O
N	I	T	S	T	H	O	E	B
A	L	D	F	R	R	S	L	B
Q	G	P	N	O	C	I	E	I
C	R	y	S	T	A	L	L	R

KEYS: CARBON: CRYSTAL: HOMING COIL:  
GUN: CONDENSER.

<b>B</b>	N	A	W	V	Z.	<b>W</b>
c	O	N	E	<b>X</b>	T	I
D	S	C	<b>R</b>	E	E	H
y	E	<b>F</b>	r	s	<b>T</b>	D
<b>Q</b>	<b>G</b>	<b>J</b>	R	I	c	5

QUESTIONS

1 .Down & 3 Across -----And -----Use it During Measurment of Noise in Narrow Ducts & Channels(4, 4)

2 & 4 ACROSS——SCREEN, PROTECTS THE MIC AGAINST POWERFUL BREEZE (4, 6)

3. FIND OUT SOME OF THE INSTRUMENTS USED IN OUTDOOR MEASUREMENT?

A	D	A	T	T	O	R	S
H	L	S	C	R	E	E	N
N	C	D	N	I	W	D	D
S	R	S	M	P	L	E	O
C	I	R	I	O	O	H	D
C	A	N	C	D	O	U	P

OUT DOOR MEASUREMENTS; INSTRUMENTS AND ACCESSORIES.  
 KEYS: RIC; DEH; SLM; ADAPTORS; MIC; TRIPOD;  
 WINDSCREEN.

4. FIND OUT THE "METERS" HIDDEN IN THIS CROSS

A	D	S	M	L	A
C	L	O	O	P	U
C	E	U	S	A	D
E	V	H	V	I	I
L	E	D	U	V	O
E	L	O	P	H	S
R	H	E	T	E	R
O	H	S	T	O	L

KEYS: DOSIMETERS AUDIOMETER; V-U METER; SOUND LEVEL METER;  
 ACCELEROMETER.

5. FIND OUT THE NAMES OF THE INSTRUMENTS USED IN CALIBRATION?

A	U	D	I	0	M	E	T	E	R
R	D	M	P	A	D	A	K	E	H
T	0	A	L	0	I	R	J	N	U
I	R	S	P	H	0	N	E	0	0
F	P	T	N	T	T	S	I	T	D
I	K	0	N	0	0	S	I	S	N
C	P	I	S	R	0	R	S	I	U
I	T	D	L	E	U	E	L	P	0
A	U	R	N	E	T	E	R	T	S
L	A	1	C	I	F	I	T	R	A

KEYS: ADAPTOR; SLM; SOUND LEVEL METER;  
 ADUIOHETERS; ARTIFICIAL EAR;  
 ARTIFICIAL MASTOID; PISTON PHONE.

6. FIND OUT THE INSTRUMENTS AND ENJOY THE WORD GAME

<sup>1</sup> M	I	C	R	<sup>3</sup> O	<sup>4</sup> P	<sup>5</sup> H	<sup>6</sup> O	<sup>7</sup> N	<sup>8</sup> E	<sup>9</sup> S	<sup>10</sup> P	<sup>11</sup> S	<sup>12</sup> P	<sup>13</sup> E	<sup>14</sup> C	<sup>15</sup> T	<sup>16</sup> R	<sup>17</sup> A	<sup>18</sup> L
O	T	O	S	S	R	R	A	O	M	L	K	I	B	L	C	E	D	F	A
<sup>19</sup> V	I	U	Q	<sup>20</sup> C	<sup>21</sup> O	<sup>22</sup> N	<sup>23</sup> E	<sup>24</sup> S	<sup>25</sup> R	<sup>26</sup> M	<sup>27</sup> A	<sup>28</sup> C	<sup>29</sup> J	<sup>30</sup> E	<sup>31</sup> I	<sup>32</sup> S	<sup>33</sup> C	<sup>34</sup> O	<sup>35</sup> P
I	R	N	O	I	Q	D	S	E	T	P	J	N	V	C	R	T	W	X	H
N	Y	T	R	L	G	F	K	F	L	S	M	A	O	T	F	D	E	R	O
G	P	E	T	L	<sup>36</sup> O	<sup>37</sup> G	<sup>38</sup> U	<sup>39</sup> N	<sup>40</sup> Q	<sup>41</sup> R	<sup>42</sup> V	<sup>43</sup> L	<sup>44</sup> X	<sup>45</sup> R	<sup>46</sup> I	<sup>47</sup> B	<sup>48</sup> B	<sup>49</sup> O	<sup>50</sup> N
O	R	R	N	A	N	M	P	<sup>51</sup>	<sup>52</sup> T	<sup>53</sup> U	<sup>54</sup> S	<sup>55</sup> W	<sup>56</sup> Y	<sup>57</sup> O	<sup>58</sup> T	<sup>59</sup> E	<sup>60</sup> R	<sup>61</sup> C	<sup>62</sup> E
W	Z	I	P	T	T	<sup>63</sup> O	<sup>64</sup> P	<sup>65</sup> R	<sup>66</sup> E	<sup>67</sup> A	<sup>68</sup> M	<sup>69</sup> P	<sup>70</sup> F	<sup>71</sup> D	<sup>72</sup> T	<sup>73</sup> A	<sup>74</sup> B	<sup>75</sup> I	<sup>76</sup> S
R	A	N	D	O	M	K	P	E	M	E	E	I	J	E	L	T	A	A	B
T	V	A	Y	R	Z	P	O	C	R	<sup>77</sup> D	<sup>78</sup> N	<sup>79</sup> T	<sup>80</sup> P	<sup>81</sup> S	<sup>82</sup> O	<sup>83</sup> P	<sup>84</sup> Q	<sup>85</sup> V	<sup>86</sup> S
<sup>87</sup> C	<sup>88</sup> C	<sup>89</sup> D	<sup>90</sup> F	<sup>91</sup> G	<sup>92</sup> R	<sup>93</sup> T	<sup>94</sup> O	<sup>95</sup> A	<sup>96</sup> R	<sup>97</sup> D	<sup>98</sup> A	<sup>99</sup> P	<sup>100</sup> T	<sup>101</sup> O	<sup>102</sup> R	<sup>103</sup> B	<sup>104</sup> E	<sup>105</sup> R	
<sup>106</sup> C	<sup>107</sup> O	<sup>108</sup> R	<sup>109</sup> R	<sup>110</sup> E	<sup>111</sup> C	<sup>112</sup> T	<sup>113</sup> O	<sup>114</sup> R	<sup>115</sup> C	<sup>116</sup> O	<sup>117</sup> T	<sup>118</sup> M	<sup>119</sup> E	<sup>120</sup> R	<sup>121</sup> E	<sup>122</sup> E	<sup>123</sup> F	<sup>124</sup> F	<sup>125</sup> P
A	N	Q	P	Z	R	O	U	D	T	<sup>126</sup> R	<sup>127</sup> C	<sup>128</sup> R	<sup>129</sup> F	<sup>130</sup> R	<sup>131</sup> E	<sup>132</sup> Q	<sup>133</sup> Z	<sup>134</sup> I	<sup>135</sup> T
<sup>136</sup> A	<sup>137</sup> D	<sup>138</sup> O	<sup>139</sup> S	<sup>140</sup> T	<sup>141</sup> M	<sup>142</sup> E	<sup>143</sup> T	<sup>144</sup> E	<sup>145</sup> R	<sup>146</sup> B	<sup>147</sup> R	<sup>148</sup> C	<sup>149</sup> A	<sup>150</sup> T	<sup>151</sup> S	<sup>152</sup> U	<sup>153</sup> O	<sup>154</sup> L	<sup>155</sup> Y
<sup>156</sup> I	<sup>157</sup> E	<sup>158</sup> C	<sup>159</sup> E	<sup>160</sup> P	<sup>161</sup> O	<sup>162</sup> R	<sup>163</sup> P	<sup>164</sup> R	<sup>165</sup> T	<sup>166</sup> F	<sup>167</sup> Y	<sup>168</sup> K	<sup>169</sup> M	<sup>170</sup> C	<sup>171</sup> O	<sup>172</sup> E	<sup>173</sup> T	<sup>174</sup> T	<sup>175</sup> R
I	N	M	A	<sup>176</sup> P	<sup>177</sup> H	<sup>178</sup> N	<sup>179</sup> A	<sup>180</sup> S	<sup>181</sup> O	<sup>182</sup> I	<sup>183</sup> S	<sup>184</sup> W	<sup>185</sup> C	<sup>186</sup> O	<sup>187</sup> U	<sup>188</sup> N	<sup>189</sup> T	<sup>190</sup> E	<sup>191</sup> R
T	S	D	N	Q	I	R	<sup>192</sup> U	<sup>193</sup> D	<sup>194</sup> H	<sup>195</sup> M	<sup>196</sup> T	<sup>197</sup> Y	<sup>198</sup> V	<sup>199</sup> U	<sup>200</sup> X	<sup>201</sup> C	<sup>202</sup> Y	<sup>203</sup> R	<sup>204</sup> Z
E	O	D	F	J	N	S	A	T	I	M	A	<sup>205</sup> N	<sup>206</sup> B	<sup>207</sup> E	<sup>208</sup> O	<sup>209</sup> Y	<sup>210</sup> P	<sup>211</sup> Q	<sup>212</sup> M
<sup>213</sup> T	<sup>214</sup> R	<sup>215</sup> I	<sup>216</sup> P	<sup>217</sup> O	<sup>218</sup> D	<sup>219</sup> S	<sup>220</sup> F	<sup>221</sup> O	<sup>222</sup> C	<sup>223</sup> A	<sup>224</sup> L	<sup>225</sup> I	<sup>226</sup> B	<sup>227</sup> R	<sup>228</sup> A	<sup>229</sup> T	<sup>230</sup> O	<sup>231</sup> R	<sup>232</sup> S

**ACROSS:**

- 1) Transducers that convert acoustic to electrical signal  
(11)
- 7)\_\_\_\_\_analyzer: A type of frequency analyzer (8)
- 10) Needle deflects here in short (2,-1)
- 11) Noses wear them during noise measurement (5)
- 12) A scope without an end from oscilloscope (4)
- 14)\_\_\_\_\_mic; not used in shooting of course (3)
- 15)\_\_\_\_\_mic; fancy & useful not an a lady's hair (6)
- 19) Sound enhanced in an ex unit of current in short (6)
- 22 & 26 across\_\_\_\_\_incidence\_\_\_\_\_
- 25)\_\_\_\_\_u sed to connect 2 instruments during measurement  
(7)
- 28) Reversed short form of the extension used in noise  
measurement.
- 30)\_\_\_\_\_analyzer: Instrument analyzes from 2Khz-20Khz in  
short (4)
- 35)\_\_\_\_\_circular turn table shortened, its not for  
tabletennis (11)
- 38) Weighting network reversed and abbrfev^ted.
- 39)\_\_\_\_\_Indicates standards set here (11)
- 40) Across and 2 down. Electronic\_\_\_\_\_ (8)
- 43)\_\_\_\_\_Humidifier\_\_\_\_\_does just the opposite of this if  
you add this prefix (11)
- 45)\_\_\_\_\_3 legged stand (7)
- 46) --- Ensure good working standards - use these (12)

**DOWN:**

- 1)\_\_\_\_\_Coil microphone.
- 2 & 40 across.\_\_\_\_\_counter.
- 3 & 16 down. Adapter (10, 4, 9)
- 4\_\_\_\_\_Adapter: an adapter (4)
- 5\_\_\_\_\_accessary used in the measurement of noise in narrow channels (4)
- 6 Sound level meter: abbreviate (1, 1, 1)
- 7\_\_\_\_\_Generators which generates the input source? (6)
- 9\_\_\_\_\_Equipment: Synonym for examination (4)
- 13 Piston\_\_\_\_\_not used to make call s but to calibrate SLM (6)
- 14 Gun microphone: Abbreviate (1, 1,)
- 17\_\_\_\_\_Set: Present in SLM used to analyze frequencies
- 18 Abbreviation for 9 down (1, 1)
- 19 Piston phone, in short? (1, 1) (12)
- 20 Tape\_\_\_\_\_instrument used to transfer and play back any signal (9)
- 23 & 27 down turned up along with out to give the display device (4, 3)
- 24\_\_\_\_\_mic: Used in noise measurements (9)
- 29\_\_\_\_\_Microphone be it quartz or be it silicone converts acoustic to electric signal (7)
- 30 Frequency analyzer; Briefly expressed (1,1)
- 32 Input signal in short (1, 1)
- 34 Rain\_\_\_\_\_not an umbrella but used to protect the mic from rain during noise measurements (5)



- 38\_\_\_\_\_The screen protects the mic from this during noise  
measurements (4)
- 41 Extension cable for short (1,1)
- 42 Microphone, in short colloquially (3)
- 43 An unit for sound as well as a B&K symbol (1, 1)
- 47 Extension rod abbreviated (1, 1)

**CHAPTER-VI****ABBREVIATIONS**

AAOO: American Academy of Ophthalmology and Otolaryngology.

ABR: Audiotory Brainstem "Response.

ADC: Audio Development Company

AER: Auditory Evoked Response.

AGC: Automatic Gain Control.

ALD: Assistive Listening Devices.

ANSI: American National Standard Institute.

ASHA: American Speech-Language Hearing Association.

AVC: Automatic Volume Control

BHOHA: Binaural Hearing with One Hearing Aid.

BHOHA: Bilateral Amplification with One Hearing Aid.

BTE: Behind - the Ear.

CAOHC: Council for Accreditation in Occupational Hearing  
Conservation.

CERA: Cardiac Evoked Response Audiometry.

CHABA: Committee on Hearing and Bio-Acoustics.

CROS: Contralateral Routing of Signals.

CID: Central Institute for the Deaf.

CRO: Cathode - Ray - Oscilloscope.

DHEW: Department of Health, Education and Welfares.

DMM: Digital Multimeter.

EDA: Electro Dermal Audiometry.

EID : Equal Input Distortion

EINS : Equivalent Input Noise spectrum.

EFNL: Effective Perceived Noise Level.

ERA: Electro Encephalic Response Audiometry.

FTC: Federal Trade Commission.

FROS: Front Routing of Signals.

GSRA: Glavanic Skin Response Audiometry.

HAIC: Hearing Aid Industry Conference.

HCP: Hearing Conservation Program.

HHIE: Hearing Handicap Inventory for Elderly.

HPD: Hearing Protective Device.

ISA: International Standards Organisation.

ITC: In-The-Canal hearing aid.

ITE: In-The-Ear hearing aid.

IROS: Ipsilateral Routing of Signals.

KBASS: Killion - Berlin Bas3 Amplified Unobstructed Sound.

KEMAR: Knowles Electronic Mankin for Acoustic Research.

LIA: Lead Industries Association.

MLR: Middle Latency Responses.

MINICROS: Mini Contralateral Routing of Signals.

MULTICROS: Multi Contralateral Routing of Signals.

NAEL: National Association of Earmold Laboratories.

NAL: National Acoustic Laboratories.

NIPTS: Noise Induced Permanent Threshold Shift.

NRR: Noise Reduction Rating.

NEF: Noise Exposure Forecast.

NIOSH: National Institute of Occupational Safety and Health.

OSHRC: Occupational Safety and Health Review Commission.

OSHA: Occupational Safety and Health Administration.

POWER CROS: Power Contralateral Routing of Signals.  
PTS: Permanent Threshold Shift.  
PVV: Positive-Venting-Value.  
RFFM: Radio Frequencies, Frequency Modulation System.  
SEA: State Education Agencies.  
SLM: Sound level Meter.  
STC: Sound Transmission Class.  
SPIN: Speech Perception in Noise.  
SRTA: Stapedious Reflex Threshold Audiometry.  
STS: Standard Threshold Shift.  
TLV: Threshold Limit Values.  
TTS: Temporary Threshold Shift.  
TWA: Time Weighted Average.  
V-U-Meter: Volume-Unit Meter.  
VVV: Variable-Venting-Value.  
WMHA: Wearable Master Hearing Aid.

**EVALUATION SHEET**

To the readers

1) Did you have difficulty in understanding the question.

Cross words and Abbreviations?

If so.

a) Were the questions ambiguous?

b) Were the questions not very specific?

c) Were the questions irrelevant?

d) If none of the above, please specify the problem encountered along with the chapter, page and question.

2) Did you find this "QUIZ Collection" useful? If so mention for what purpose (S) it was useful, like for interview, examination, teaching, setting QUIZ questions, getting to know instruments etc.

Your suggestions for making this work is more useful and are welcome.

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