

QUESTION BANK ON ASSISTIVE LISTENING DEVICES

REG. NO. M9414

***AN INDEPENDENT PROJECT WORK SUBMITTED IN PART
FULFILMENT FOR THE FIRST YEAR MASTERS DEGREE
IN SPEECH AND HEARING TO THE UNIVERSITY OF
MYSORE***

***ALL INDIA INSTITUTE OF SPEECH AND HEARING
MYSORE 570 006
INDIA
MAY 1995***

***DEDICATED
TO
DAD, MOM AND LAMP***

CERTIFICATE

This is to certify that the Independent project entitled "*QUESTIONBANK ON ASSISTIVE LISTENING DEVICES*", is the bonafide work, done in part fulfilment for the First year of the Master's degree in Speech and Hearing of the student with Registration No.M 9414.

Mysore
May 1995




Director

All India Institute of
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CERTIFICATE

This is to certify that this Independent project entitled "*QUESTION BANK ON ASSISTIVE LISTENING DEVICES*" has been prepared under my supervision and guidance.

Mysore
May 1995


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DECLARATION

I hereby declare that this Independent Project entitled *Question Bank on Assistive Listening Devices* " is the result of my own study undertaken under the guidance of Dr. (Miss) S. Nikam, Director, All India Institute of Speech and Hearing, Mysore and has not been submitted earlier at any University for any other Diploma or Degree.

Mysore
May 1995

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INTRODUCTION

Assistive Learning devices were developed to address specific listening problems which occur as a result of hearing loss (Zelski & Zelski 1985). They apply to all systems designed to improve communication ability of hearing impaired person or to alert them to the presence of environment sounds. They are products designed to solve one or more specific listening problems created by a hearing loss. ALDs are another option for hearing impaired population.

Prior to the sixteenth century A.D, there were but a few isolated attempts by various priests and monks to educate the hearing handicapped. In pre-Christian era, Aristotle had assumed a common or organic relationship between deafness and muteness. While he did not assume that speech was a skill acquired through auditory modality he did not believe that deaf were incapable of education. By the time of the reformation, some attitudinal changes towards the deaf had evolved. Now the deaf are considered educable, principles were set for improved educational and social positions. The first consumer organization in the field of hearing impairment was the National Association of the deaf which was started in 1880. Under the leadership of Ruth. R. Green, the first public programme on ALD was organised. The league has played an active role in the development, evaluation and application of ALDs .

Compton (1991) explains that hearing impaired have four kinds of communication problems; face to face, broadcast media (radio and TV), telephone and environmental (door bell, smoke alarms). Hearing aids do not solve all of these problems for all people. ALDs overcome these problems and its role is adjunctive to hearing aid fitting; it serves to achieve the goal more fully helps the hard of hearing to utilize hearing to the maximum for the development of speech and language. But they do not restore the auditory efficiency fully. There are other dimensions that are desirable to recapture. Apart from auditory mode, ALDs use the other sensory modes to convey the information to the deaf which are vision and tactile sense. In short XLDs can be listening systems which generally interface with hearing aids to solve problems that hearing aids do not handle well, like listening in noise, in reverberative areas or from distance.

ALDs are divided into two main types

a) Wireless and b) Hardwired

Wireless do not require a direct connection between the sound source and the listener where as hardwired requires it.

Another categorization is

- (1) Devices to improve speech signal in adverse listening environments.
- (2) Signal indicators and warning signals.
- (3) Full range of devices for TV and radio receptors.
- (4) Telephone devices ranging from amplifiers to TDD.

ALDs can be again divided into

(a) Devices that use auditory mode

Egs: Induction Loop, FM hearing aids and Infra red systems.

(b) Devices that use the visual mode

Egs: Close captioned TV, TDD, Upton's eye glasses, LEDs.

(c) Devices that use the tactile mode

Egs: Alerting devices like vibration with alarm clock, vibrotactile aids.

ALDs can be used by people with any degree of hearing loss. It has application not only for the hard of hearing but also for speech and language handicapped children with normal hearing. They enable better understanding of speech in adverse listening conditions, by favouring a high S/N ratio, allowing auditory self monitoring, enabling child-to-child communication and binaural reception. They enhance speech understanding and enjoyment of music in everyday situations by making it possible to listen from a distance and by significantly reducing back ground noise and echo. They can be used in large areas such as lecture and concert halls, in churches or in interpersonal situations such as small group discussions, restaurants, television viewing and in telephone conversations.

Some of the ALDs are bulky and assume a lot of space. It is expensive. ALD such as induction loop has a major problem of spill over while problems may arise when more than one class uses the same transmitting frequency in FM systems. Not all ALDs can be used outdoors. With the proliferation of assistive devices and

systems, the consumer should receive professional help in selecting devices to meet his/her needs. Although there are many programmes like The Gallaudet assistive devices programmes, there is no specific standard programmes or methods for the selection of ALD. The suitability of the EAC of ALDs for the individual hearing impaired person is generally not clinically evaluated. Furthermore, there are limited data available on gain, frequency response and harmonic distortion of these devices.

This question bank has been made as an attempt to cover the available material on ALD with the following aims:

- (a) To familiarize the reader with the basic concepts and principles related to ALDs.
- (b) To provide the reader with the history of ALDs.
- (c) To give the reader an idea about the different types of ALDs, their functioning, advantages and disadvantages.
- (d) To familiarize the reader with the recent advances in the area of ALDs.

HISTORY OF AIDS

1. Match the accomplishments description in the coloumn on the right with the persons list in the coloumn on the left.

- | | |
|----------------------------------|---|
| (1) Gerald I William (1979) | (a) discovered "magnetic leakage" in telephone receivers. |
| (2) sennheiser & Beyer | (b) promoted the study of the use of tele typewriters. |
| (3) Radioear (1926) | (C) introduced telephone devices. |
| (4) Alexander Graham Bell (1876) | (d) coined the term ALD & systems. |
| (5) Sam Lybarger (1947) | (e) invented modern which provide the link to telecommunication system. |
| (6) Robert Weitbrecht (1963) | (f) introduces IR system. |
| (7) David Meyers (1986) | (g) first manufacturer to make hardwire system. |
| (8) Scott & Ruth Holder | (h) pioneers in FM development. |

2. Fill in the blanks

1. The telecommunication was enacted for the disabled by _____.

2.—was the first to offer the different types of amplifiers.

3. Access to TV viewing to American hearing impaired population was through_____.
4. The movie which is the winner of Oscar Award & used IR system is_____.
5. _____ were the first to use FM systems for Orchestra concerts.

Give the significant events in the area of ALDs during the years.

- (a) 1968 -
- (b) 1970 -
- (c) 1976 -
- (d) 1979 -
- (e) 1980 -
- (f) 1981 -

DEVICES THAT USE AUDITORY MODE

1. State whether the following statements are true or false
 - a. ALDs has the application only for hard hearing and not for normal hearing.
 - b. Virtually everyone including persons with normal hearing can use ALDs.
 - c. ALDs can be used by people with middle ear disorders.
 - d. ALDs cannot be used with personal hearing aids.
 - e. FM systems can be successfully fit on infants as young as 2 to 3 months with out difficulty.

2. Fill in the blanks
 - a. The transmission strength of FM is approximately _____ feet under normal conditions.
 - b. A system that uses a wire or loop placed around the perimeter of room/enclosed area is_____.
 - c. The induction loop system makes use of the principle of
•
 - d. The setting of hearing aid for IL is_____.
 - e. The carrier frequency of AM radio transmitter is _____.

3. The following persons have published many & or major articles on ALDs.

Author	Yes	No
--------	-----	----

- (a). Arthur BoothRoyd
- (b). Kaplan
- (c). Mark Ross

- (d). Bekesy
- (e). Jerger
4. Give the names of currently available carrier wave systems
 5. List three supplies of ALDs that are typically used for classroom amplification and the reasons for each.
 6. Name the assistive devices which can be used in churches, theaters, meeting hall, etc.
 7. Give synonyms for ALDs.
 8. Expand the following abbreviations.
ALD, FM, IR, IL.
 9. Categorize ALDs based on their use.
 10. Categorize ALDs based on the sensory mode utilized.
 11. Define ALD's as succinctly yet completely as possible.
 12. How is the S/N ratio enhanced by IL system ?
 13. What are the ways in which sound is transmitted into the ear in FM system ?
 14. Contrast the following terms by stating one or two major distinctions between the hardwired ALD and wireless ones.
 15. Name the three ways by which FM systems can be evaluated.
 16. How can the back ground noise be cut out by FM systems with environmental mics ?
 17. How can FM system be hazardous to speech and language development if not used appropriately ?
 18. How does a FM system with BTE trasducer help children with profound heavy loss ?

19. How can IR receiver be used with "In the ear" or "BTE" aids ?
20. Give the advantages of IL specifically respect to home.
21. How can IR systems be benefitted for people with severe hearing loss ?
22. What is the type of unit used by AM system ?
23. Give four methods of coupling a hearing aid to a FM receiver to produce a personal FM system.
24. Why is an FM system with environmental mic more preferable?
25. Differentiate IR, FM and IL & hardire based on their working ?
26. Compare advantages and disadvantages of the following.
27. List some ways in which IL is adequate in (1) Viewing TV (2) At home (3) Public address system

Devices that use Visual Mode

1. a) Unscramble the letters below to obtain a few ALDs that use visual mode.

1. TROSPECGRAMS
2. RNID DDETY BREA
3. TIRACIFILAA LAPATE
4. SONTPTU YEE ALGSS DSAI
5. PSEEH C SEPCDRRAIGPHIC SIDLPAY
6. AMS
7. TIRACIFILA SPCEEH & SPCEEH CONGTIION YSSTEM
8. SPECEH RPOCSSEOR
9. OYT NIART HTIW CITSUOCA LORTONC
10. ECTROEL ALATOP HGRAP
11. AIC
12. VSF DINCATRO
13. LARYNOGGRAHP

b) Classify the above as a. Speech movement indicators
b. Visual sensory aid with reinforcement, c. Visible speech system d. Speech computing aids.

2. What do these acronyms stand for

SAM

CAI

NCI

FCC

TICCIT

CCTV

3. Choose the correct answer

1. The earliest developed visual sensory aid is_____.
a) Oscillograph & CRO b) Uptons eye glass e) Laryngograph
2. The speech indicator which responds directly to articulation and phonation is_____.
a) Artificial Palate & electropalatograph b) Laryngograph
c) All three.
3. The vocal tract is displayed as a curve representing the cross-sectional area of vocal tract by_____.
a) Speech movement indicator b) Uptons eye glass
c) Close captioned TV.
4. Pick the odd man out_____.
a) SAM.b) RNID teddybear c) CCTV
5. Name the ALD of recent technology and origin
a) Class room amplification systems b) Computers
c) Laryngograph.
6. The biomechanical model of vocal fold physiology developed by Titz and Talking can be used as|_____.
a) Computer modeling of speech production b) CAI
c) Speech Processor for deaf.
7. The primary advantage of close captioned TV is _____.
a) Helps them to hear & Communicate better
b) Is a mode for entertainment
c) HOH of all ages can communicate with their families and peers as they share current information and entertainment.

8. "Line 21" is
- a) A blank line of beam line of TV Picture made used by CCTV
 - b) A Visual aid which helps HOH in Communication
 - c) A TV programme for hard of hearing
9. The above are parts of
- a) Friction indicator b) Nasality indicator
 - c) Intensity indicator.
10. Tick the common statements of intensity, nasality and friction indicators.
- a) They are-parts of kostic apparatus and individual units aswell
 - b) The give auditory feed back of all sounds produced.
 - c) They are visual indicators
 - d) They were deviced by D.J. KOSTIC
 - e) They indicate intensities of all sounds.
11. Indicate in the above block diagram the number of bulbs required.
12. Indicate the levels corresponding to extreme left, middle and right bulbs in this.
13. Which bulbs are to be glowed by the deaf in the intensity indicator.
- a) to speak at normal conversation levels.
 - b) Speech to be as loud as 80dB
 - c) Speech to be as loud as 20dB

14. Friction indicator connected to intensity indicator would result
- As an aid to maintain loudness of fricatives
 - It would stop working
 - It would merely indicate the presence of fricatives.
15. To teach the fricatives you would opt for
- Friction indicator
 - VSF
 - Nasality indicator.
16. Indicate the bulb to be glowed to learn Voicing in VSF
17. In the above diagram (Q.No:16) indicate the sounds required to be activated against each.
18. The one which is not a basic approach identified for computer assisted instruction in programmes for hearing impaired is _____
- DAVID
 - SPEC
 - APPLE
19. Which is real time graphic display and time square graphic display.
- Presentation of language in printed or written form to one person
 - It is which moves across the screen and disappears rather than a hard copy print.
4. Would you say...
- ... well written captions in close captioned TV can attack communication problems of the hearing impaired listener.
 - ... VSF indicator can only be used to teach sounds in isolation and not any combination of two response patterns.

- 3) ... SAM can be used with deaf aswell as multiply handicapped.
- 4) ... Real time graphic display provides the deaf child with oppportunity for expression and verbal interaction.
- 5) ... Oscillograph and CRO, displays speech wave form on to screen by means of a suitable microphone.
- 6) ... Intensity indicator can be used outside in day to day speaking situations
- 7) ... Friction indicator may not prove useful in day to day conversations.
- 8) ... In uptons eye glass aid, the illumination of lights is in a successive manner.
- 9) ... In SAM, Monkey climbs only a certain distance however long the utterance word or a sentence.
- 10) ... Friction indicator can help the deaf to produce different fricatives differentially
- 11) ... In the toy train with acoustic control, the distance travelled by the train depends on the length of the utterance.
- 12) ... HOH Veiwers of close captioned TV requires special decoding devices such as adapter to comprehend the conversations.

- 13) ... Close captions are broadcasted as part of the programme and appear on all TV sets in close captioned TV.
- 14) ... A very young deaf child can make effective use of Oscillograph /CRO.
- 15) ... The deaf person can communicate with a normal hearing individual through artificial speech and speech recognition systems.
- 16) ... The deaf can communicate with each other through artificial speech and speech recognition systems.
- 17) ... A speech processor may be used by the deaf to receive their own speech, recognize their out put and improve intelligibility.
- 18) ... The computer modelling of biomechanics of speech production is used with deaf as speech training aids.

5.' Fill up the blanks

- 1, Kostic's apparatus, was deviced in-----
2. _____ authorized the temprory used of line 21 to broadcast, the first experimental close captioned programmes.
3. In the year _____ first captioned film for the deaf was founded.

4. _____ allows speech learners to see tongue to palate contact patterns needed to produce some consonants and vowels.
 5. _____ is a visual display of certain speech patterns which can be used to help HOH to improve speech perception & production.
 6. The visible speech system was developed by _____.
 7. The more sophisticated visible speech system was developed by _____.
 8. Autocuer is artificial speech & speech recognition system developed by Cornett in the year 1965.
 9. Alarm clocks utilize either _____ or _____ as their signal for alerting HOH.
6. Which of the sequencing is appropriate to give an understanding on captioning of a TV programme
- a) The disc is sent to TV broadcast where caption data is inserted into "line 21" of TV picture.
 - b) The producer furnishes a video tape of the programme to national captioning facility prior to broadcast date.
 - c) The broadcaster then transmits the caption data along with the regular picture and sound portions of the programme.
 - d) In National Captioning Facility, caption editors transform the spoken dialogue into captions which are recorded on magnetic disc.
- BDAC, ABCD, CDAB .

Given below are certain statements about upton's eyeglass.

Point out those which are grossly incorrect.

- a) It is a wearable auditory sensory aid.
- b) It was built by a deaf engineer for his personal use.
- c) It should be worn by the person with normal hearing while conversing with a deaf person.
- d) It has incandescent lights which responds to phonetic features of sound and is attached to user's eye glass.
- e) It creates a round shape which frames only the face to give appropriate visual clue.

Put a tick against the statements applicable to video disc and asterisk those concerning teletext.

- a) It has been used to educate the parents of HOH.
- b) It can teach normal hearing population finger spelling through programmed instruction approach.
- c) It is a visual aid which makes use of TV monitor to deliver a wider range of news, listening announcement and other local and national information which appear on TV.
- d) It is a new TV source and a programme captioning system.
- e) Is being used in IOWA school for deaf and Nebraska school for deaf, it helps students for quiz sessions.
- f) The size of the lettering can be varied in this system.

- g) The placement of the captions can be varied within the frame thereby visually attributing the dialogue of different characters.
- h) The list of characters with description of their speaking styles can be operated based on needs of the client, in this system.
- i) A visual text book has been developed using this.
- j) The one developed by MDPHI includes teacher grade materials, vocabulary instructions, film strip type, sequencing and interactive quiz sessions.
- k) The language can be made simple depending on viewer age and alternative vocabulary may also be provided for different words in this system.
- l) This list of characters with descriptions of their speaking styles can be operated based on needs of the client in this system.
- m) It can be interfaced with computer to eliminate the need for two display screens.
- n) It can be used to teach problem solving in a systematic way for HOH.

9. Give specific terms for the following

- 1) Device for indicating the positions and movements of the tongue and larynx in order to train and correct the speech of hearing impaired.
- 2) A periodic wave which shows voice, pitch, VOT and other aspects of voice quality.

- 3) A direct sensor which responds to phonation of vocal folds by monitoring the degree of contact between vocal folds.
- 4) A speech indicator which holds an array of many electrical contacts in mouth to display contacts of tongue.
- 5) A graphic plot of sound, frequency versus time display with intensity represented by darkness of tracing.
- 6) A process in which the dialogue portion of TV programme is translated into captions, converted in the regular broadcast TV signal in a portion of the picture.
- 7) This system enables the deaf speaker who cannot speak intelligibly to produce speech messages by typing into their synthesiser to which the normal hearing individual will reply by speaking which would be transformed into a written version.
- 8) Systems that alert or warn the hearing impaired person to the presence of auditory signal rather than amplifying it.
- 9) A dog that has been professionally trained to alert its deaf/hearing impaired owner to certain sounds such as an alarm clock, clock bell, knock, telephone ring etc.

10. Match the following

- a) SAM a) Monkey a) Eyes glow
 b) RNID teddy bear b) Train b) climbs up & down

- c) Toy train with acoustic control
- c) Red, orange and green lights
- c) Moves
- d) VSF
- d) Teddy Bear
- d) Indicate specific sounds

11. Match the following types of CAI systems to appropriate one

- a) PLATO
- a) Microcomputer
- b) TICCIT
- b) Intermediate to small scale time-shared systems
- c) DAVID
- c) Large scale, time shared dedicated systems
- d) APPLE ,
- d) Small scale special purpose system

DEVICES THAT USE TACTILE MODE

Fill in the Blanks

1. The Specific features of Speech signals are displayed in _____Tactile aids.
2. The different types of Spectral display as classified by __ _Reed etal are , & _____.
3. _____and _____arrays are the two new types of transducer systems.
4. In _____type of tactileaid the spectrum of the encoded sound is represented using either a one or two dimensional array of stimulators.
5. _____is a single channel vibrator system developed by Gault (1920's).
6. The single frequency at which skin is most sensitive is _____.
7. The two types of tactual Vcoders are _____& _____.
8. _____is an ideal device which would help a post-lingual profoundly deaf.

State whether the following statements are True or False.

1. Lengthy and methodological training is required to make vibrotactile input a meaningful source for HOH.
2. ALDs were intended to replace hearing aids for fulltime use in varied listening condition.

3. A deaf-blind can make use of tactile aids to full extent in conjunction with a hearing aid.
4. A Vibrator held in hand, worn on wrist or around the waist can give rise to sensation of hearing.
5. Single Channel ALDs have single output transducer.
6. Tactile aids do not result in significant improvement in speech reading performance.
7. The Sensory channel accessible to Vibrotactile aid is the acoustic nerve.
8. Vibrotactile sensitivity is vulnerable to aging like vision and hearing.
9. A tactile Vocoder enables the HOH in distinguishing visible sounds only.

Answer the following :

1. The following persons have made contributions or published major articles on tactile aids.

AUTHORS	YES	NO
---------	-----	----

- (a) Gault
- (b) Nobert wiener
- (c) Gunner Fant
- (d) Pickett
- (e) Boothroyd

2. What are Vibrotactile devices?
3. Name a few alerting devices which use vibration as their signal.

4. Match the accomplishment/description in the column on the right with the persons list in the column on the left.

- | | |
|-------------------|---|
| (a) Gault & Crane | 1. Teletactor |
| (b) Nobert Wiener | 2. Project Felic at MIT |
| (c) Gunner Fant | 3. Published the article Impact of technology on management or deafness |
| (d) Blarney | 4. Tickle talker |
| (e) Both Royd | 5. Developed Multichannel systems |
| (f) Gault | 6. Royal institute of technology Sweden |

5. How can tactile aids be classified?

6. Fill in the missing details

Device	No. of Channels	Type of Simulation	Location
A. Minifonator			
B. Mini Vib 3			
C. TAM			
D. Tactaid I			
E. Tactaid II			
F. Telex KS3/2			
G. Tactaid V			
H. Queens aid			
I. Tacticon TC-1600			

7. Distinguish the following

	TACTAID II	TACTAID V	TACTICON 1600
A. Type of stimulation			
B. No. of Channels			
C. Body site on which they are worn			

8. Name the portable tactileaid.

9. Name the two types of Vibro tactile stimulators.
10. What is the purpose of the Vibrotactile stimulation ?
11. What ability of the skin paved way for the development of tactileaids ?
12. Can tactile aids help HOH in intergrating speech information. If so how ?
13. How does tactile aids help the HOH in Speech reading ?
14. Describe the tactile aids fitted in 1970"s.
15. In brief explain how a single-channel tactileaid works ?
16. What led to the development of multichannel tactile aid ?
17. Why is comparison of multichannel tactile aids required ?
18. How does a multichannel tactileaid, aid in speech reading ?
19. Give features of a transducer system that will provide reliable and efficient display to the skin.
20. How does a tactile device help the HOH to monitor his speech or help him to produce speech.
21. What are electronic aids ?
- 22., Give a short note on "Tickle Talker".
23. List the possible disadvantages of vibro tactile aids.
24. Differentiate between linear and planar display.
25. Give the new advances in Vibro tactileaids ?
26. What are the advantages of portable tactile aids ?

TELECOMMUNICATION AIDS FOR THE DEAF

1. Rearrange the following to obtain the different telecommunication aids for the deaf.
 - a) L E T E I O L C
 - b) R E T I R W E P Y T E L E T
 - c) A P T E R A D
 - d) T E E L E N O H P L I F I E R A M P
 - e) T R O S L E C E A N D H E I T E R S W
 - f) E E P S C H O D E C
 - g) N O N E E C H S P D E O C S
 - h) R A I D O P A G N G I S Y S T E M
 - j) O C D E M O C
2. Which of the following would be preferred in hearing aid to get most effective results during conversation through teleo phone.
 - a) Active telecoil with vertical placement.
 - b) Active telecoil with horizontal placement.
 - c) Vertical placement of any type of telecoil.
 - d) Any type at any position.
3. Using an amplified hand set, intensity of sound can be increased by
 - a) Adjusting the volume dial on the hand set.
 - b) By speaking loudly.
 - c) Increase automatically.
4. Greater magnetic leakage provided by amplified hand set is of help to HOH
 - a) When using "M" setting.

- b) Is not of any help.
 - c) When using "T" position.
5. Portable amplifier can be used with telephone
- a) Without magnetic leakage.
 - b) With magnetic leakage.
 - c) Both.
6. In telephone coding system the hearing inmpaired is able to detect the code
- a) through hearing aid only.
 - b) through amplified hand set.
 - c) both.
7. In non-speech codes
- a) Practice with code is essential.
 - b) Practice with code is not essential.
 - c) There is no code system used.
8. Radio paging system transmit
- a) Voice or tone only.
 - b) Vibro-tactile only.
 - c) both.
9. A code com is telephone device contents
- a) Sound into visual signals only.
 - b) Sound into tactile signals only.
 - c) sound into visual or tactile signals.
10. To send or receive message through code com
- a) Morse code is used.
 - b) Yes/No code or morse code is used.
 - c) Braille is used.

11: Which is the odd one out

- a) Teletypewriter
- b) Close captioned TV
- c) TDD
- d) Telecoil

12: State whether the following statements are true or false. If false write the correct answer.

- a) Intensity of sound can be increased by 25-30 dB using an amplified handset.
- b) A person with normal hearing cannot use telephones with built in handset due to over amplification.
- c) Electronic handwriters require typing skills for communication through telephone.
- d) A Brailled typewriter converts incoming typed conversation into braille while the outgoing message is sent in standard typing forms.
- e) Telephone coding systems can be used by hearing impaired who cannot detect through audition.
- f) In speech code Yes/No code is used and is not a real conversation.
- g) Non speech codes require intelligible speech.

13. Name the two types of portable telephone amplifiers.

14. Name the varieties of telephone amplifiers.

15. Name the two telephone communication system for deaf blind.

16. Match the following

- | | |
|--------------|-------------------------------------|
| a) Tele coil | a) Telephone device for deaf-blind. |
|--------------|-------------------------------------|

- b) Amplifier b) Used by normal & HOH
- c) Tele typewriter c) Yes-No code.
- d) Speech coded) Rythmmpatterns for codes.
- e) Non-speech code e) Morse code.
- f) Speech indicator f) TDD
- g) Radio paging equipment g) Built in telephone
- h) Code com h) "T" position.

17. Give reasons.

- a) "T" position setting is preferred to "M" in telephone communication.
- b) Horizontal placement of telecoil circuit is not preferred although it yields a stronger signal.
- c) "T" position setting can be disadvantageous to HOH population.

18. Define the following

- a) Active telecoil/Amplified telecoil.

19. What are the following

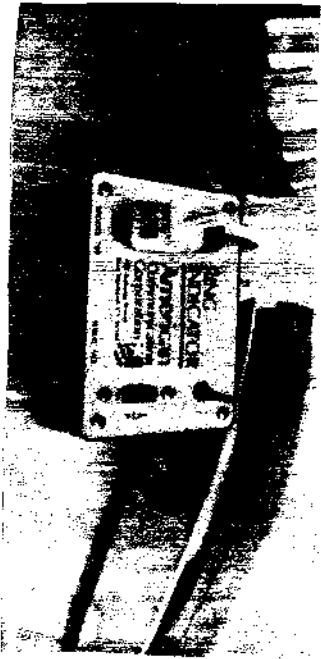
- a) Tele typewriter b) Adapter c) Portable amplifier

20. How does an amplified handset assist severely to profound impaired using a hearing aid ?

21. What are the possible features of tele typewriter ?

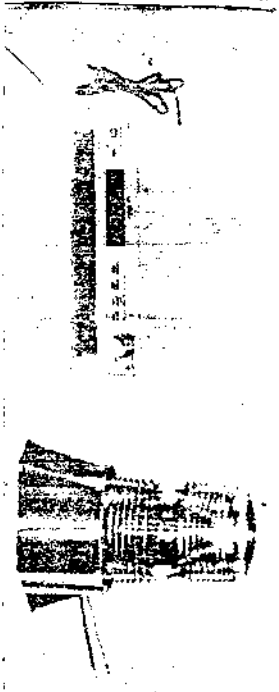
MIX MATCH ON RECENT DEVELOPMENT IN ALP'S

1. Match the following pictures to the respective names and their functions.



A. Tel Ray

1. Alarm clocks with a heavy duty vibrators which will awaken HOH.



B. Tel Horn

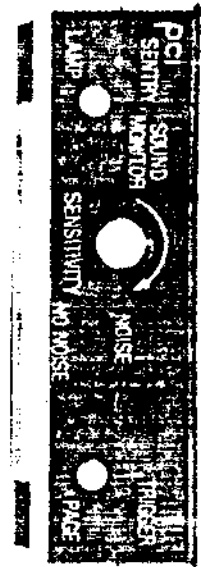
2. Signals when telephone is ringing, and is plugged into wall outlet with suction cup attached to telephone.



C. Telephone Monitor

3. A solid state telephone relay that activate AC appliances like fan, desk lamp when the phone rings.

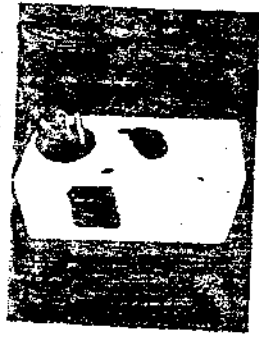
(d)



D. Silent Page Alerting Systems.

4. Designation for a complete line of electronic ringers designed for use in noisy locations over a wide area.

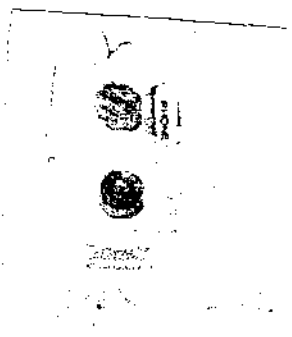
(e)



E. Sound Activated Switc

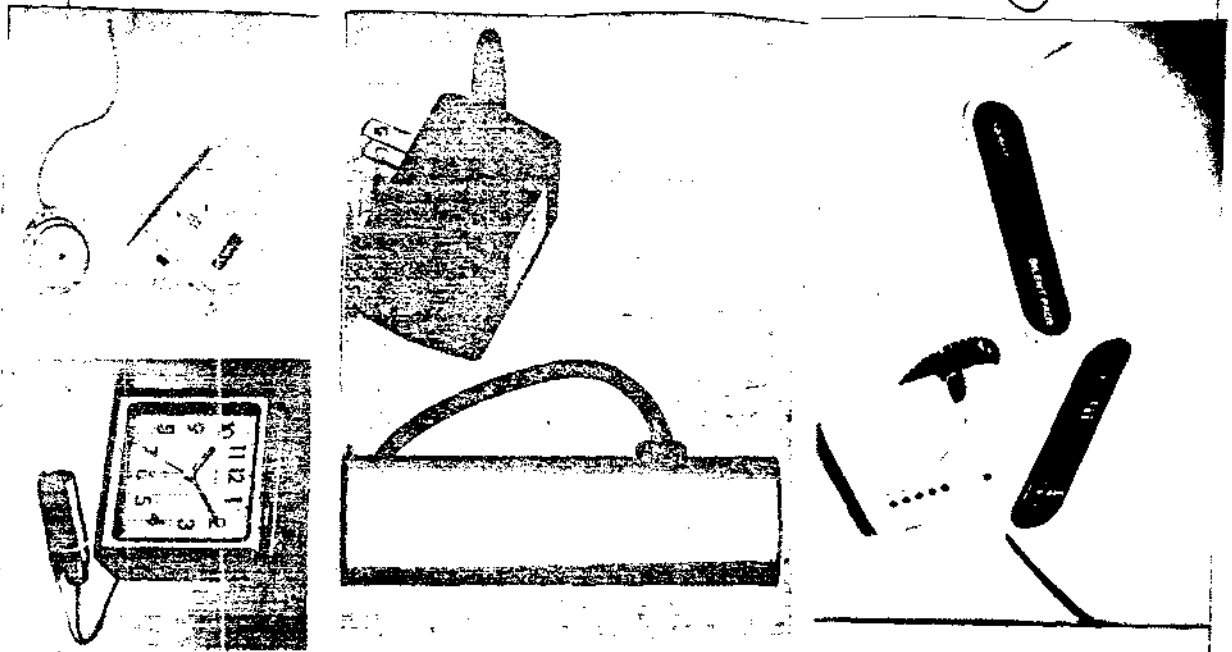
5. Alerts hearing impaired to doorbell, alarm clock, smoke alarm, baby cry etc. by flashing lights on/off.

(f)



F. Bed Vibrator

6. Has a silent, flashing light to awaken a sleeper after 10 minutes followed by a buzzer alarm.



G. Ring indicator

7. Device which alerts to a wake up clock, timer etc. by vibrating bed when placed between mattress and box spring

H. Digital Electronic alarm clock

8. Used as Security guard to turn on light at the first sound of an intruder in homes and apartments.

I. Compact Travel Alarm

9. Wakes up hearingimpaired person at preset time and can be carried around.



J. TV and Radio Inductor Kit

10. Consists of sensor transmitter which sends a radio signal to the identified by coded light.

K. Infrared Cordless head phone system

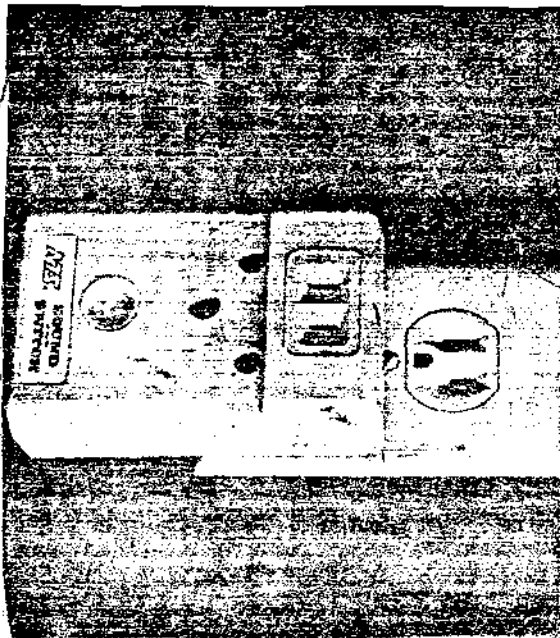
11. Designed for listening to TV or radio equipped with socket and does allow inference from room noise or people talking

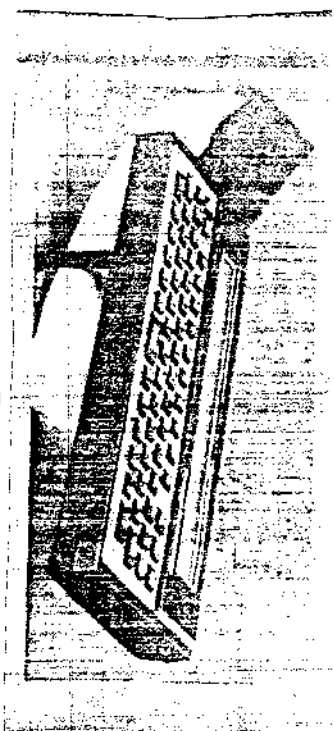
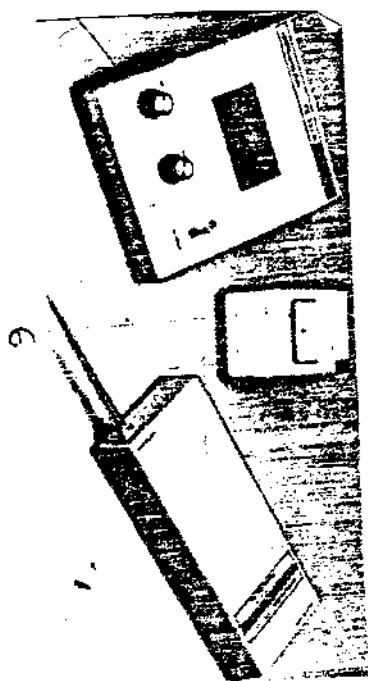
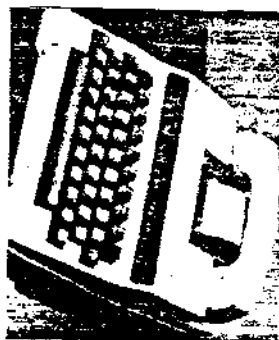
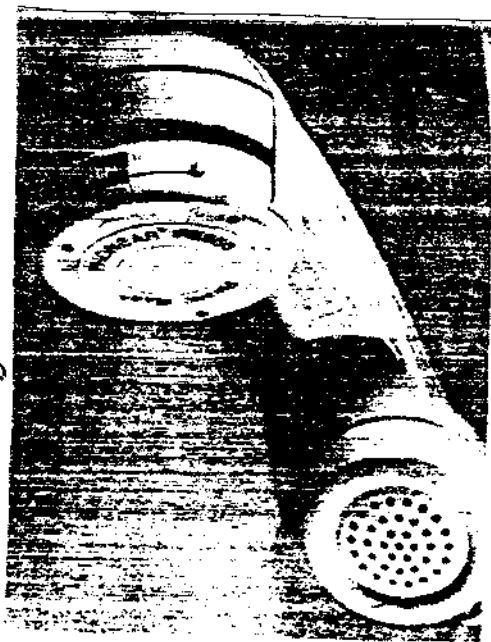
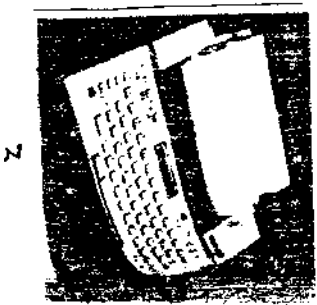
L. Electric Flash Alarm

12. Monitors telephone for ring signal by flash of light which is transmitted to central receiver to display "Phone" on front panel

M. Watchman signalling System

13. Used by the HOH people to watch TV/listen to radio while moving around the room

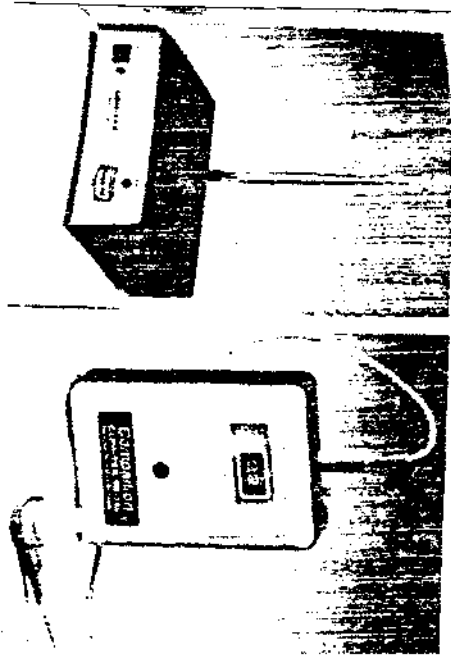




5



4



SOLUTIONS

HISTORY OF ALPS

Match the accomplishment/description in the coloumn on the right with the persons list in the coloumn on the left.

1. (d)
2. (f)
3. (g)
4. (c)
5. (a)
6. (e)
7. (b)
8. (h)

Fill in the blanks.

1. US Congress in 1982.
2. American telephone & telegraph national special needs center (NSNC).
3. NCI, 1979.
4. Children of a lesser god.
5. Buffalo philharmonic.

Give the significant events in the area of ALDs during the years.

- (a) Radio frequency systems became popular.
- (b) FM systems were put to use.
- (c) IR systems were introduced.
- (d) FM systems were used for concerts for the first time.
- (e) FM systems were installed in churches & court rooms.
- (f) FM systems were employed in theaters.

DEVICES THAT USE AUDITORY MODE

1. (a) False.

It can be used by speech-language handicapped children for normal heading.

(b) True.

(c) True.

(d) False.

ALDs can be used with personal hearing aids

(e) True.

2. (a) 300-600 feet

(b) IL

(c) Magnetic induction

(d) "T" position

(e) 480 khz

3. (a) Yes

(b) Yes

(c) Yes

(d) No

(e) No

4. FM & IR systems

5. (a) IL system

(b) FM system

(c) IR system

6. IL, FM, AM and IR

7. Auditory assistive devices

Communication assistive aids

Special auditory aids

Assistive listening systems.

8. ALD - Assistive Listening Device
FM - Frequency Modulated
IR - Infra Red
IL - Induction Loop
9. Devices to improve speech signal in adverse listening environment.

Devices which act as signal indicators & warning signals.

Full range of devices for TV and Radio reception.

Telephone devices from Amplifiers to TDDS.
10. Systems that use auditory mode.

Systems that use visual mode.

Systems that use tactile mode.
11. Assistive device is defined as any non-hearing device designed to improve a hard of hearing person's ability to communicate and to function more fully despite of hearing loss, either by transmitting amplified sound more directly from its source to listener or by transforming it into visual or tactile signal.
12. By delivering an amplified signal directly to the listener and bypassing the environment.
13. (a) Without hearing instrument.
(b) With hearing instrument.
(c) With a hearing instrument's direct audio input connection.

- | | | |
|-----|---|--|
| 14. | Hardwired ALD | Wireless ones |
| | There is connection between the unit that pick up the sound & the unit that delivers it to the ears | No wire between the unit that pick up the sound & the unit that delivers it to the ears. |
15. (a) With behavioural techniques in audiological test room.
 (b) For probe tube measures.
 (c) Electro-acoustically in a 2 cc coupler.
16. Transmitter mic override most of the noise.
 For occasional very noisy situation, the environmental mic can be turned off.
17. Without appropriate education parents and teacher can use an FM mic in an altered manner, resulting in the child receiving confusing auditory information.
18. Speech information can be received by environment mic alone and over all speech will be more intense and high frequency will be amplified sufficiently.
19. BTE is equipped with a "T", a silhoutte inductor may be worn behind the ear or neck loop is worn around the neck and either is plugged into IR receiver.
20. (a) With use of telecoil, the HOH can enjoy TV/radio without interfering with others in home who do not wish to listen to same program.
 (b) Even within a few feet of a loud speaker, reception via the loop is reported to be superior to normal hearing and use.

- (c) A good sized house loop provides almost uniform reception throughout the house, allowing the hearing impaired individual to move freely.
21. Due to the availability of a receiver with induction plate output to couple magnetically to hearing-aid.
22. AM transmitter and receiver which typically uses frequency at the bottom of AM band (480 Khz or 530 Khz).
23. (a) Direct audio I/P
(b) Neckloop or teleloop
(c) Silhoutte inductor
(d) Acoustic coupling
24. FM system with environmental mic provides better self monitoring & hence it is more preferred.
25. Hardwire - This unit consists of a microphone ampifier and a number of earphones. The teacher's microphone is connected to an amplifier and the resulting amplified signal is then delivered to a series of headsets located in fixed positions.
- IL - The amplified electric analog of sound waves is fed to the coil of wire, producing electromagnetic variations in the room. The electro-magnetic field then crosses a tiny induction coil in the child's hearing aid and induces an electric current in the coil. This current is then amplified and reconverted to sound waves by students' hear-aid receiver.

FM systems - The microphone picks up speech at its source and it is frequency modulated on to a radio frequency carrier wave and is transmitted through the air by an FM transmitter. The FM receiver worn by the listener, demodulates the speech, amplifies it and delivers it to the ear via earphones.

IR systems - Here the transmission of signals is by infra red light. A FM mic transmitter is utilized and an FM receiver is attached to the infra red transmitter. The speech is converted from an acoustic signal to an electrical signal and modulated into a radio frequency carrier wave by the microphone transmitter. The signal is received by an IR transmitter that modulates it into IR light frequencies that are emitted from radiators. The modulated IR light is then picked up by a receiver and demodulated before it enters the hearing aid.

26.

Hardwire

Advantages

Inexpensive comparatively.
 High S/N ratio.
 Most effective in classroom situations.
 and
 Provides a wide frequency range, low distortion and high sound pressure output.
 Offer a high fidelity signal.

Disadvantages

Restricted mobility.
 Cannot replace hearing aids.
 Location of the microphone may affect auditory self monitoring
 child-to-child
 and child-to-child communication negatively.
 Lacks flexibility.

IL system

Advantages

Can be used at home and individual use.
Can enjoy TV/Radio.
Enhance S/N ratio.
Improved mobility.
Self monitoring.
Improved child-to-child communication.
Relatively inexpensive and easy to install.
Provides greater frequency range.

Disadvantages

Hearing must have "T" position.
The placement of telecoil in the hearing aid may have to be oriented at an angle that does not allow maximum magnetic coupling to occur,
Spill over between rooms.
May generate high levels of internal noise.
Flourescent light and other source of magnetic energy, introduce noise in the system.

FM system

Advantages

Can be used in theatre, meeting, home & schools.
Particularly beneficial in large to auditorium.

Disadvantages

If transmitter is not put off the FM aid use can listen private conversations,
Do not provide adequate

Superior performance on speech intelligibility.

Good S/N ratio.

Provision for an auxiliary input directly from an external audio device (radio, tape, sound channel of TV etc).

Can work in conjunction with personal ear level hearing aids.

child-to-child communication.

Problems can be caused by interference from extraneous signals.

Problem may arise when more than one class uses same transmitting frequency

IR

Advantages

High fidelity system.

High quality performance.

Little maintenance.

Moderate price.

Improved mobility.

Easy Installation and use.

May be used in homes, fitted to TV sets.

It can match with patterns of hearing loss.

IR receivers are universal and can be used with any IR transmitter.

No spill over.

Reliable and durable.

Disadvantages

Cannot be used outdoors or in rooms without emitters.

IR lights can be absorbed by black curtains and walls.

Devices that use Visual Mode

1. (a) 1. SPECTROGRAMS
 2. RNID TEDDY BEAR
 3. ARTIFICIAL PALATE
 4. UPTONS EYE GLASS AIDS
 5. SPEECH SPECTROGRAPHIC DISPLAY
 6. SAM
 7. ARTIFICIAL SPEECH & SPEECHCOGNITION SYSTEM
 8. SPEECH PROCESSOR
 9. TOY TRAIN WITH ACOUSTIC CONTROL
 10. ELECTROPALATOGRAPH
 11. CAI
 12. VS INDICATOR
 13. LARYNGOGRAPH
- (b) a. 3, 10, 13 b. 2, 6, 9 c. 1, 5, 4 d. 7, 8, 11
2. SAM - Sound Activated Monkey
CAI - Computer Assisted Instruction
NCI - National Captioning Institute
TICCIT - Time shared Interactive Computer Controlled
 Information Television
CCTV - Close Captioned TV
3. (1) - a
(2) - c
(3) - a
(4) - d
(5) - b
(6) - a

- (7) - c
- (8) - a
- (9) - a
- (10) - a, c, d
- (11) - 5
- (12) - 1 - too soft
 - 2, 3, 4 - normal
 - 5 - too loud
- (.13) a - Middle 3
 - b - Extreme left
 - c - Extreme right
- (14) - a
- (15) - b
- (16) - Red
- (17) - Red-Voiced. Orange- f
- (18) - b
- (19) a - Real time graphic display
 - b - Time square graphic: display

- 4. 1. Yes
- 2. No. VSF can be used to teach sounds in isolation as well as in any combination of. two response patterns.
- 3. Yes
- 4. No. It doe-5 not provide the deaf an opportunity for verbal interaction.
- 5. Yes
- 6. No, It cannot be used in day-to-day speaking situation because it is not a personal aid.
- 7. Yes

8. Yes
 9. No. Monkey climbs the distance proportional to the length of utterance.
 10. No. Friction indicator can only indicate the presence or absence of fricative sounds.
 11. Yes
 12. Yes
 13. Yes
 14. No. It is difficult to comprehend,
 15. Yes
 16. No. Refer-Q. No.15
 17. Yes
 18. Yes
5.
 - 1 - Institute of -experimental phonetics & speech pathology, Belgrade Yugoslavia)
 - 2 - FCC
 - 3 -
 - 4 - Palatometry
 - 5 - Voiscope
 - 6 - Mellville Bell (1972)
 - 7 - Potter Copp & Green (1974)
 - 8 - Artificial speech- & speech recognition system
 - 9 - Vibration or light
 6. BDAC
 7. a, c, e

- 8 a - /
- b - /
- c - *
- d - *
- e - /
- f - *
- g - *
- h - *
- i - /
- j - /
- k - *
- l - *
- m - /
- n - /

- 9. ¹ -Speech movement indicator
- 2 - Laryngogram
- 3 - Laryngograph
- 4 - Artificial palate
- 5 - Spectograms
- 6 - Close captioning
- 7 - Artificial Speech a Speech recognition system
- 8 - Signalling systems
- 9 - Hearing dog

- 10. a - b - b
- b - d - a
- c - b - c**
- d - c - d

DEVICES THAT USE TACTILE MODE

Fill in the blanks

1. Speech processing
2. Linear, Planar static & Planar swept
3. Piezo electric vibrator & Miniature two dimensional Vibrator
4. Spectral/Vocoder
5. Teletactor
6. 250 Hz
7. 24 Channel Vibro tactile & 32 Channel Electrocutaneous
8. Vibrotactile aid

State whether the following statements are True or False.

1. True
2. False
3. True
4. True
5. True
6. False

It was designed to deliver sound directly to ear for out problems of distance, reverberation & maskong ambient noise.

7. False
8. True
9. False

They compliment visual clues by giving tactile clues.

The mechanoreceptive system of the skin.

It also enables distinguishing non-visible sounds like friction, nasality & Voice

Answer the following :

1. (a) Yes
(b) Yes
(c) Yes
(d) Yes
(e) Yes
2. Systems with Electro mechanical transducers that mechanically vibrate the skin surface.
3. - Vibrating Clocks
- Door bell indicator
- Smoke detector
- Vibrating signal sys - telephone, doorbell, smoke alarm, baby crying
- Baby crying indicator
4. (a) - 5
(b) - 2
(c) - 3
(d) - 4
(e) - 1
5. (a) Based on type of stimulation - Vibratory, Electrical
(b) No. of Channels of strategy - Single, Multi
(c) Type of processing strategy
6. A. 1, Vibratory, Wrist
B. 1, Vibratory, Wrist
C. 1, Vibratory, Wrist
D. 2, Vibratory, Sternum

- E. 2, Vibratory, Wrist
 - F. 2, Vibratory, Wrist
 - G. 5, Vibratory, Arm
 - H. 16, Vibratory, Forearm
 - I. 16, Electrical, Abdomen
7. A. Vibratory, Vibratory, Electrical
 - B. 2,5,16
 - C. 2-4 inches apart on the Horizontal plane on either sternum, forehead or wrist, On Forearm, Belt worn on abdomen
 8. Tactaid II, Tactaid V, Tickle talker, Tacticon
Electrocutaneous Vocoder
 9. (a) Electromagnetic
 - (b) Piezo Electric
 10. - Provide additional sensory input to HOH
 - Adds complementary/redundant information to that which child is already receiving
 - Increases total amount of information available
 - Allows the user to solidify his/her concept of information received
 11. The ability to perceive through the skin a variety of patterns of pressure and vibration was suggestive itself as an exploitable talent that can provide to such functional alternative channel.
 12. Yes, it can integrate speech information presented simultaneously through amplified audition and tactile aid. The consistently better performance with these combined sensory modulation helps HOH to learn speech in novel situations.

13. - By transmitting many phonetic contrasts through artificial hearing devices that simulate the sense of touch.
 - They also transmit certain information not available through the traditional method of lip reading and the provision of the useful feedback system for imitation in speech production training.
14. Simple devices consisting of BC vibrators driven by high-power hearing aids.
15. Speech sounds are transduced to electrical signal by a mic, amplified mic, amplified and impressed on a single ear phone. Users placed their thumb or fingers on the diaphragm of the single unit receiver.
16. The inability of the tactile system to discriminate frequencies with sufficient resolution to identify speech signals led to the development of tactile devices that convey spectral information about acoustic stimuli by coding it spatially, by use of multichannels which convey information in different frequency region.
17. Due to splitting of the signal across multiple channels could actually interfere for the processing of envelope aspects of signal resulting in poorer performance of some tasks.
18. Speech frequency is coded by vibration amplitude displays can be manifested as 2-dimensional spectral displays in which speech frequency is coded along one spatial axis and speech energy along another perpendicular axis.

19. Small size, low mass, high efficiency, appropriate frequency response, low radiation of acoustic energy insensitivity to contact pressure, low distortion, large dynamic range, little long term discomfort and reliability.
20. The HOH child "feels" sound as patterns of comfortable vibrating like sensations on the skin. When teacher speaks to HOH wearing the tactual vocoder, the child feels a moving pattern of stimulation. The child's task is to learn to produce similiar patterns of stimulation on skin using his/her voice. These the tactual feedback provides the child with information that can be used to monitor speech production.
21. Aids which converts the acoustic speech signal into tactile patterns represent a much more feasible solution to communication problems confronting many HOH.
22. Tickle talker extracts feature of F_0 and F_2 and presents them on skin. F_0 is the primary cue to pitch and thus is important in perceiving speech intonation. F_2 is the important for the perception of consonants and vowels. Tickle talker presents F_0 , F_2 and amplitude via eight electrodes. One placed on each side of finger on one hand excluding the thumb. The electrodes are worn as set of rings. Electric pulses are transmitted through the rings and F_0 is represented as the rate of pulse transmission. Changes in F_0 are perceived as differences in the "roughness" or "smoothness" of tactile

signal. F_2 is represented by the location of stimulation on the hand i.e., on the front or back of different fingers. Thus i ($F_2 = 2200$ Hz) would be felt at sixth electrode on the front of ring finger. In contrast p ($F_2 = 900$ Hz) would be felt at the first electrode on the back of the index finger.

23. (a) Feed back problems
 - (b) Wearing arrangements particularly in hot weather.
 - (c) Use in noisy environment where the influx of sound makes the unit vibrate continuously.
 - (d) Durability of aids.
24. Linear - Unidimensional array of vibrators is used, each vibrator representing a difference frequency band and the amplitude of vibration representing the power of each frequency band.
- Planar - 2 dimensional matrix of vibrators is used, each column of matrix representing a different frequency band. The 2nd dimension of the matrix can be used to represent either time or amplitude.
25. (a) Electrocutaneous stimulation
 - (b) Use of microprocessor to provid advanced signal processing capability in a small wearable unit.
 - (c) Spectral and Vocoder type displays.
 - (d) Speech processing tactileaids.
26. Give hearing impaired children extended exposure to tactual speech information in a variety of settings like classroom, home, speech training and lab training and testing.

TELECOMMUNICATION AIDS FOR THE DEAF

- 1 a) Tele coil
b) Tele typewriter
c) Adapter
d) Telephone Amplifier
e) Electronic Hand Writers
f) Speech Code
g) Non Speech codes
h) Radio Paging System
i) Code Com
2. (a)
3. (a)
4. (c)
5. (b)
6. (c)
7. (a)
8. (c)
9. (c)
10. (b)
11. (b)
12. (a) True
(b) False.

When the dial is returned to zero, the telephone handset works without amplification.

(c) False.

No, it uses electronic writing equipment with telephone.
(d) True

- (e) True
- (f) True
- (g) False.

It can use morse code or special code to send & receive information.

- 13. Magnetic to acoustic type.
Acoustic to magnetic type.
- 14. Telephone handsets prewired with internal amplifier,
Battery powered units that are inserted into modular
telephones, battery powered portable amplifiers.
- 15. Code com, Braille TTY
- 16. (a) - (h)
(b) - (g)
(c) - (f)
(d) - (c)
(e) - (e)
(f) - (d)
(g) - (b)
(h) - (a)
- 17. (a) "T" setting makes it easier to concentrate on telephone
conversation, it eliminates problems of hearing aid
feed back when set in "M" setting.

(b) It severely limits the telecoil effectiveness when used
with IL systems & neckloops.

(c) Cannot monitor their own speech through the hearing aid.
- 18. (a) Active tele coil: A tele coil circuit equipped with
a pre amplifier.

19. Adapter; It is designed to strengthen the magnetic field to permit the use of "T" setting when there is insufficient leakage.

Portable Amplifier: Small battery operated amplifier that slips over the telephone handset.

Teletypewriter: It is an equipment which helps in communication through telephone where the words which are transmitted and received are typed out,

20. It provides additional gain; makes it easier to hear without straining in long distance when spoken in soft voice.

21. Portability, a paper print out conversation, a display area for seeing typed conversation a memory for storing message, a direct connection to telephone line.

MIX MATCH ON RECENT DEVELOPMENT IN ALP'S

1.

- a - G - 2
- b - H - 1
- c - L - 6
- d - C - 12
- e - A - 3
- f - B - 4
- g - D - 10
- h - F - 7
- i - I - 9
- j - M - 5
- k - E - 8
- l - J - 11
- m - K - 13

2.

- a - 1, 6, 7
- b - 2, 3, 4, 5
- c - 8, 9, 10

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