QUESTION BANK ON TESTS DEFFERENTIATING COCHLEAR AND RETROCOCHLEAR PATHOLOGY

REG. NO.M9422

AN INDEPENDENT PROJECT SUBMITTEDED AS PART FULFILMENT OF FIRST YEAR M.Sc. (SPEECH AND HEARING) TO THE UNIVERSITY OF MYSORE, MYSORE

ALL INDIA INSTITUTE OF SPEECH AND HEARING: MYSORE 570 006

MAY 1995

DEDICATED TO

PARENTS, BROTHERS AND RAJI, DEEPAK, SAJAN AND KASHISH

C E R T I F I C A T E

This is to certify that this Independent Project entitled : QUESTION BANK ON TESTS DIFFERENTIATING COCHLEAR AND RETROCOCHLEAR PATHOLOGY has been prepared under my supervision and guidance.

Mysore

May 1995

Dr. (Miss) S. Nikam,
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CERTIFICATE

This is to certify that this Independent Project entitled: QUESTION BANK ON TESTS DIFFERENTIATING COCHLEAR AND RETROCOCHLEAR PATHOLOGY is the bonafide work in part fulfilment for the First year MSc, (Speech and Hearing) of the student with Reg.No.M9422.

Mysore
May 1995

Dr.(Miss) S.Nikam
Director
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DECLARATION

I hereby declare that this Independent Project entitled: QUESTION BANK ON TETS DIFFERENTIATING COCHLEAE AND RETROCOCHLEAR PATHOLOGY is the result of my own study under the guidance of Dr.(Miss) S. Nikam, Prof, and Head of the Department of Audiology, 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

Reg.No.M9422

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Last but not least Rajalakshmi Akka for her neat typing.

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INTRODUCTION

Hearing impairment is used to mean a deviation or change for the worse in either auditory structure or auditory function, usually out side the range of normal (ASHA, 1981).

Hearing impairment could be broadly classified into three main types:

(1) Conductive impairments

(2) Sensori-neural impairments

(3) Mixed impairments

(1) Conductive impairment - Any dysfunction of the outer or middle ear in the presence of a normal inner ear is termed a conductive impairment of hearing- In other words, the difficulty is not with the perception of sound but with the conduction of sound to the analyzing system.

(2) Seneorineural impairment - When the loss of hearing function is due to pathology in the inner ear, or along the nerve pathology from the inner ear to the brain stem, the loss is referred to as a sensori-neural impairment.

(3) Mixed hear ins impairment - When the loss of hearing function is due to both conductive and sensori-neural impairment.

The first step in the diagnosis is to find out whether this hearing loss is conductive or sensori-neural in type, and it could be done *on* the basis of an inspection of air and bone conduction hearing levels obtained in routine pure tone audiometry. But, ioantifying an impairment as sensori-neural does not say anything about the site of lesion except that it is not in the outer or the middle ear.

The term sensori-neural implies that the site of the lesion may be in the sensori find organ (the cochlea), in the auditory nerve, or in both. When the site of lesion is in the cochlea than it is referred to as cochlear impairment and when the Bite of lesion is in the adutiroy nerve than it is referred to as retrocochlear impairment.

Ever since Dix, Hallpike, and Hood (1948) reported that cochlear involvements could be differentiated from retrocochlear pathology on the basis of noting the presence (cochlear) or absence (retrocochlear) of the recruitment of loudness (Dix, Hallpik and Hood, 1948). There has been

great interest on the part of otologists and audiologists in developing tests that would assist in the determination of site of lesion in case of sensori-neural impairment. If these tests were in any way indicative of cochlear involvement, there was a tendency to say that they were tests of recruitment on the assumption that all cochlear involvement demonstrated recruitment.

In the late 1940s and early 1950s considerable interest developed in the use of difference limen for intensity test as substitutes for binaural and monaural loudness - balance tests, the "classical" tests for determining the presence of recruitment.

Difference limen tests provoked theoretical arguments as to whether they measured recruitment of loudness or some other manifestation of cochlear dysfunction that may or may not be related to the recruimtent phenomenon.

More recently the emphasis has been placed on the development of tests that yield information concerning the site of lesion in cases of sensori-neural impairment, and the question as to whether or not a particular test result represents the presence of "recruitment" has been considered irrelevant.

Jerger sums up this of view:

From the stand point of differential diagnosis the important consideration is not recruitment but site of lesion. Recruitment tests (that is, loudness balance methods) are of value to the extent that they predict site of lesion successfully. The most meaningful criterion to apply to other tests involving other phenomena is not whether they predict recruitment but whether they predict site of lesion. If they do, then they are of value whether they predict recruitment or not.

Jerger has also made the point that it is unwise if not impossible to make decisions regarding the site of lesion on the basis of any single test. Instead, one must view the results of a battery of tests in order to predict with any degree of assurance whether a given patient presents a sensorineural involvement of a cochlear or a retrocochlear type, or presents a central auditory disorder.

Tests of cochlear function:

Two procedures, sensitiive to cochlear function, which have been used in diagnostic test batteries are loudneBs

balance techniques and the short increment sensitivity index (SISI). Loudness balance techniques were first developed by Fowler (1936) for comparing loudness growth in a normal verses abnormal ear. Reger (1936) is credited with the loudness balance procedure used to study symmetrical, binaural losses where there is normal hering at some frequencies. Jerger et al. (1959) developed the SISI test as an out growth of studies of the difference limen for intensity (DLI) (Jerger, 1952, 1953).

Since the advent of these procedures, other behavioural and electrophysiological tests have been developed for clinical use. In many cases tone decay, Bekesy audiometry, immittance and brainstem evoked repose audiometry technique have been used in conduction with the loudness balance and SISI procedures in diagnostic batteries.

Tests of retrocochlear function:

Clinical aduiologists use a variety of diagnostic test for the detection of retrocochlear lesion. Behavioural tests that are currently used, although test in the past will be considered. Since site of lesion testing became part of the practice of clinical audiology, a significant number of new and innovative procedures for identifying

retrocochlear lesions have been developed. There are a number of behaviour procedures that are available to the tester for the purpose of detecting the presence of a possible retrocochlear lesion. Several of the diagnostic tests have declined in importance because of the development of newer and more sensitive tests. However,some of the older procedures retain useful clinical functions these older tests may then serve an important screening function - Tone Decay Test, Bekesy and performance intensity for phonetically balanced words (PIPB rollover) procedures.

Although these behaviour tests have declined in use in the past decade because of rapid advances in electrophysiologic techniques, these behaviour tests still retain their utility in the differential diagnosis of retrocochlear pathology. In particular, tone decay and PIPB are useful tools and they can be performed in a short time with readily available equipment. Bekesy audiometry and high level SISI can also serve a role in detecting retrocochlear pathology, especially when used as a part of a test battery approach.

This project has mainly dealt with the various types of questions and answers of different aspects of tests that

differentiat cochlear pathology from retrocochlear pathology.

OBJECTIVES OF THE PROJECT

1. It can be used to check a basic concept about the different tests that are used to differentiate cochlear and retrocochlear impairment.

2. To get collective information about different aspects of these tests based on which they can differential cochlear and retrocochlear impairment.

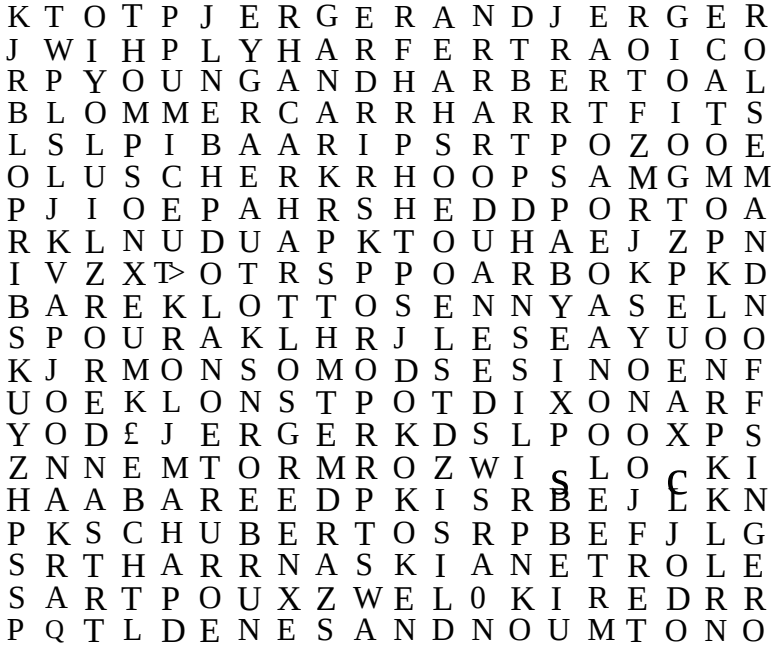
3. It can be used to evaluate trainees after the training program.

4. It can be used to monitor student knowledge in understand the subject.

5. It can be considered as a reference for examination and interview purposes.

SUBJECTIVE TESTS

I. DLI,SISI,TDT and STAT Tests were developed to differentiate between cochlear and retrocochlear pathology. DLI test was first developed in 1902 and TDT was first developed in 1944). Researchers modified the tests in the later years. Can you identify some of the proponents of DLI, SISI, TDT and STAT test.



NOTE

DLI - Difference limen for intensity

SISI - Short increment sensitivity index

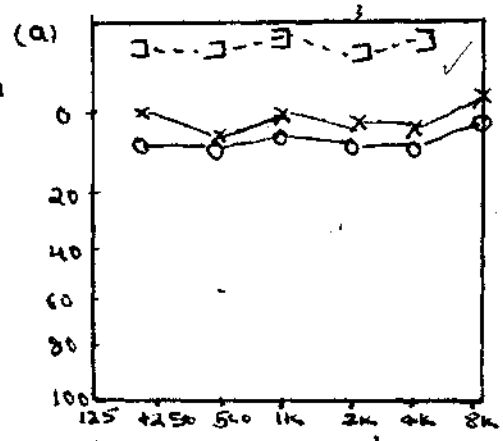
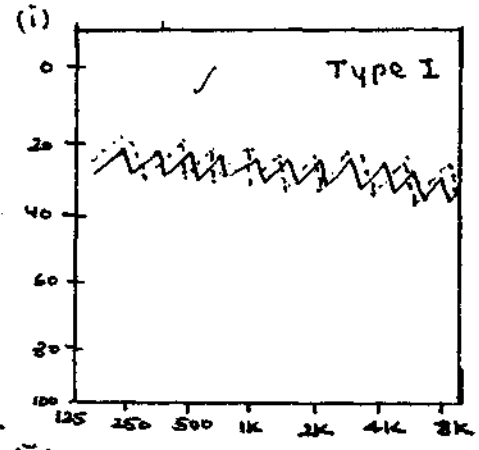
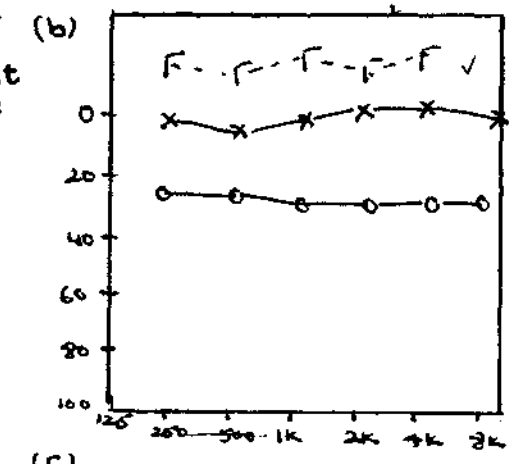
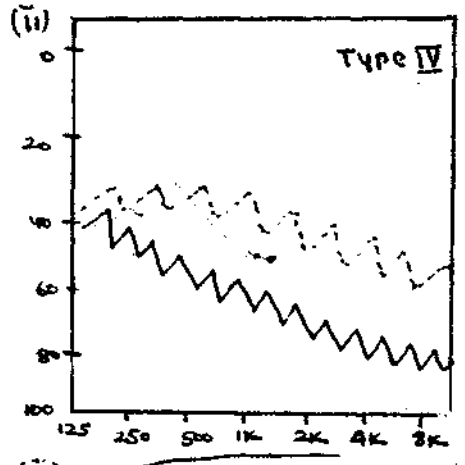
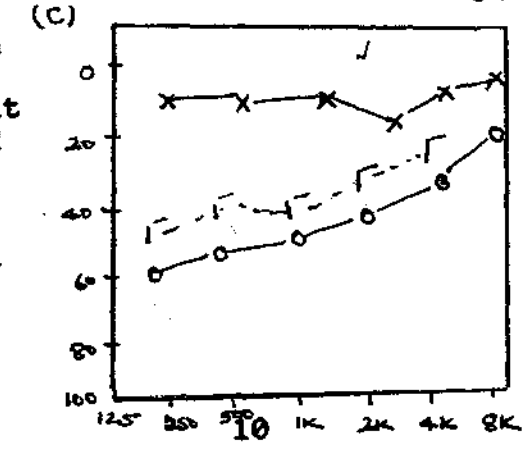
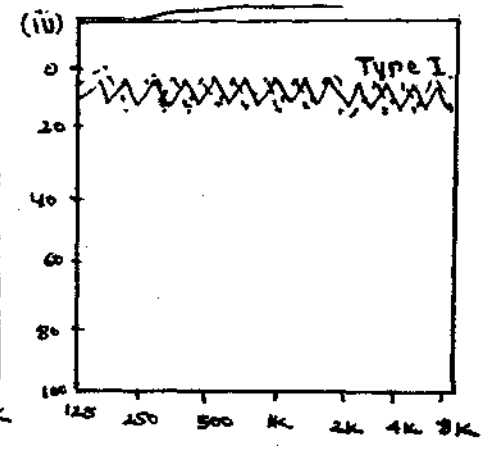
TDT - Tone decay test

STAT - Supra threshold adaptation test

II. Match the following

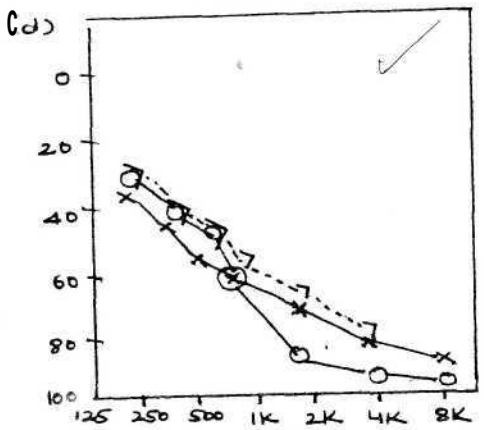
Founders	**Tests**
1. Katz (1960)	(a) Critical off time
2. Reger (1936)	(b) Alternate loudness Balance Test
3. Fritz (1978)	(c) Bekesy Tracing using ABLB
4. Jerger and Jerger (1974)	(d)Bekesy audiometry
5. Fowler (1926)	(e)Continuous tone masking
6. Young and Harbert (1966)	(f) Computer assisted ABLB
7. Bekesy (1947)	*(B)* Monoaural loudnees balance test
8. Miskotezy-Foder (1964)	(h) Bekesy comfortable level
9. Sander (1982)	(i) Modified SISI
10. Dix et al.(1960)	*(j)* Bekesy tracing relative to site of lesion.
	(k) Grason-Stadler Model E-800 audiometer
	(1) Difference limen test

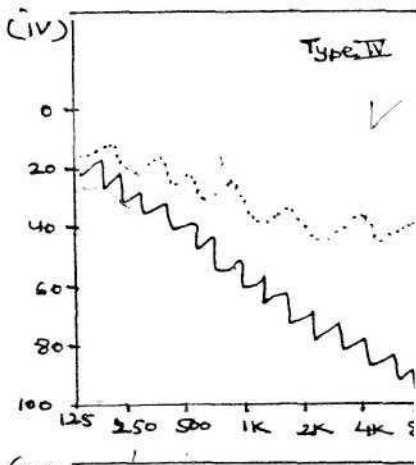
III Given in the left column are some case histories. Match the audiogram (2nd column) and Bekesy audiogram (3rd column) for each history.

History	Audiological findings	Bekesy Tracing
1.A 30 year old man comes with the complaint of hearing loss in both ears. He wanted a physically handicapped certificate		
2.A 20 year old woman comes with a complaint of hearing loss in right ear consequent to head injury history of bleeding from right ear. No history of tinnitus, vertigo.		
3.A 40 year old woman comes with a complaint of tinnitus and giddiness **-Reports to have difficulty in understanding speech.**		

4.A 38 year old man comes with the complaint of hearing loss in left ear.

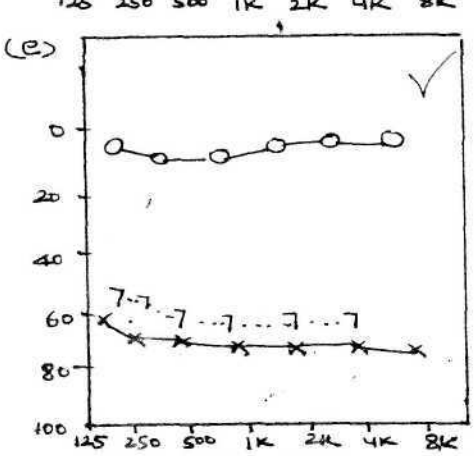
-H/O fluctuating hearing loss, tinnitus, vertigo, nausea, and full-ness in the ear.

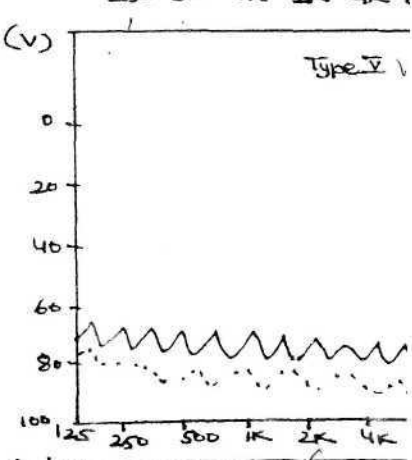




5.A 15 year old boy comes with the complaint of pain in the right ear. No H/o hearing loss, vertigo, tinnitus.

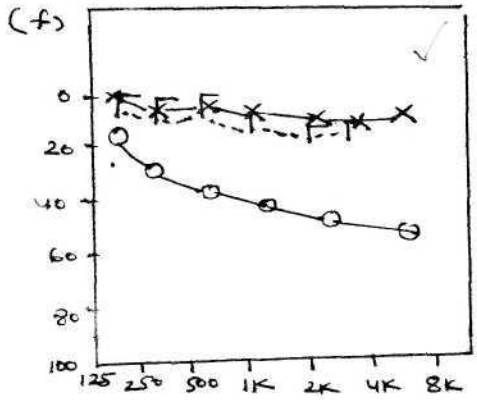
H/o tonsilectony 2 months back.

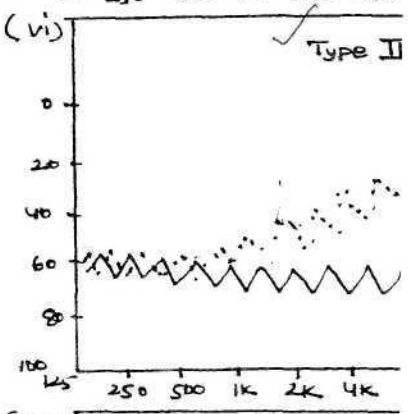




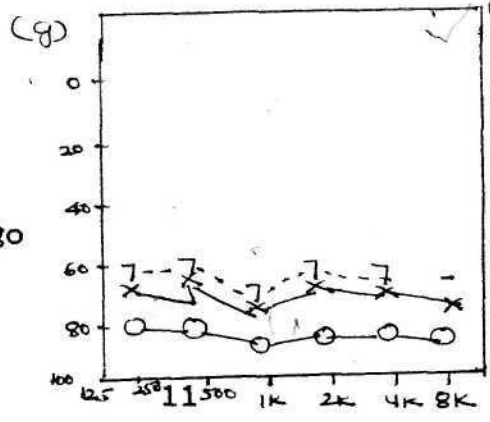
6.A 35 year old man comes with the complaint of hearing loss in both ears. H/o tinnitus, vertigo.

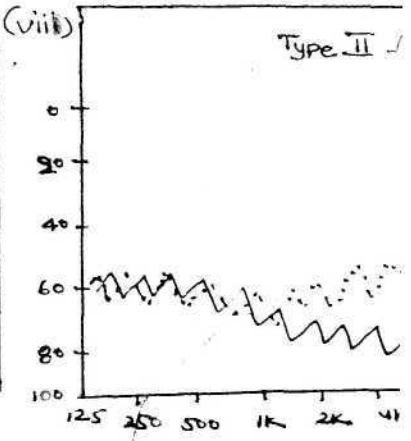
No H/o of nausea can hear only loud sounds.





7.A 25 year old woman comes with the complaint of fluctuating hearing loss in the right ear. H/o tinnitus, vertigo and nausea, Can't hear soft sounds.





IV. Indicate whether the statement is true or false.

1. Subjects with normal hearing cannot detect small changes in the intensity, True/False
2. Difference limen test and SISI test are based on the same principle. True/False
3. Tone decay is nothing but increase in threshold sensitivity resulting from the presence of barely audible sound. True/False
4. In Bekesy audiometry, the critical off time is less for retrocochlear pathology. True/False-
5. During Bekesy audiometry, if the difference between the threshold obtained using forward and backward method is greater than 10 dB at least over one octave, it indicates cochlear pathology. True/False
6. Differential sensitivity for intensity does not depend on the frequency of stimulus. True/False
7. Patients with cochlear pathology can detect 1 dB increment in intensity, when the tone is presented at 20 dB SL. True/False
8. Carhart/s tone decay test makes no provision for a rest period between successive level of stimulation. True/False

9. A normal ear can detect 1 dB increment at 70 dB HL. True/False

10. There is a rest period employed in the Schubert tone decay test. True/False

11. Inability to detect 1 dB increment at 70 dB HL, indicates cochlear pathology True/False

12. Under continuous tone masking, the threshold for pulse tone is reduced in patients with retrocochlear pathology True/False

13. When the amount of tone decay obtain is greater than 30 dB, tone decay test is considered as positive. True/False

14. Difference limen for intensity is smaller for patients with retro-cochlear pathology when compared to cochlear pathology. True/False

15. The speech discrimination score is proportionate to the degree of hearing loss in subjects with cochlear pathology. True/False

16. Instructions to patients are same in Green's modified tone decay test and carhart tone decay test. True/False

17. Abnormal tone decay is observed in patients with retrocochlear pathology. True/False

V. Name the test/tests that use the following presentation levels/starting level.

(a) 20 dB SL

(b) 70 db HL

(c) 5 dB SL

(d) 0 dB SPL

(e) 110 dB SPL

<f) 40 dB SL

(g) 5 dB below puretone threshold

(h) 4 dB SL and 44 dB SL

NOTE: SL (Sensation level) = (With reference to pure tone threshold).

VI. Fill in the blanks:

1. Two primary methods used in plotting loudness balance results are ._____and _____
2. Generally patients with_____pathology show complete or partial recruitment, where as those with_____ pathology show no recruitment.
3. The ability to detect smallest change in the intensity is called_____for intensity.
4. Short increment sensitivity index test is a modification of_____test.
5. Equal loudness judgements made at equal _____ +/- 10 dB indicates no recruitment.
6. The ability to detect smallest change in frequency is called_____._____
7. Complete recruitment is present, when reference and variable ears are judged equally loud at equal_____ +/- 10 dB.
8. Tone decay test is negative in _____ and _____ pathology.
9. According to Jerger (1962) results of alternate binaural loudness balance test are_____,_____,_____ and _____
10. If equal loudness judgement on alternate binaural loudness balance test falls between those of complete and no recruitment, it refers to _____

11. Bekesy reported that a very narrow tracing width is associated with _____ pathology.

12. During Bekesy audiometry, there is descripency between forward and backward Bekesy tracing in the _____ pathology.

VII. Match the following:

Terminology	Authors
1. Temporary threshold fatigue	Ma) Hood (1956)
2. Abnormal adaptation	(b) Parker, Pecker and Richrds (1968)
3. Temporary Threshold Shift	(c) Harbert and Young (1962 a and b)
4. Albrecht effect	(d) Lierle and Reger (1955).
5. Tone perversion	(e) Kos (1955).
6. Perstimulating auditory perception	(f) Flottesp (1963)
7. Slow adaptation	(g) Jerger (1960)
8. Pathological relapse	(h) Ward and Richards
9. Threshold drift	(i) Katz (1955)
10. Pathological fatigue	(j) Palva (1964)
	(k) Sorenson (1962 a,b)
	(l) Carhart (1957)

VIII Tick the correct one

1. Difference limen test is used to differentiate between
   a) Cochlear vs. retrocochlear pathology
   b) Conductive vs. sensori-neural hearing lose
   c) Organic vs. functional hearing loss
   d) None of the above.

2. The alternate binaural loudness balance test was initially developed to detect.
   a) Otitis media
   b) Cholesteotoma
   c) Otosclerosls
   d) None of the above.

3. With the increase in sensation level or intensity, the difference limen for intensity.
   a) Increases
   b) Decreases
   c) No change
   d) None of the above.

4. The use of conventiqonal audiometer to measure tone decay was first reported by
   a) Schubert
   b) Jerger
   c) Hood
   d) None of the above.

5. The occurrence of tone decay in bone conduction was first demonstrated by
   a) Canadi (1890)
   b) Ward (1890)
   c) Reger and Koe (1890)
   d) Hone of the above

6. DLI and SISI test are based on the principle that
   a) Patient with cochlear pathology cannot detect small change in intensity.
   b) Patient with retrocochlear pathology can detect small change in intensity.
   c) Patient with cochlear pathology can detect small change in intensity.
   d) None of the above.

7. The expected results with conductive hearing loss on ABLB test is

   a) Complete recruitment

   b) No recruitment

   c) Partial recruitment

   d) None of the above

8. In the STAT the none test ear is masked with

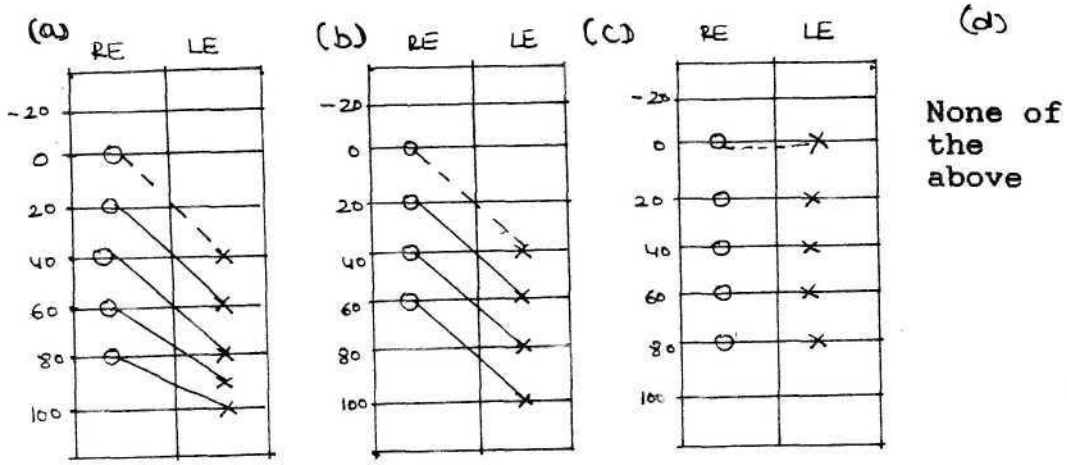
   a) Narrow band noise

   b) Broad band noise

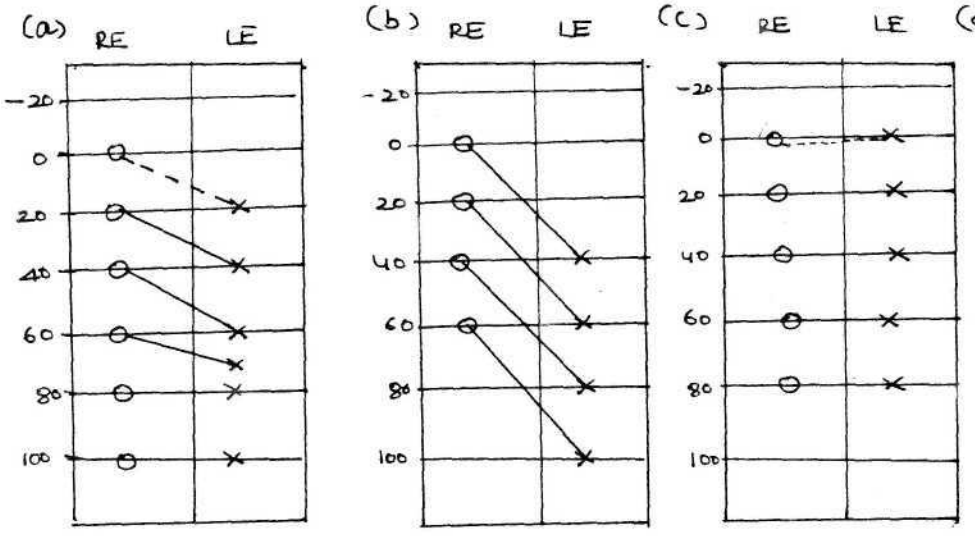
   c) White noise

   d) None of the above.

9. The type of laddergram obtain in the ear with cochlear pathology.

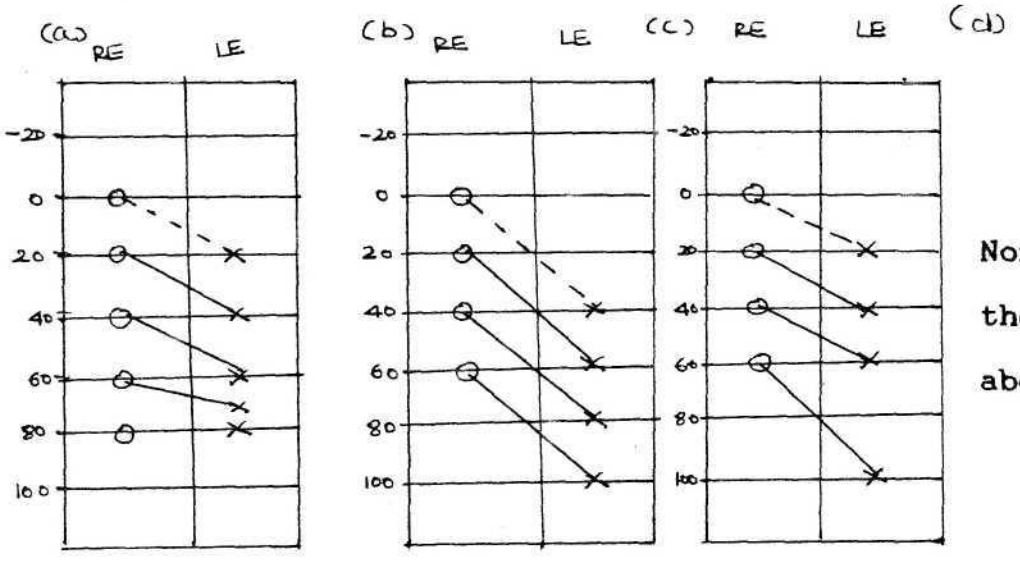


10. The laddergram pattern obtain In the ear with normal sensitivity is



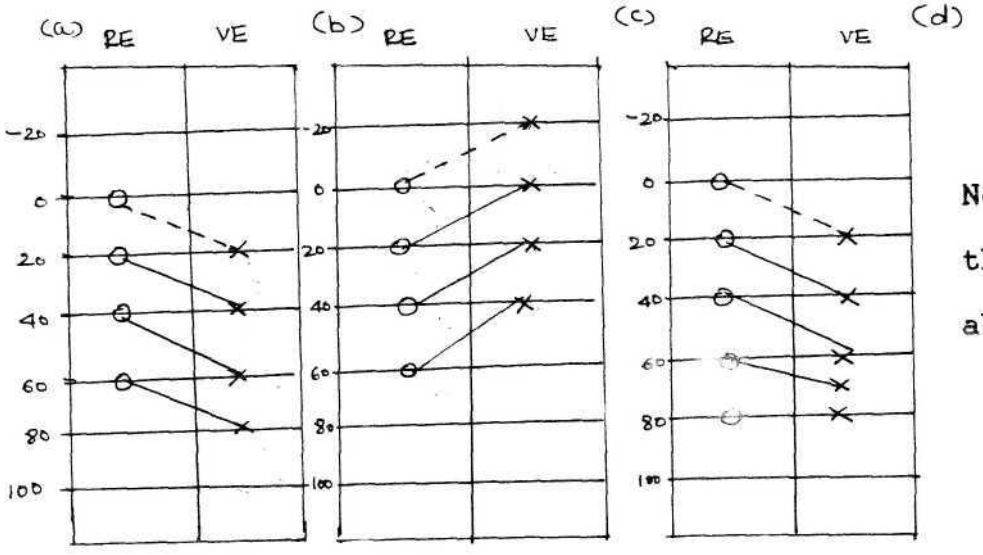
None of the above

11. The laddergram pattern seen in the ear with retrocochlear pathology is.



None of the above

12. The type of laddergram obtain in the ear with conductive hearing loss is



13. In the er with cochlear pathology the excursion width on Bekesy Tracing is found to be

a) 5 dB - 15 dB

b) 5 dB or narrow

c) 10 dB and broad

d) None of the above

14. In the ear with retrocochlear pathology, the excursion width of Bekesy tracing is found to be

a) 5 - 10 dB

b) 3 - 4 dB

c) 5 - 15 db and broad

d) None of the above

15. Altenate binaural loudness balance test is administered the case with

a) Bilateral sensori-neural hearing loss

b) Unilateral sensori-neural hearing loss

c) Sensori-neural hearing loss

d) None of the above

16. Monoaural loudness balance test is administered to the case with

a) Bilateral sensori-neural hearing loss

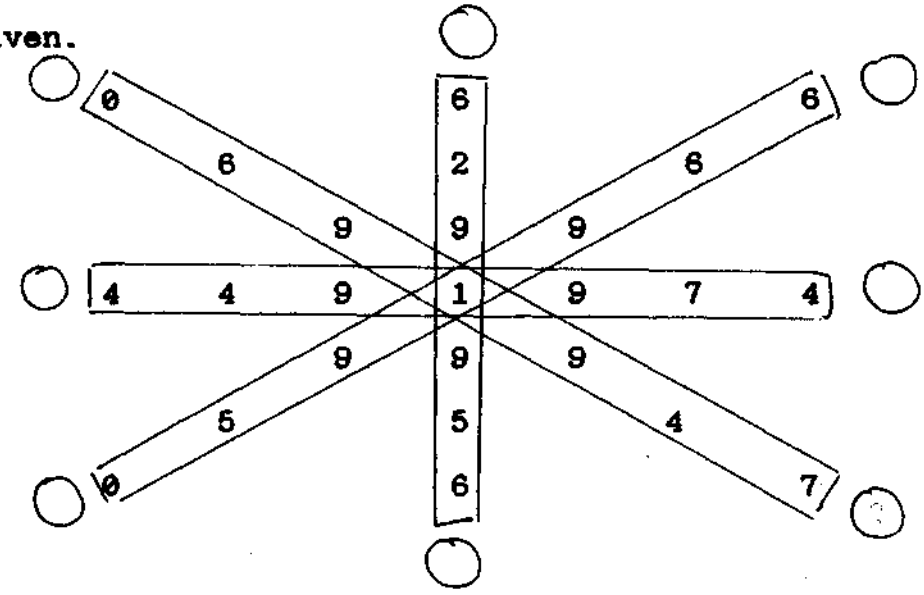
b) Conductive hearing loss

c) Unilateral sensori-neural hearing loss

d) None of the above.

IX. How much do you know about the history of audiological tests. In the puzzel given below can you write the year in which the following tests/contributions were given.

(A)



1) Hoods tone decay test 1956

2) Bekesy audiometry 1947

3) Alternate binaural loudness balance test 1937 26

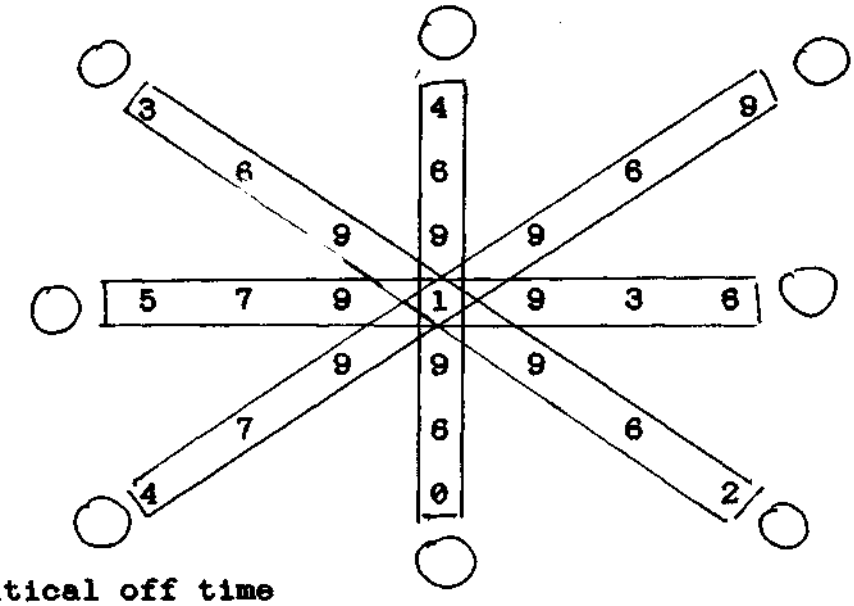
4) Modified DLI test (Denes and Nounters test)

5) Olsen and Noffsinger's Tone Decay Test 1971

6) Continuous tone masking 1960

7) Graso-Stadler model E800 audiometer

8) Schubert Tone Decay test. 1944



9) Critical off time

10) Conductive SISI

11) Suprathreshold adaptation test

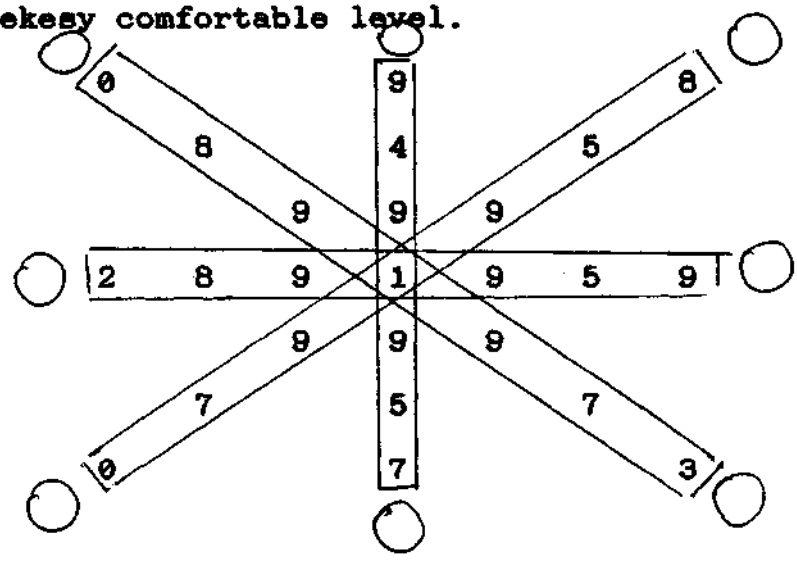
12) Monoaural loudness balance test

13) Modified SISI test (Thompson) 1969

14) Green's modified Tone Decay test 1963

15) Owend Tone Decay test 1964

16) Bekesy comfortable level.



17) Difference limen for intensity (Lucher and Zwislocki)

18) Modified SISI test (Sander)

19) Classical SISI test

20) Carhart Tone Decay test

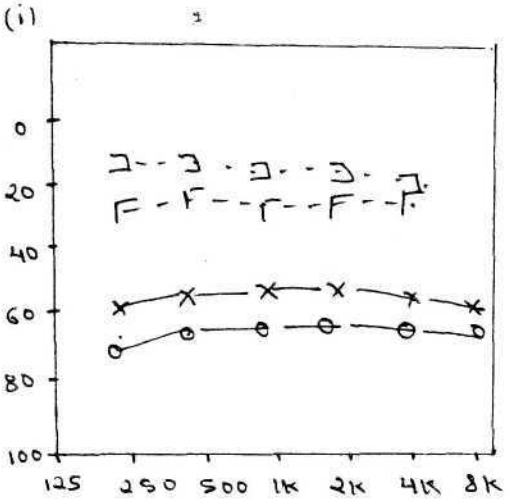
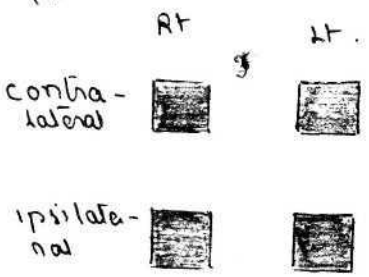
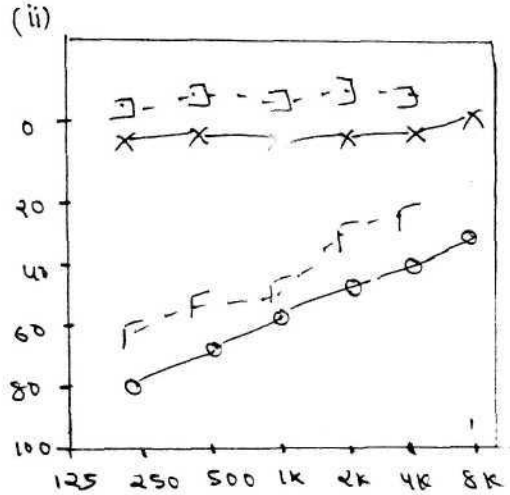
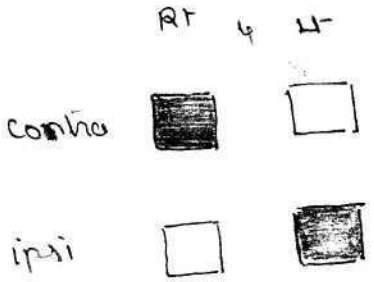
21) Rosenberg screening tone day test.

OBJECTIVE TESTS

I. Match the following

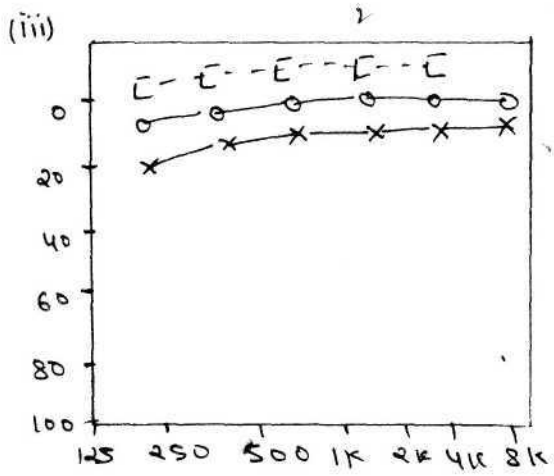
Founder		Test
1. Metz (1952)	*(a)*	Reflex decay test
2. Jerger (1975)	(b)	Reflex relaxation Index-
3. Anderson and Barr (1969)	(c)	Loudness recruitment test
4. Norris et al (1974)	(d)	Differential ratio quotient.
5. Fitzgaland and Balkany (1974)	(e)	Physical volume test
	(f)	Diagnostic application of reflex.

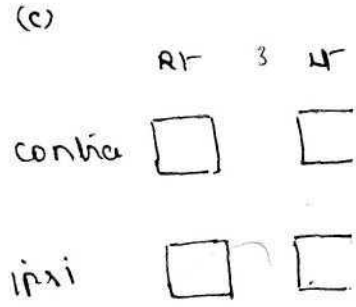
II. Given in the left column are some case histories. Match the audiogram (2nd column) and Jerger Box Pattern (3rd column) for each histories.

History	Audiological findings	Acoustic reflex
1.A 35 year old man comes with a complaint of hearing loss in the right ear. H/o nausea, tinnitus, vertigo. Reports that can hear loud sounds	(i) 	(a)  (b)
2.A 35 year old woman comes with a complaint of tinnitus also complaints of difficulty in closing right eye and closing mouth H/o right side facial paralysis. No C/o hearing loss.	(ii) 	

3.A 40 year old man comes with a complaint of hearing lose in both ears

H/o tinnitus, vertigo. Reportedly can hear loud sounds.

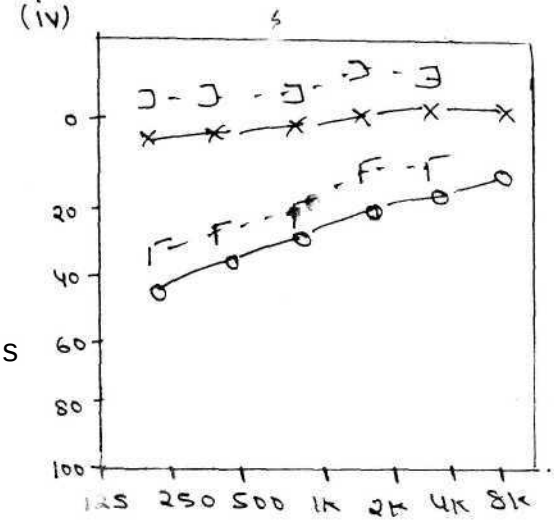


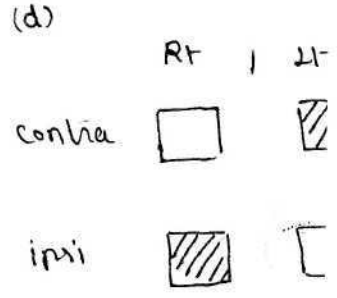


4.A 15 year old boy comes with the complaint of hearing loss in left ear. Reported that he can hear moderately loud sounds.

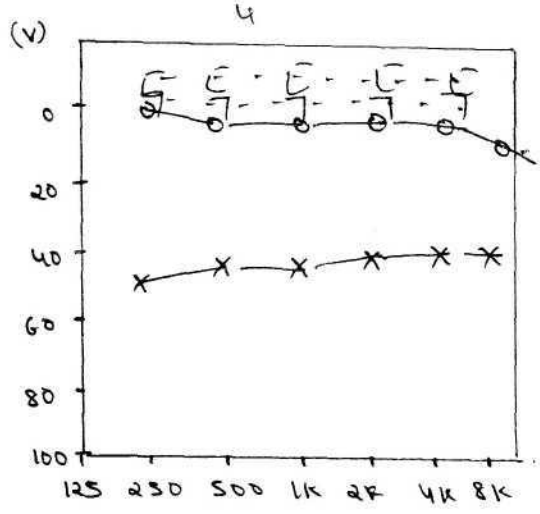
No H/o tinnitus vertigo.

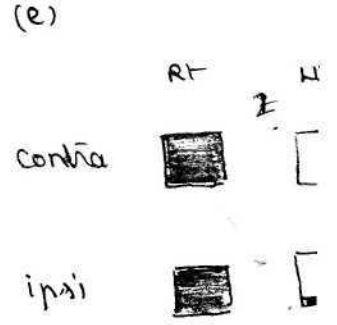
H/o ear discharge in childhood and pain in the left ear.





5. A 35 year old woman comes with the complaints of hearing loss in the right ear H/o nausea, tinnitus and fluctuating hearing loss has difficulty in hearing soft Bounds.



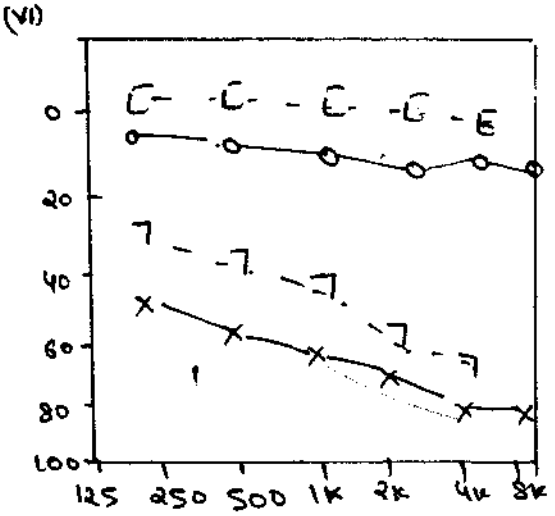


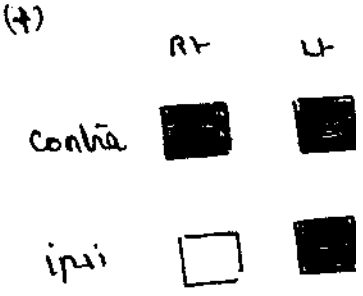
6.A 40 year old man comes with the complaint of hearing loss in the left ear.

H/o vertigo and tinnitus

No H/o nausea, eardischarge.

Reports of having difficulty in hearing louder sounds.





III. Indicate whether the given statements are true or false

1. If the difference between puretone threshold and acoustic reflex theshold is less than 60 dB. then it indicates that the subject has recruitment. Ture/False
2. Differential ratio quotient differentiates between cochlear and retrocochlear pathology Ture/False
3. A normal ABR threshold does ensure normal processing of auditory stimuli at the cortical level. Ture/False
4. Prolonged ABR latencies at the lower stimulus intensity levels can be explained by increased transmi-ssion time along the cochlear partition. Ture/False
5. If the differential ratio quotient value is zero, it indicates there is complete recruitment. Ture/False
6. Differential rate quotient can be used to detects presence of recruitment in cases with bilateral sensori-neural hearing loss. Ture/False

7. The absence of an ABR does not ensure that a peripheral hearing loss exists. Ture/False
8. Absolute amplitude of wave V helps in differential diagnosis of auditory disorders. Ture/False
9. The presence of wave V is used to estimate threshold because it is consistently the most robust and stable component of the ABR. Ture/Falee
10. Latency of the acoustic reflex is reduced in cases with cochlear pathology because of abnormal adaptation. Ture/False
11. Reflex relaxation index differentiates between cochlear and retrocochlear pathology. Ture/FalBe
12. Reflex decay test is positive in cochlear pathology. Ture/False
13. Lesions along the VIII nerve pathway, such as an acoustic neuroma, can results in prolongation of absolute latency. Ture/False

14. In normals reflex relaxation index is generally greater than 30%. Ture/False
15. In cases with cochlear pathology, there is prolongation of inter wave latency intervals. Ture/False
16. In cases with cochlear pathology reflex relaxation index is less then 30% Ture/False
17. Latency of acoustic reflex is less in cases with retrocochlear pathology. Ture/False
18. In the VIII nerve or low brainstem lesions with normal hearing interpeak latency difference between I and V will be within normal limits. Ture/False
19. In the brain stem lesion, there can be partial absence of the waveforms. Ture/False
20. Sedation affects the amplitude, latency, or detectability of the ABR. Ture/False
21. Masking may be required while recording ABR. Ture/False
22. In subjects with profound hearing loss, ABR may be obtained. Ture/False
23. In subjects with retrocochlear pathology the inter wave latency intervals are prolonged. Ture/False

IV. Fill in the blanks

1. If the magnitude of reflex reduces by 50% within 5 seconds, then reflex decay is said to be_____and if here is no reduction, than reflex decay is said to be

2. In patients with retrocochlear pathology the absolute latency is_____.
3. Reflex threshold at low sensation levels are observed in cases with_____and_____.
4. In_____lesions, interpeak latency difference (I and V) of ABR decreases.
5._____measures of the ABR wave peaks have excellent diagnostic potential.
6. As the intensity of the stimulus increases response amplitude also increases more rapidly in subjects with _____pathology.

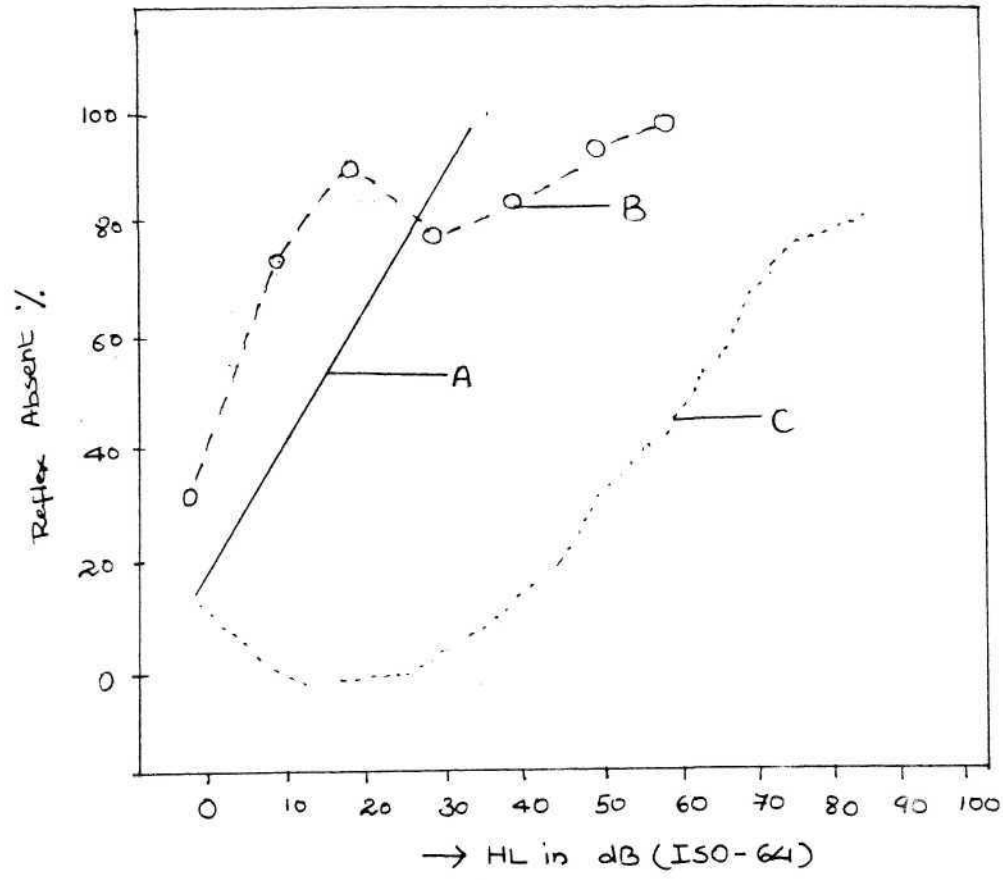
V. Tick the correct one.

1. Reflex decay test is administered at a level of
   a) 5 dB SL reference to puretone threshold.
   b) 10 dB SL reference to acoustic reflex threshold.
   c) 10 dB SL reference to puretone threshold.
   d) None of the above
2. An absence of an acoustic reflex to probable in
   a) In conductive hearing loss
   b) In facial nerve paralysis
   c) In profound sensori-nerural hearing loss
   d) All of the above.
3. As the intensity of the stimulus is lowered the amplitude of the response. a courlic reflex.
   a) Increases
   b) Decreases
   c) No change
   d) None of the above.
4. In case of hearing loss, associated with eighth nerve or low brainstem lesions.
   a) Total absence of ABR waveforms
   b) Unreadable ABR waveforms
   c) Both
   d) None of the above

5. An acoustic reflex at 5 dB SL suggests
   a) Cochlear pathology
   b) Retrocochlear
   c) Pseudohypocus is
   d) None of the above
6. Presence of reflex decay at 500 Hz. suggests
   a) Cochlear pathology
   b) Conductive hearing loss
   c) Retrocochlear pathology
   d) None of the above.
7. Reflex decay test is found to be positive in
   a) Conductive hearing loss
   b) Cochlear pathology
   c) Retrocochlear pathology
   d) None of the above.

VI. The relationship between degree, of hearing loss and the likelihood of acoustic reflex absence in patients with conductive, cochlear and eighth nerve disorders (Jerger, et al. 1974) is shown below.

Label - A, B and C in this graph.



——— A

------ B

..... C

VII. Locate the invnntifatnrg in the field of ABR acoustic reflex.

F O S P D K T H I G O P D O T P L O U S A A L X Z
T O O P X Y Z G E R G E R W J A B B E R D N D T O
A P C O U D H O O D S A J E R G E R M A N A M R E
D L K S R A E L O T R U Y B Q A A E I A N D E R P
T E R K I L D S O N A N D S C D L L N I E L S E N
R G R E E Y O C D E N A S T S S O O X Y Z O P N O
O P A E S E M N T O L M K E I T H J K A T P N O R
G C A R T A T U L L U S C R C A T O U X P O O R R
E R O S E N B S L O O K E R P U X Y Z O U P M O I
R U D G E U X L E V I N O L S E N A N D M O F R S
K O U P L T O E L E N A T O C K L P X Z U P H N P
E O [C P I T R P B O M S O N A N G E U R K I M K
G K L T D T S I S I D L E U E T K G U T R I E P O
B E K E S Y P K O U X Z L E I T O M M E R S I L Y
J O L P X E M M F I O A T N K B R A C K M A N E R
B T S T O C K A R D W E T A T H E R E P U M A M H
R T T O U L Q C T O U U E N M I L O J O S E Y M E
A O A O K C A H O G R G R U N D Y C O F I S I O N
P L R A B O K O D R A K S O L I K E E P E S A L L
O P R R F P H R P Y K T A R G E R G R K K O K L P
U V K K E J J D L S M E E R J E R B E R R T I M E
X R A B R O S S I T E R L E K E T S T I N D I A N
N J Z Z T S E O E A I Y S D O O P R O V G E S T R
L P Y O E J E K X N N H S D T O O G E R U P G E T
T O U F I Z F R P N N S E G S H U S L E R P A K O

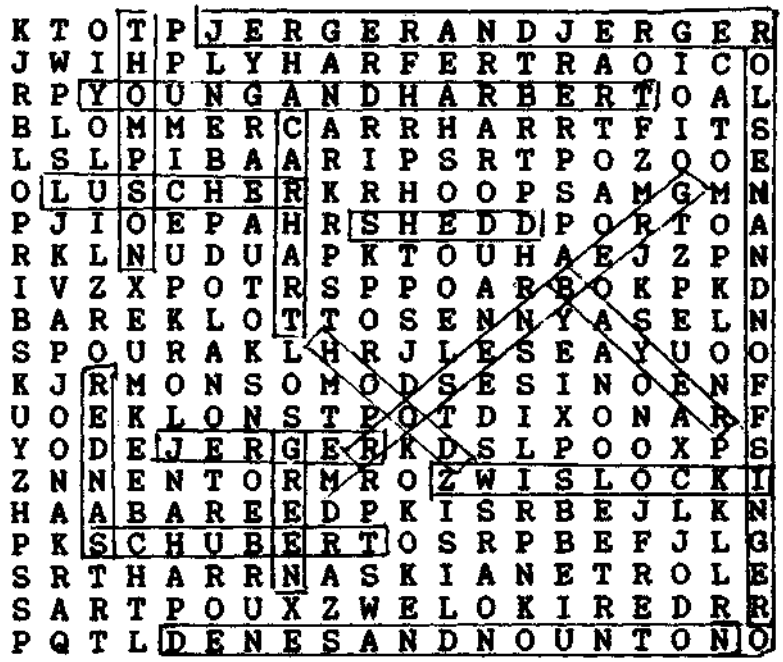
VIII. Unscramble the letters in the given words to form the appropriate one.

1. E R L F D E E T T S E X A Y C
2. E E M R T C R T I U E T Z M N E T S E T
3. A E T C N Y L
4. I R A L E E X O N X N T X R A L L O I F
5. T N E I T E U O O I T A R L A I T N E R F F I D

SOLUTIONS

SUBJECTIVE TESTS

I.



II. 1 ... [e] 2 ... [g] 3 ... [f] 4 ... [h]

5 ... [b] 6 ... [k] 7 ... [d] 8 ... [c]

9 ... [i] 10 ... [ ]

III. 1.... g.... (v)

2.... b.... (i)

3.... f.... (iv)

4.... e.... (vii)

5 .... a .... (iii)

6.... d.... (ii)

7.... c.... (vi)

IV 1 ... CT] 2 ... [T] 3 ... [F] 4 ... [F]
5 ... [F] 6 ... [F] 7 ... [T] 8 ... [T]
9 ... [T] 10 ... [F] 11 ... [F] 12 ... [T]
13 ... [T] 14 ... [F] 15 ... [T] 16 ... [F]
17 ... [T]

V. (a) Classical Short Increment Sensitivity Index,
Alternate Binaural Loudness Balance Test,
Olsen and Noffsingsr's Tone Decay Test
(b) Modified short increment sensitivity index
(c) Hoods tone decay test
Schubert tone decay test
(d) Rosenberg screening tone decay test
(e) Supra threshold adaptation test
(f) Luscher and Zwlslocki different limen for intensity
(g) Carharts tone decay test and Green's tone decay test
(h) Denes and naurtons different limen for intensity.

VI. (1) Laddergram and graph
(2) Cochlear and retrocochlear pathology
(3) Difference limen
(4) Difference limen for intensity
(5) Sensation level
(6) Difference limen for frequency

(7) Hearing level

(8) Conductive and cochlear pathology

(9) Complete recruitment, partial recruitment, no recruitment and decruitment

(10) Partial recruitment

(11) Cochlear

(12) Retrocochlear pathology

VII 1 ... [e] 6 ... [j]

2 ... [1] 7 ... [k]

3 . . . [d] 8 ... [a]

4 . . . [h] 9 ... [c]

5 ... [b] 10 ... [f]

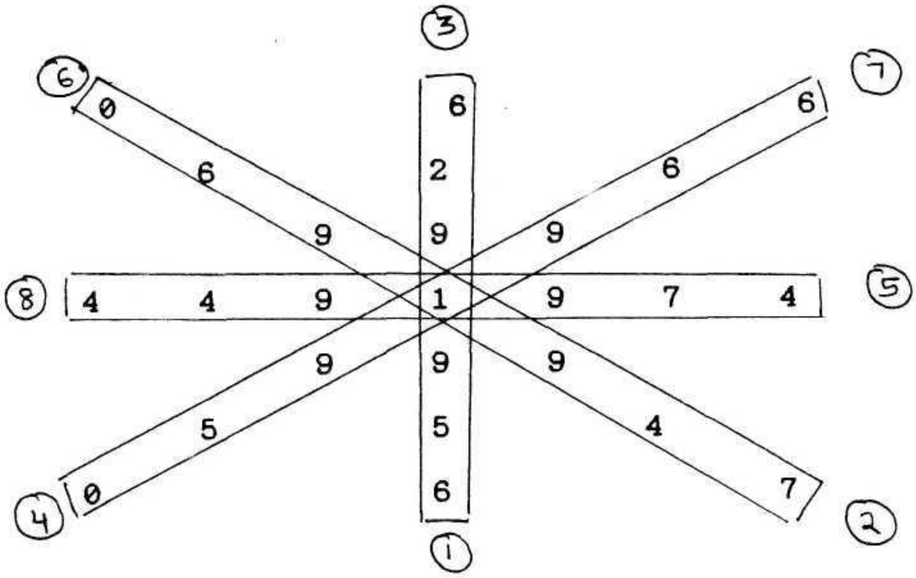
VIII. 1... [a] 2...Cc] 3...[b] 4...[a]

5...[a] 6...[c] 7...[b] 8...[c]

9...[a] 10...[c] 11...[c] 12...[a]

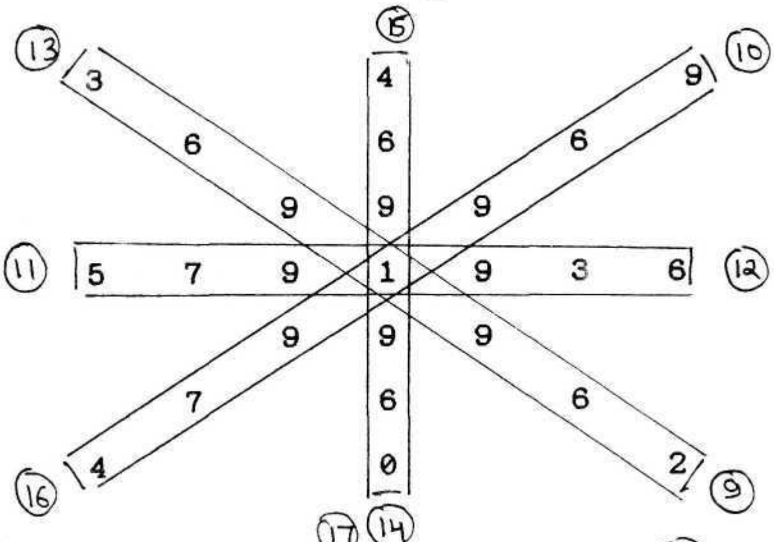
13...[b] 14____[c] 15....[b] 16... [a]

IX.
(A)



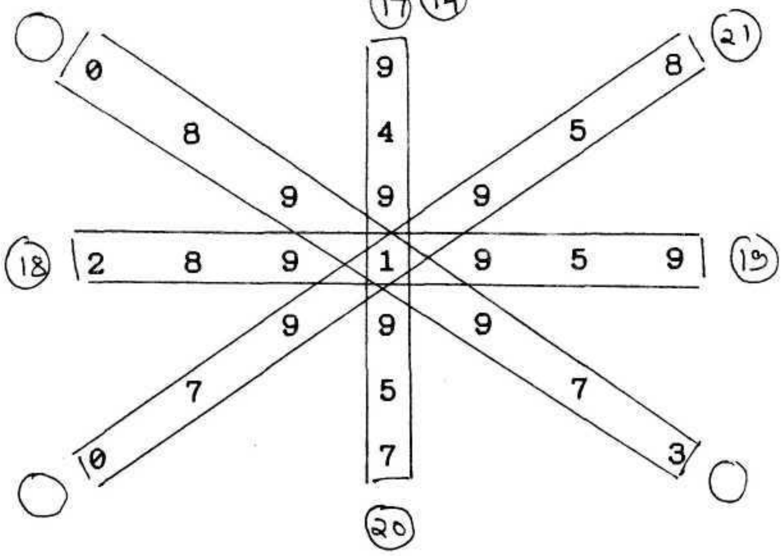
3
6 2 9 1 9 5 6
1
8
4 4 9 1 9 7 4
5
6
0 6 9 1 9 4 7
2
4
0 5 9 1 9 6 6
7

(B)



15
4 6 9 1 9 6 0
14
11
5 7 9 1 9 3 6
12
13
3 6 9 1 9 6 2
9
16
4 7 9 1 9 6 9
10

C)



17
9 4 9 1 9 5 7
20
18
2 8 9 1 9 5 9
19
0 8 9 1 9 7 3
0 7 9 1 9 5 8
21

OBJECTIVE TESTS

I. 1 ...[c]

2 ...[f]

3 - - -[a]

4 ...[b]

5 ...[d]

II. 1 - - - (ii) .- - [d] -

2 ...(iii)'. . .[e]

3 ... (i) ... [a] .

4 ... (v) ... [f]

5 ... (iv) ... [c]

6 ... (vi) ... [b]

III. 1 .. CT] 2 .. [T] 3 .. [F] 4 . . [T] 5 .. [F]

6 .. [F] 7 .. [T] 8 .. [F] 9 .. [I] 10 .. [F]

11 .. [T] 12 .. [F] 13 .. CT] 14 ..CT]

15 . . [T] 16 .. CT] 17 .. [F] 18 .. [F]

19 .. CT] 20 .. CF] 21 . . [T] 22 .. [F]

23 .. [T]

IV. (1) Positive and negative

(2) Prolonged

(3) Cochlear pathology and psuedohypocusis

(4) cochlear lesions

(5) Latencies

(6) Cochlear

V. 1 [b] 2 [d] 3 [a] 4 [a] 5 [c]
6 [c] 7 [c]

VI. A (Conductive hearing loss)

B (Retrocochlear pathology)

C (Cochlear pathology)

VII. 1. Reflex decay test

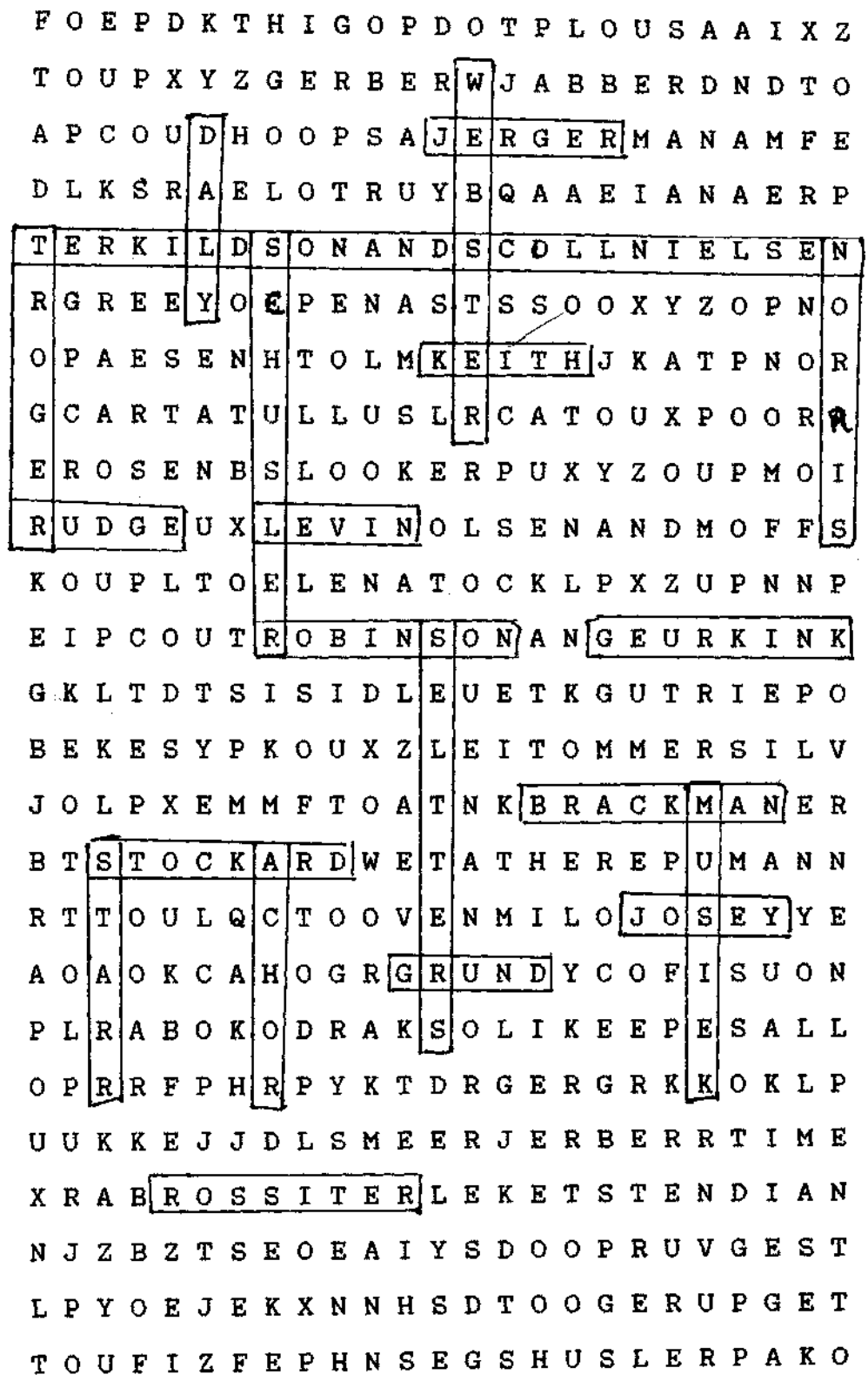
2. Metz recruitment test

3. Latency

4. Reflex relaxation index

5. Differential ratio quotient

VIII


FOEPDKTHIGOPDOTPLOUSAAIXZ
TOUPXYZGERBERWJABBERDNDTO
APCOUDHOOPSAJERGERMANAMFE
DLKSRAELOTRUYBQAAEIANAERP
TERKILDSONANDSCOLLNIELSEN
RGREEYOEPENASTSSOOXYZOPNO
OPAESENHTOLMKEITHJKATPNOR
GCARTATULLUSLRCATOUXPOORR
EROSENBSLOOKERPUXYZOUPMOI
RUDGEUXLEVINOLSENANDMOFFS
KOUPLTOELENATOCKLPXZUPNNP
EIPCOUTROBINSONANGEURKINK
GKLTDTSISIDLEUETKGUTRIEPO
BEKESYPKOUXZLEITOMMERSILV
JOLPXEMMFTOATNKBRACKMANER
BTSTOCKARDWETATHEREPUMANN
RTTOULQCTOOVENMILOJOSEYYE
AOAOKCAHOGRGRUNDYCOFISUON
PLRABOKODRAKSOLIKEEPESALL
OPRRFPHRPYKTDRGERGRKKOKLP
UUKKEJJDLSMEERJERBERRTIME
XRABROSSITERLEKETSTENDIAN
NJZBZTSEOEAIYSDOOPRUVGEST
LPYOEJEKXNNHSDTOOGERUPGET
TOUFIZFEPHNSEGSHUSLERPAKO

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