HAC EXAMINERS REPORT 2005(1) (draft 10.08.05)
Collated by J Irwin 13.09.05

THEORY PAPER

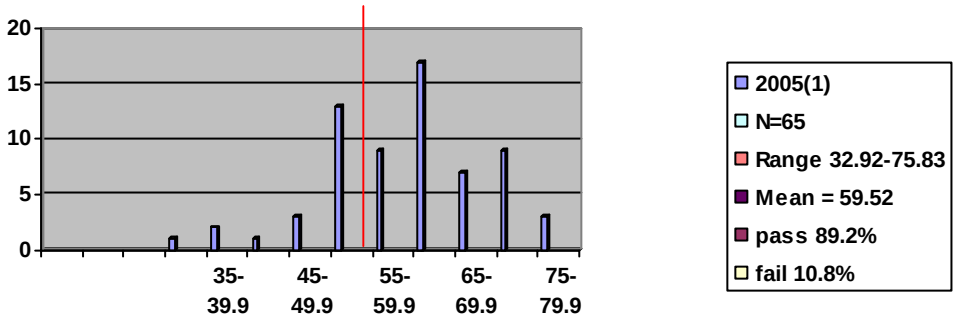
General comments

In the graphs that follow the red line is the pass mark.

Despite the slight hiccough with a part of the paper missing, of the 65 candidates who sat papers 1 and 2 of the theory exam 89.1% passed. In detail 3 (4.6%) failed badly, 4 (6.2%) failed, 22 (33.8%) passed, 24 (36.9%) passed with merit and 12 (18.4%) passed with distinction. As usual some questions seemed harder than others but there were also some questions with high average marks. Examiners comments included:

In general, the rehabilitation questions were poorly answered. Some candidates seemed to have learned stock answers which did not fit the question! Rehabilitation holds equal weight with other areas and deserves time and effort to be spent on it during training.

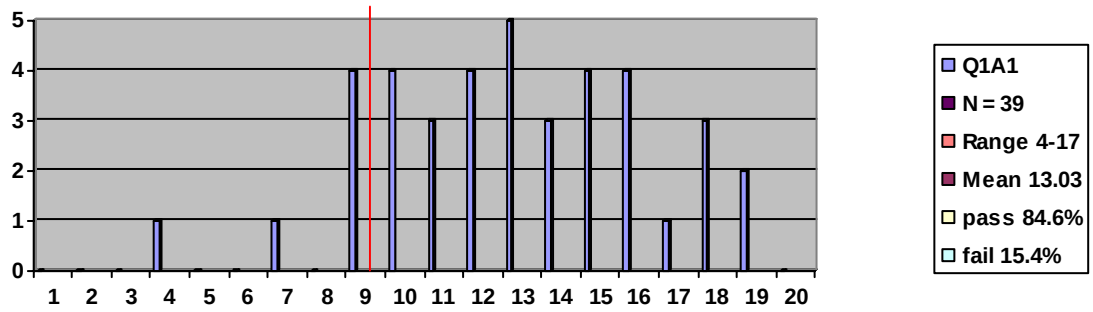
Theory Paper Overall marks 2005(1)



1A1

(a) **Describe the differences between the inner and outer hair cells. Include structure and function in your answer.** **14**

(b) **How would you expect the loss of each of these two types of cells to affect hearing?** **6**



In general this question was well answered, most being able to give a satisfactory description of both the hair cell anatomy and physiology and the effect of hair cell loss.

1A2

Write short notes on all of:

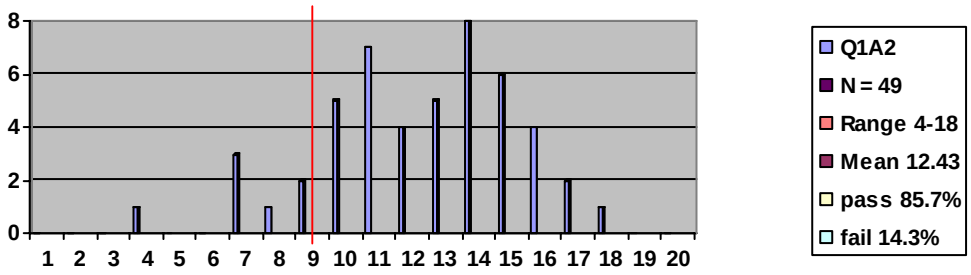
(a) **stapedius fixation** **4**

(b) **tinnitus** **4**

(c) **acoustic neuroma** **4**

(d) **stria vascularis** **4**

(e) **diplacusis** **4**

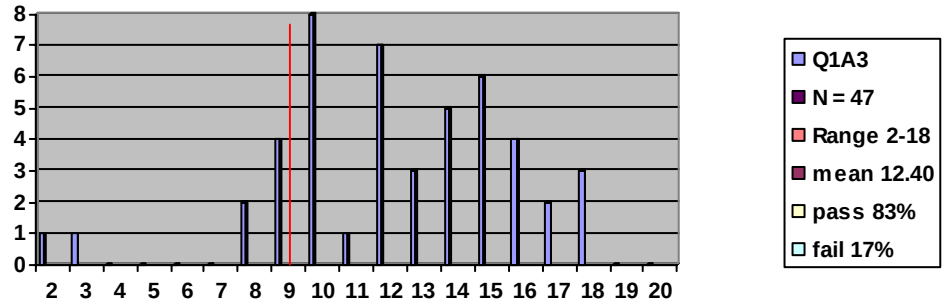


There were no consistent mistakes in the answers to this question. All parts of this question were answered well.

1A3

(a) Describe in detail how sound is localized. 14

(b) What might a client with a moderate bilateral hearing loss experience if they lost the remaining hearing in one ear? 6



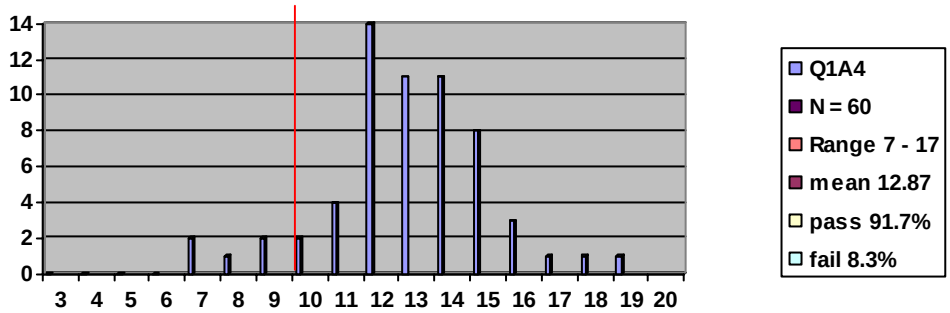
Most were able to provide an adequate description of the acoustic clues for localisation in the horizontal and vertical planes and give an explanation for front-to-back localisation. Part (b) was answered by some in terms of localisation only whereas better answers recognised that a bilateral hearing loss resulted in the loss of other binaural advantages in addition.

1A4

(a) Describe the function of the healthy middle ear in the transmission of sound to the cochlea. 11

(b) List three pathological conditions of the middle ear that would affect this. 3

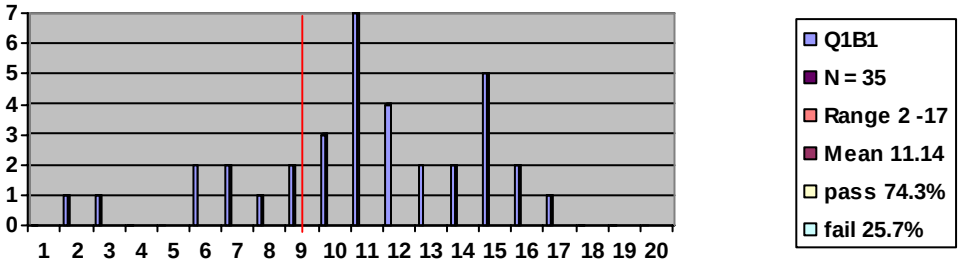
(c) Describe briefly how each of these three conditions interferes with this normal transmission. 6



Most candidates answered all parts of this question well.

1B1

(a)	**Describe the composition of 2 types of speech lists commonly used for assessing hearing aid benefit with adults.**	**3**
(b)	**How are the tests scored using these materials?**	**3**
(c)	**Describe the relative advantages and disadvantages of each of these 2 lists.**	**6**
(d)	**Describe how a simple speech test might be set up and undertaken to assess hearing aid benefit and mention any particularly important aspects.**	**8**

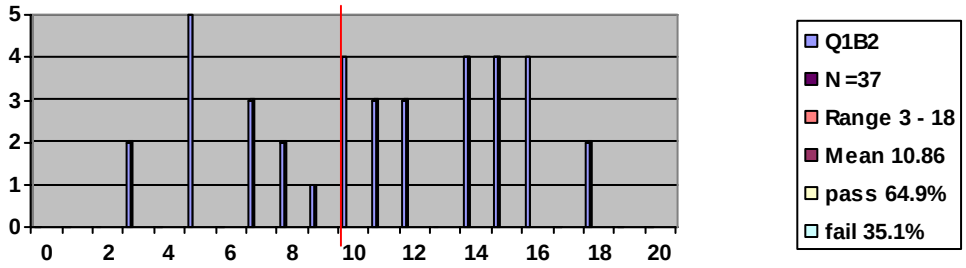


It is always pleasing to note that trainers take heed of the practical examination summaries. Every session candidates demonstrate this by correcting those minor hiccups in the previous exam. Thinking along similar lines for the written examination, although this was a repeated question from last year's paper, there was still a 24% fail rate. It would seem that advice on demonstrating the procedure of speech audiometry, where candidates can put theory into practice, had been neglected by some. Candidates fared well in mentioning testing with and without hearing aids but many omitted the setting up of equipment and seating arrangements, calibrated signal level and use of a sound level meter.

Although marks were given, using Fry speech material is rather old fashioned and not mentioned in today's literature. Arthur Boothroyd isophonemic word lists, BKB sentences, and FAAF with the updated computerized version, which was mentioned by a few candidates, are preferable.

1B2

(a) What are equal loudness contours and how were they derived? 8
(b) Comment on the differences between the 40 phons and 100 phons curves. 6
(c) In relation to hearing what are the Minimum Audible Pressure (MAP) and Minimum Audible Field (MAF), how do they differ? 6



Candidates need to know that the starting point of the 40 phon curve is 1000Hz at 40dBSPL. The 40 phon curve is derived by comparing pure tones across the frequency range to be of equal loudness to that of 1000Hz at 40dBSPL.

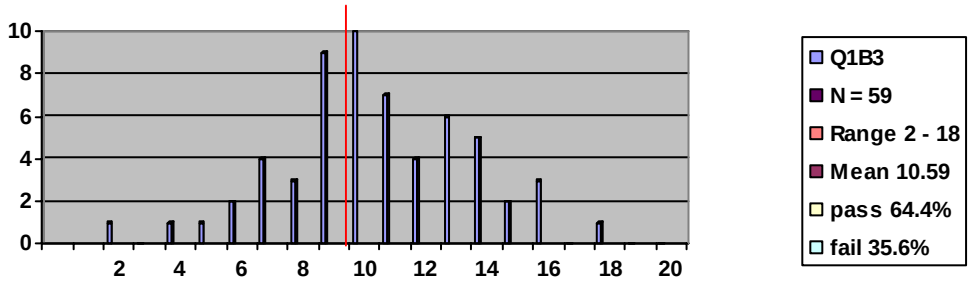
Most candidates were aware that the 100 phon curve was flatter than the 40 phon curve. This understanding should include the reason for this outcome, where the bunching together of the phon curves in the lower and very high frequency indicate a more rapid growth of loudness at these frequencies.

Candidates did very well in describing the difference between MAP and MAF.

1B3

Write short notes on all of:

(a)	**The octave frequency scale and its relevance to hearing**	**5**
(b)	**How you can determine the approximate distance of a sound source?**	**5**
(c)	**Factors affecting reverberation time**	**5**
(d)	**Upward spread of masking.**	**5**

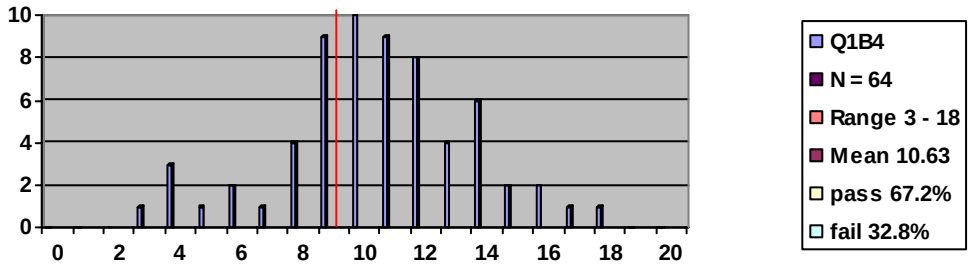


Overall this question was answered well. Marks were lost in part (a) for not recognising that the linear scale would not represent the response characteristics of the human ear and that the octave scale is similar to the dB scale (Logarithmic). In part (b) for not stating that the high frequencies are more readily dissipated thorough heat and therefore distant sounds are perceived to be duller. In part (c) there were no consistent errors but part (d) most candidates did not relate the upward spread of masking to the choice of aid(s) or their design.

1B4

(a) **Explain in full the terms dBSPL; dBHL; and dB(A). Make clear in your answer the difference between the terms and how they are derived. In what circumstances would you encounter each of these terms?** **15**

(b) **The performance data of a hearing aid is measured to IEC 118-7 and IEC 118-0 specifications. Discuss how these two methods of measurements differ.** **5**



Again this was well answered. Consistent omissions were in part (a) that dBSPL is an objective measurement. In part (b) that dBHL is a subjective measurement. And in part (d) that the two test methods stated still do not allow comparison of any additional features of hearing aids such as directional microphones.

2A1

Study the audiogram below.

(a) Based on this audiogram how would you expect the client to describe their hearing difficulties? 3

(b) Explain the frequency response you are aiming to achieve through a hearing aid fitting and what you want to avoid. 4

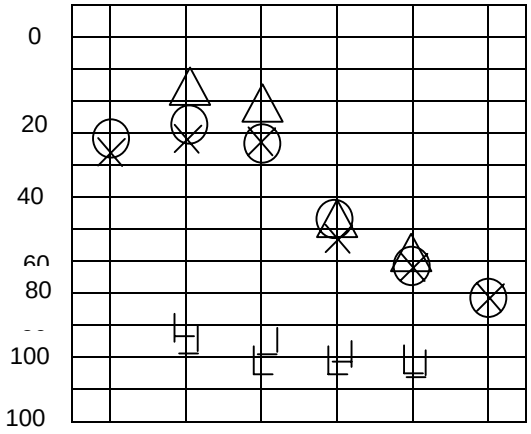
(c) In the case of a BTE fitting:

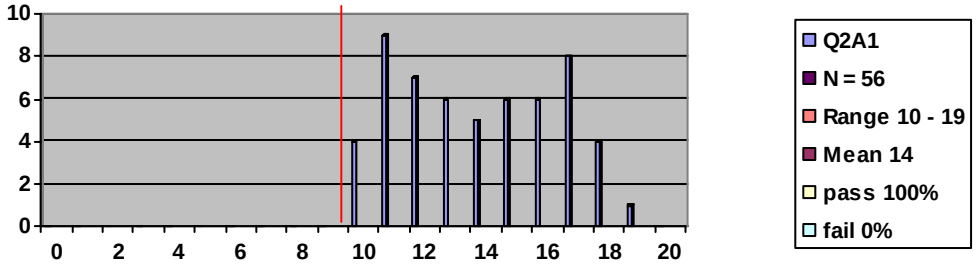
1. Give four reasons why you would choose a binaural fitting 4

2. Give four reasons why you would choose to fit monaurally 4

3. State what earmould style and material you would select and why 3

4. State what tubing you would use and why 2





This proved to be an easy question.

The question starts by asking how the client would describe their loss, some candidates explained the expected difficulty of this loss in an “audiological text book report style” language rather than saying what the client would say to them.

Candidates lost marks for only mentioning avoiding exceeding UCL whilst giving no consideration to over amplification of low frequencies. When providing reasons for fitting binaurally or monaurally some gave the client’s job as one reason and then the client’s lifestyle as another – these are the one of the same.

Some candidates talked about a severe loss & wanted to fit silicone full shell, long meatus & narrow bore tube/thick wall tube. They are looking in isolation at the extremities for the high freq loss and not thinking about the overall audiogram and the effects of that approach.

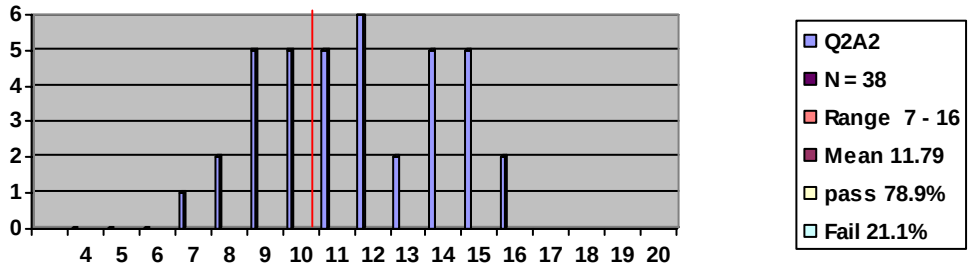
Some candidates used this as an opportunity inappropriately to explain how various compression types worked rather than discussing the overall frequency response desired. Other candidates used the question to start explaining in detail about recruitment instead of explaining the desire for the MPO not to exceed the ULLs. These candidates gained no extra marks as the question did not call for this level of detail and therefore used valuable time for no value.

2A2

(a) **State three different types of difficult listening conditions for a person with a bilateral, sensorineural hearing loss. Include why they would be difficult for such a person. For each type of difficult listening condition, briefly describe a situation which illustrates the difficulties and explain why this happens** **7**

(b) **What technical features exist in currently available hearing aid which are designed to assist in each of the three situations? In addition to these technical features, what other recommendations would you make to minimise the difficulties described in (a).** **10**

(c) **How can hearing tactics assist in the three situations?** **3**



Very often candidates listed three types of background noise, instead of 3 distinct areas of difficulty. Additionally, they would then group a set of features together and lazily comment that the same features could be of benefit to all 3 areas.

There was a tendency to throw in a whole array of features, almost as if just in case when quite clearly they were not specifically going to address or assist in the area of difficulty being discussed eg loop system in a bar?

When the question asked why the situation would cause difficulty a number of candidates went into great length to discuss Anatomy and physiology of the inner ear. Whilst this had some bearing it was not necessary to start to describe OHC functionality and all of the associated disorders – this was an HAT question after all.

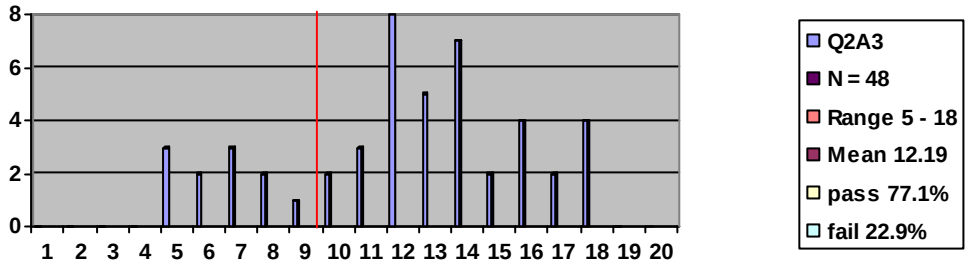
Some candidates focused on the problems wearing a hearing aid would cause as opposed to problems a hearing impaired person would have.

Very few picked up on the binaural relevance and did not address the specific problems that a bilateral loss causes.

Some candidates missed the fact that the question was looking for features of hearing aids that would be of assistance and started to discuss things like subtitles, Ceefax and hearing tactics, even though hearing tactics was a question all on its own.

2A3

(a)	**Draw a labelled diagram of a hearing aid test box as used to measure the performance of an air conduction hearing aid.**	**8**
(b)	**Briefly describe four functions of an aid's performance that can be tested in this way**	**8**
(c)	**List four functions of an aid's performance that cannot be tested in this way**	**4**



Too brief on list of tests that can be performed – "describe!"

Graphs not necessary.

A very poor graph/diagram is in circulation which candidates have learned

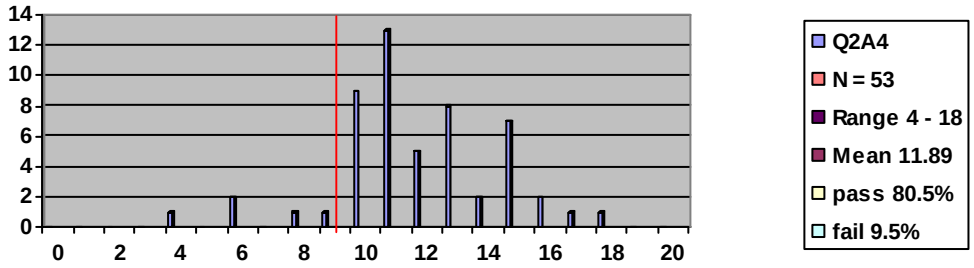
Association with ULLs was a common mistake

A number of simple errors were being made eg functions that cannot be tested in a test box did not mean cochlear functions or GHABP scores. The fact that this question was talking about hearing aid functions was again lost on some.

2A4

Many hearing aids have or can be fitted with a telecoil.

(a)	**In what listening conditions can a telecoil be beneficial and why?**	**3**
(b)	**What is the difference between a switch marked 'T' and 'MT'?**	**2**
(c)	**How can some programmable systems enable variations in the response of a telecoil and for what reasons would this be an advantage?**	**4**
(d)	**For what type and degree of hearing loss can a telecoil be most helpful?**	**6**
(e)	**What can be the disadvantages of a telecoil?**	**5**



Overall candidates did relatively well with this question. Those obtaining low scores had written very little or only provided one suggestion per part of the question when clearly the weighting of the scores indicates more detail is required, particularly for part e).

Some candidates spent a long time providing a detailed explanation with diagrams of how a loop system actually works; unfortunately this did not warrant extra marks as the question does not ask for this.

For section a) the question was looking for listening conditions such as trying to listen in reverberant conditions, over distance or against background noise rather than just expecting candidates to say "in churches, theatres & banks".

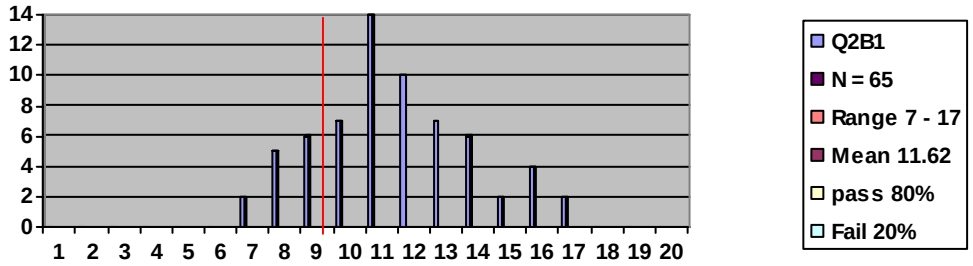
Candidates lost marks for only discussing briefly the type and degree of loss that a telecoil would be most helpful. Some candidates stated that it was only for a severe loss, others who scored well entered into a discussion about the benefits and restriction for all types of losses. The weighting of this section indicates it requires more than a couple of sentences.

Some candidates appeared to be confused with section c) and lost marks as they talked about multi programme application & how they would configure directional microphones & compression algorithms. This section was looking for a discussion on programming the mix of telecoil with mic, altering frequency response, gain & output with an explanation as to why providing these options would be advantageous. Candidates who wrote about the telecoil programmability but didn't discuss the advantages also lost some marks.

2B1

A dispenser practices from a hearing aid centre as well as undertaking home visits. In order to ensure compliance with the HAC Code of practice, describe in detail:

(a)	**What limitations there are regarding how a dispenser can describe himself and his premises in written promotional material?**	**8**
(b)	**What rules must be observed when making home visits other than through an approach by telephone by the dispenser?**	**8**
(c)	**What items of equipment must be available at each consultation? Does this requirement differ depending on whether the consultation is in a client's home or in the Centre?**	**4**

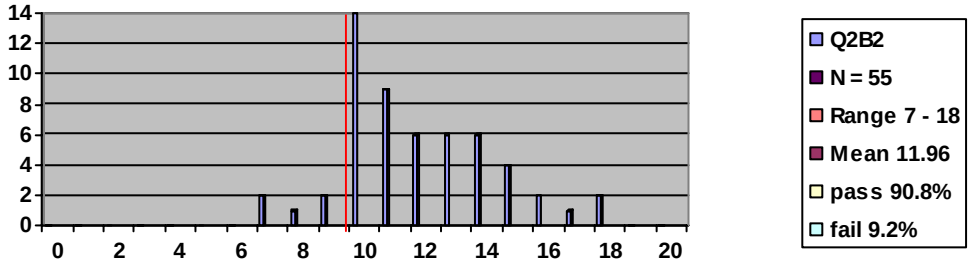


Most candidates scored well with this question, but attention to detail would have earned them more marks. Few candidates appear to have studied and understood the Code in depth. The implications of clause 10 are widely misunderstood, particularly the difference in the regulations that apply to potential and existing clients.

2B2

An elderly, active and intelligent client was fitted with a binaural in-the-ear hearing aid system approximately 12 months ago.
A relative of the client contacts you to say that the client stopped using two hearing aids after a few months of the fitting and has only worn one of them irregularly over the last 6 to 8 weeks.

a) What are the possible reasons for this client not wearing both hearing aids regularly? 6
b) What would you do with a view to ensuring that the client makes regular use of amplification? 6
c) What can you do as a matter of routine practice to avoid such situations from arising? 8



The answers to this question were mostly acceptable. There were very few really good answers (but equally there were few very poor ones).

Generally candidates need to think more deeply about what the question is asking. This question refers to aids that were fitted 12 months ago but where the problems started later. Answers tended to say why an aid might be rejected (although few people thought to check for changes in hearing) but they did not take much account of the time periods involved.

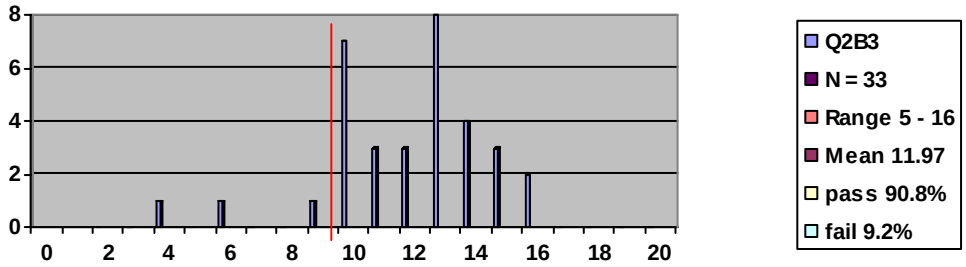
Some candidates did not relate (b) to the given client and situation but instead answered very generally. Some candidates mixed the answers to (b) and (c) and, whilst they were not penalised for this, it made marking more difficult.

Some scripts were almost illegible. Writing has to be able to be read if it is to gain marks. Legible, well-organised scripts that answer the question and don't waffle should be the order of the day!

2B3: You feel that binaural aiding is appropriate for your client.

(a) Why might they initially reject the idea of wearing binaural hearing aids? 8

(b) How would you seek to change that attitude – and why? 12



Many candidates would probably have earned more marks if they'd read the question with greater care. The first part clearly refers to a client rejecting the idea of a binaural system, not rejecting a binaural system after its use. In the second part of the question very few discussed why you should seek to change a client's attitude towards binaural fittings.

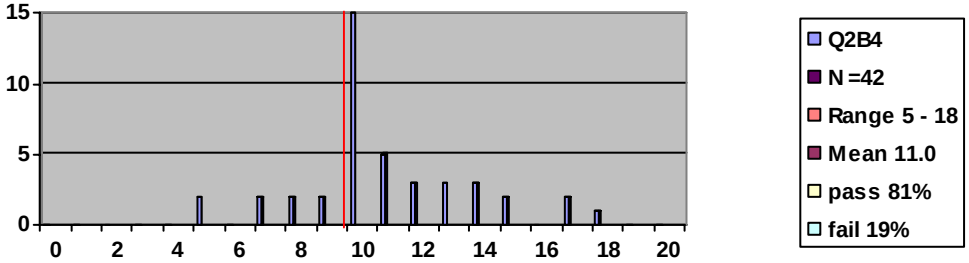
2B4:

a) Explain what is meant by the occlusion effect in association with hearing aids. 6

(b) Explain which features of earmould and shell design affect occlusion. 6

(c) What audiometric results would suggest that a patient would be likely to report occlusion? 4

(d) What is meant by the viscosity of an aural impression material and why is it important? 4



This question was answered reasonably well overall. However, in (c) several wrote about how the hearing loss would change if there was occlusion, rather than what audiometric features might result in complaints of occlusion. Few candidates pointed out that the hearing loss would be sensorineural although where they had included an appropriate audiogram, they were given credit for this.

Aptitude test

Six (75%) of the 8 candidates who sat paper 3 passed. Of these six 1 passed with distinction and 4 with merit.

3A1

Study the audiogram below.

- **(a) Based on this audiogram how would you expect the client to describe their hearing difficulties? 3**
- **(c) Explain the frequency response you are aiming to achieve through a hearing aid fitting and what you want to avoid. 4**
- **(c) In the case of a BTE fitting:**
  1. **Give four reasons why you would choose a binaural fitting 4**
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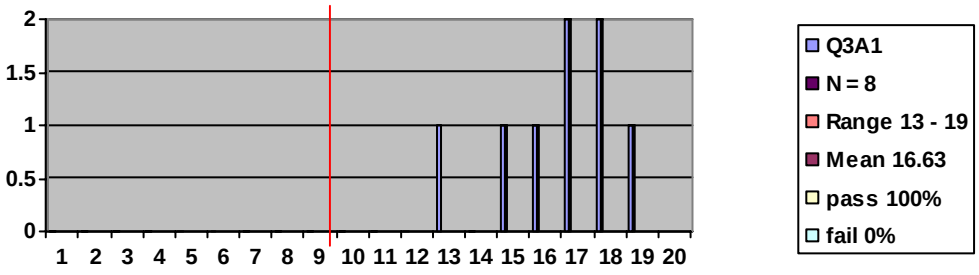

See 2A1

3A2

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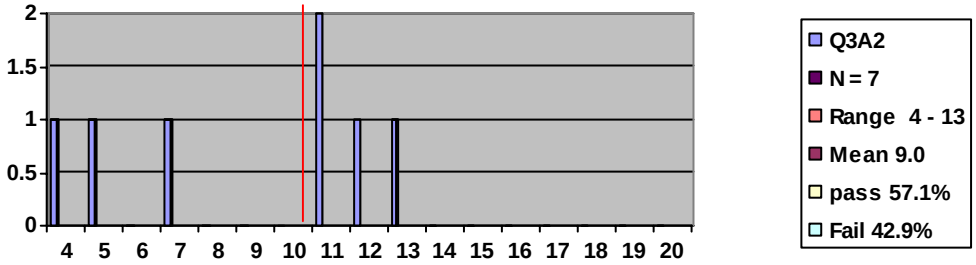

See 2A2

3A3

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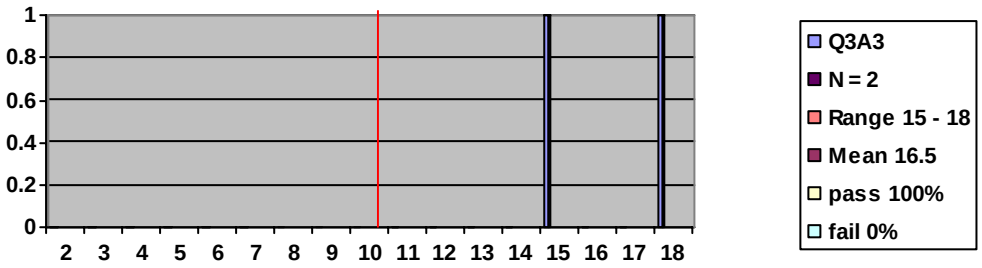

See 2A3

3A4

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(a) **In what listening conditions can a telecoil be beneficial and why?** **3**

(b) **What is the difference between a switch marked 'T' and 'MT'?** **2**

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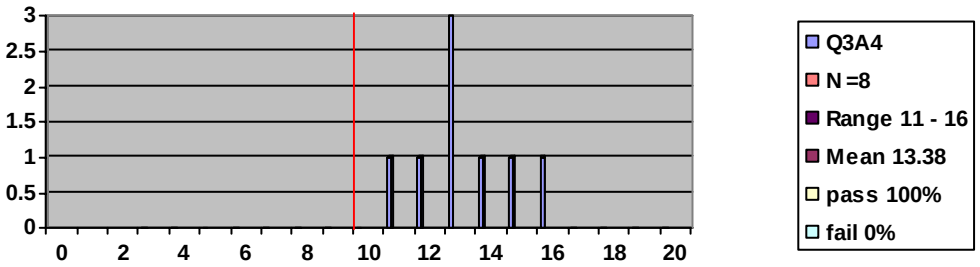
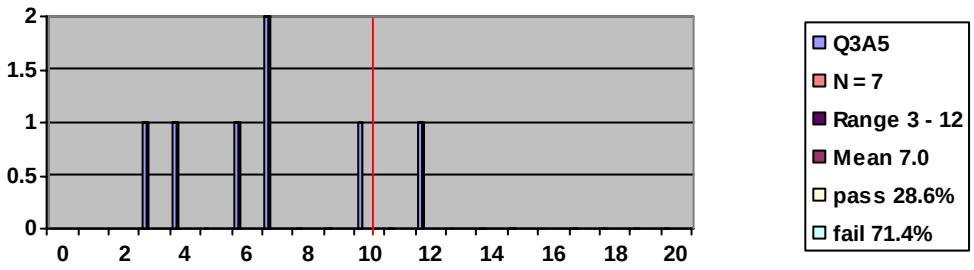


See 2A4

3A5

a) **Describe with the use of simple diagrams how a DSP hearing aid functions and how it differs from a digitally programmable analogue hearing aid? 8**

b) **Explain the various compression strategies that can be employed by a dispenser with a DSP hearing system to maximise a users' understanding of speech. 12**



Overall this question was answered poorly. Over emphasis was placed on the different algorithms used eg IHAFF v DSL I/O.

3B1

A dispenser practices from a hearing aid centre as well as undertaking home visits. In order to ensure compliance with the HAC Code of practice, describe in detail:

(a)	**What limitations there are regarding how a dispenser can describe himself and his premises in written promotional material?**	**8**
(b)	**What rules must be observed when making home visits other than through an approach by telephone by the dispenser?**	**8**
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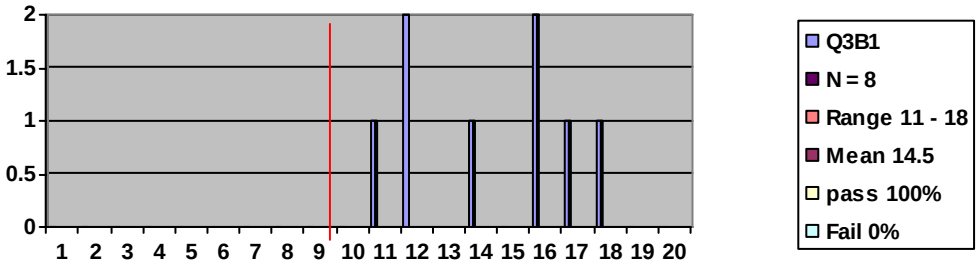
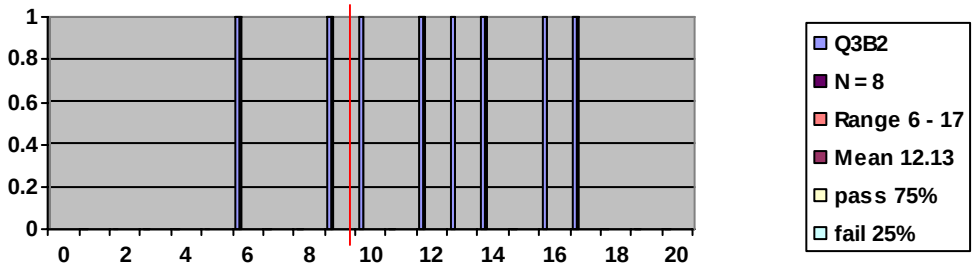


See 2B. There was a 100% pass rate from the aptitude candidates on this question compared with 80% on paper 2.

3B2

(a)	**Who legally can be the 'notified supervisor' of a trainee dispenser?**	**3**
(b)	**With reference to seven separate clauses of the Code of Practice describe 7 responsibilities of a 'notified supervisor' in relation to a notified pre-exam trainee**	**7**
(c)	**During the post-examination period what does the HAC Standard of Competence require of a supervisor and a trainee in respect of the logbooks?**	**8**
(d)	**What are the duties of a supervisor of a trainee who is an applicant for registration undergoing an adaptation period? (clause 29)**	**2**



Most candidates answered this question well.

PRACTICAL EXAMINATION

43 (63.2%) of the 68candidates who sat papers 1 & 2 passed the practical with 25 (36.7%) failing. Eight of those who failed were offered a partial resit. One candidate passed with distinction.
Five of the 10 aptitude candidates passed the practical.

Medical Aspects

Otoscopy was satisfactorily performed in most cases. Hygiene in preparation for the procedure was of sufficient standard in almost all instances and all candidates bar one or two took appropriate bracing measures. Most were able to describe what they saw accurately.

Knowledge of the referral conditions was generally good. A few candidates, however, tended to forget to mention the period in which a particular symptom needed to appear in order to qualify.

Most were able to give a good description of the anatomy of the cochlea and the semicircular canals. Some excluded the vestibule from a description of the vestibular system and were unable to identify the utricle, saccule and endolymphatic duct and sac from a photograph. Most were able to describe the pathology of conditions such as Meniere's disease, otosclerosis and otitis media and were able to identify abnormalities in photographs of abnormal tympanic membranes.

When asked about causes of hearing loss few gave the more common causes first. There was some confusion regarding mumps and measles, most of those who mentioned these conditions thought that they were causes of intrauterine infections. None named non-syndromal genes as a cause of sensorineural hearing loss but most knew the names of two genetic syndromes- Waardenburg Syndrome and Ushers Syndrome. Some named Treacher Collins Syndrome as a cause of sensorineural hearing impairment. Most candidates knew about noise induced hearing loss but there was general uncertainty regarding the intensities at which action levels came into force.

Impression Taking

When performing otoscopy a number of candidates used a speculum that was too small.
Candidates are warned that the over-use of disinfectant can lead to contamination of the impression material and incomplete setting, sterilising measuring spoons is both unnecessary and inappropriate.
Several candidates made impressions that were much too short and are advised that all impressions should be of a good length. Candidates need to learn what faults render an impression unusable.
Some candidates said that BTE earmoulds should normally be washed daily in soapy water, this is not good advice.

Knowledge of tubing and earmould types and materials was very weak.

Hearing Aid Technology

The overall standard of knowledge demonstrated by candidates appeared to have improved from former groups especially in being able to explain the concept of multi channel and different compression strategies. However typically some candidates still remain confused about the difference between WDRC and compression limiting and the application of these strategies.

There was less confusion between the terms “multi-channel” and “multi-programme” but some candidates were unable to relate to the case study as to how they would envisage multi programmes being used for their given client.

There was an awareness of outcome measures and techniques for validating a hearing aid fitting but little understanding about why these are used, at what point they are used and the thinking behind these approaches. The weakest area of knowledge was on Real Ear Measurements.

There is still a lack of understanding of how to individualise rehabilitation advice and discuss the relevance of recommended features to the particular case being dealt with. Disappointing comments were made by a number of candidates who failed to take into account the experience of the hearing aid user they were dealing with.

Candidates unable to identify, wax traps, vari vents, battery sizes, cleaning tools and models of hearing aids lost marks. Lack of practical exposure shows with these candidates and this needs to be addressed.

Audiometry

Trainers have obviously taken note of comments on how to better the candidate’s practical performance in pure tone audiometry. Each suggestion has been taken up, resulting in a high standard of practice in test procedures and attention to the client.

Candidates had received and understood the latest BSA recommended procedures.

One latest development of the test procedures is the occlusion of the test ear for high frequencies where the radiation of the tone might produce erroneous results. The use of an ear plug or headphone are both correct, but when using the headphone please make sure that this is not impinging on the BC headband close to the ear or pressing the pinna against the BC vibrator. This could result in misplacement or a reduction of vibration through absorption.

PRACTICAL EXAMINATIONS PARTIAL RESITS

A total of 8 candidates attended for partial practical resits. 2 sat Medical Aspects, 3 Audiometry, 2 Hearing Aid Technology and 2 Impressions.

7 candidates passed and one failed.

Once again the candidates showed a marked improvement in standard between the original exam and this.