

THE HEARING AID COUNCIL

REPORT ON THE THEORY EXAMINATION 2006(1)

General comments

Our warm thanks go to John Irwin who resigned as Chief Examiner at the end of last year. He had the onerous task of overseeing the first OSPEs to a level that ensured a standard of competency that was fair and gave a good base for future practical examinations.

Sue Gray, Chief Invigilator reported a number of issues that need addressing in the theory examination which future candidates should note.

1. Yes, candidates can take their watch in with them, but not their mobile telephone.
2. It is a good idea to draw up a plan on an examination sheet, but candidates must remember to put a line through this and attach it to the back of their answer.
3. Candidates must leave their examination papers on the table and not in their pack.

As you read the report on the written examinations you will see the familiar comments - 'Candidates should take more care in reading the question' and 'if a list is asked for, any discussion wastes time for both the candidate and the examiner'. Candidates should also note the marks given for each part of the question does help to indicate the amount of information required in your answer.

EXAMINERS' REPORTS ON:

2006(1) Paper 1 Section A

Q 1A1

- | | | |
|-----|--|----|
| (a) | Describe the anatomy of the external auditory canal, up to but not including the tympanic membrane. Use diagram if you wish. | 10 |
| (b) | List two functions of wax | 2 |
| (c) | How does the normal auditory canal modify the acoustic input to the middle ear? | 2 |
| (d) | List two non-infectious conditions of the external auditory canal | 2 |
| (e) | How is the acoustic input affected by each of the two conditions described in above? | 4 |

Number of scripts = 96 Range 7 - 20 Average = 15.89

There were very few problems with this very easy question with all but a few candidates scoring highly. Where problems did occur they included:

- Discussion of the pinna and tympanic membrane was not needed and was ignored by the examiner when it occurred.
- If a list is asked for, any discussion wastes time for both the candidate and the examiner.
- Half of the marks for this question were for part a) most of the other sections scored 2 and e) only 4. I would suggest that time for the answers is divided accordingly. The candidate who submitted 1 side of A4 on a part question worth 2 marks can only score a maximum of 2 marks.

John Irwin

Q1A2

- | | | |
|-----|---|---|
| (a) | Draw a cross section of the cochlea and label all parts | 8 |
| (b) | Explain the passage of vibration through the cochlea resulting in the production of an action potential | 6 |
| (c) | Name 3 ototoxic drugs | 3 |
| (d) | Name 3 effects of ototoxic drugs on the cochlea | 3 |

Number of scripts = 91 Range 6 – 18 Average = 12.57

- a) This was a popular question and was answered well on the whole. Most candidates were able to draw and accurately label a cross section of the cochlea but those candidates gaining the highest marks were those able to give the more detailed labelling of the cochlea.
- b) Most could explain the passage of sound through the cochlea but again details were important for gaining marks. Time was lost by a few candidates who included the middle ear in their answers.
- c) The question asked for the **names** of three ototoxic drugs and full marks were gained by classifications.
- d) This section was less well answered with most not giving enough details.

Val Newton

Q1A3

- | | | |
|-----|--|---|
| (a) | List 4 causes of hearing loss that can be prevented | 2 |
| (b) | How might each of them be prevented? | 6 |
| (c) | How does each one of them lead to a hearing loss? | 6 |
| (d) | What type of hearing loss results from each of these causes?
Use diagrams where necessary | 6 |

Number of scripts = 31 Range 6 – 17 Average 12.19

- a) Candidates were able to list preventable causes of hearing loss. Most selected noise and causes of external ear blockage or tympanic membrane perforation. Those who thought otitis media was preventable had difficulties in the next section.
- b) Noise was one of the preventable causes selected and whereas most knew about ear defenders there was a tendency to forget other means of prevention – quiet machinery etc.
- c) The pathological effects of noise damage were not well described.
- d) The type of hearing loss was generally known but marks were lost here for insufficient detail with regard to the shape of the audiogram or degree of hearing loss.

Val Newton

Q1A4

Write short notes on **four** of the following five subjects

- | | | |
|-----|------------------------------|---|
| (a) | ventilation tubes (grommets) | |
| (b) | hyperacusis | 5 |
| (c) | barotrauma | 5 |
| (d) | chronic otitis media | 5 |
| (e) | non-organic hearing loss | 5 |

Number of scripts = 70 Range = 6 -19 Average = 11.97

NB if the questions asks for “short notes on **four** of the following five subjects” it means just that. There was a small but significant number who answered all 5. This is an obvious waste of valuable time and only the first (not necessarily the best) 4 will be marked.

- a) Ventilation tubes are (as the name suggests) to allow ventilation of the middle ear rather than to allow fluid drainage. This is not a question about glue ear, its causes and prevention.
- b) There is still a little confusion between hyperacusis and recruitment but not as much as in previous years.
- c) There were no particular errors or problems with this section.
- d) Chronic means long standing and not as several candidates suggested recurrent or repeated.
- e) There were no particular errors or problems with this section

John Irwin

2006(1) Paper 1 Section B

Q1B1

List BSA recommended procedures for the subjective tests that should be carried out on the audiometer for the following:

- (a) Stage A: Daily check tests 8
- (b) Stage A: Weekly tests 8
- (c) When are Stage A and Stage C objective calibrations carried out 4

Number of scripts = 74 Range = 3 -19 Average = 9.12

This question has become more relevant now that the daily checks are omitted from the OSPEs in Audiometry. The BSA recommended procedures categorise the daily and weekly stages. Many candidates lost marks by placing the checks into the wrong category. Stage C was unknown to many - a full check requirement when a major error or fault occurs and advisable when an audiometer is 5 years old.

Gillian Booth

Q1B2

- (a) How does the acoustic features of speech differ from those of a sustained 1kHz pure tone? 10
- (b) Your client has a severe sensorineural loss above 1kHz, but normal hearing in the low frequencies. How is speech perception likely to be affected? 10

Number of scripts = 57 Range = 4 -16 Average = 10.39

38/57 (66.6%) scored equal to or more than 50% whilst the remaining 33.4% scored below the 50% mark.

- a) Periodic vs aperiodic and single tone vs speech spectrum were well

- identified but temporal features less well described.
- b) Presence of speech power in vowels and intelligibility poor with loss of consonants was well documented but poor frequency resolution and limited temporal coding less well identified.

Deepak Prasher

Q1B3

- (a) Discuss the purpose of masking in pure tone audiometry 8
- (b) The client's average not masked pure tone thresholds are as follows:
 - bone conduction 40dBHL
 - left air conduction 80dBHL
 - right air conduction 90dBHL
 Masking is required.
- (i) Why might obtaining true thresholds be difficult? 3
- (ii) What are the possible true thresholds? 9

Number of scripts = 67 Range = 4 -16 Average = 9.69

The word 'purpose' broadened the perception of this question and the 8 marks should have indicated this. Masking is used to obtain true threshold where cross-hearing is suspected. Without this process an accurate recording of the type of hearing loss, the need for referral and a correct prescription of a hearing aid could be overlooked. Most candidates answered this well but the least popular outcomes were the ability to determine the type of hearing loss and need for referral.

The (b) part of the question was based on the fact that true thresholds would be difficult to obtain because of reaching the masking limitations and the maximum output for bone conduction recordings. Only 19 candidates mentioned that there was insufficient masking to obtain a plateau.

The *possible* true thresholds are: i) results remain the same; ii) sensorineural for either ear where the poorer AC becomes worse or a 'dead' ear or the poorer ear remains conductive requiring the extended reverse Rule 2 of masking to establish whether the better ear is sensorineural; iii) both ears show a mixed hearing loss with a possible greater degree of sensorineural in one of the ears.

Gillian Booth

Q1B4

Write short notes on **four** of the following five subjects

- (a) periodic and aperiodic sounds 5
- (b) abnormal loudness growth 5
- (c) narrow band masking 5
- (d) equal loudness contours 5
- (e) standing waves 5

Number of scripts = 88 Range = 5 -18 Average = 11.32

66/88 (74%) of the candidates scored equal to or better than 50%. The remaining 26% scored below 50%. Overall a greater number of candidates attempted this question and performed better at this than for 1B2.

- a) Periodic vs aperiodic was well answered.
- b) No significant problems in the description of abnormal loudness growth
- c) It was generally not appreciated that narrow band masking is less fatiguing for patient but use of narrowband masking and its bandwidth well described.
- d) Generally answered well with diagram
- e) Standing waves in confined spaces leading to resonance was not appreciated but construction and destruction elements well described.

Deepak Prasher

2006(1) Paper 2 Section A

Q2A1 & Q3A1

Two clients each have a moderate bilateral hearing loss, one typically sensorineural and the other typically conductive.

- (a) Describe the hearing difficulties that these two clients would have in various listening conditions. How might these difficulties be similar or different for each client? 7
- (b) Your **general** recommendations for a hearing aid system may not be the same for each client. Describe the similarities and differences. 6
- (c) You choose to specifically advise a programmable, digital hearing aid system for each client. In what ways would your approach to programming the hearing aid system result in different performance characteristics. 4
- (d) Describe why you would take these different performance characteristic approaches? 3

Number of scripts = 82

Range 3 - 15

Average = 10.02

Aptitude candidate = 8

Range 10 - 15

Average == 11.13

The general standard of answers on this question was disappointing with the omission of some important and very relevant points.

The majority of answers to part (a) of this question focussed on the presence of background noise and few included speaker – listener distance and reverberation in describing difficulties in various listening conditions. This meant that the majority of candidates covered only hearing difficulties in quiet and in noisy conditions and often superficially so.

Only a minority gave a satisfactory answer to part (b) and many either combined parts (b) and (c) or answered part (c) with content more appropriate to part (b) or vice versa.

A glaring omission from part (b) answers was any reference to the importance of recommending a bilateral hearing aid system fitting.

Generally there was too little reference to audiometric differences between typical sensorineural and conductive hearing losses, to the presence or absence of abnormal loudness growth/loudness recruitment and the relevance of these differences to the programmed performance characteristics of DSP hearing aid systems.

There was a surprising amount of confusion between the terms “analogue” and “linear” with frequent examples of their being used interchangeably.

Barry Downes

Q2A2 & Q3A2

- (a) Describe, with the use of simple diagrams, how a digital signal processing (DSP) hearing aid functions.
Describe how it differs from a digitally programmable analogue hearing aid 8
- (b) Explain the various compression strategies that can be employed by a DSP hearing system to maximise a client’s understanding of speech in noise. 12

Number of scripts = 72 Range 2 - 14 Average mark 10.29
Aptitude candidates = 6 Range 6 – 13 Average mark 10.33

Overall this question was not well answered with candidates losing significant marks through not reading the question correctly.

For section a) candidates lost marks where they omitted diagrams or used completely irrelevant diagrams such as I/O graphs and frequency response graphs. Other candidates lost marks where they only produced a block diagram of a DSP circuit and no explanation. Diagrams required are illustrated in the chapter within “Principles of Hearing Aid Audiology - Maryanne Maltby”.

A majority of candidates also lost marks for not completing part a) as they failed to tackle the differences between the DSP and the digitally programmable analogue hearing aid

Section b) was answered by a large proportion of candidates describing in detail WDRC and or Compression limiting whilst relating the selection of this to audiogram types. Other candidates focused their explanations as to why people can’t hear in noise or talked about multi microphones. The question asks for various strategies, i.e. how the knee point, ratios, attack & release may be varied across multi channels to match varying audiogram dynamic ranges and how multi programmes with specific features might assist. A significant amount of marks were lost due to focusing on one strategy and going into too much detail.

Karen Shepherd

Q2A3

- (a) List the steps of impression taking on a client who is regularly exhibiting feed-back problems with a powerful behind-the-ear hearing aid system. 10
- (b) Throughout the impression procedure, what inspections and actions must you take to ensure safe practice? 10

Number of scripts = 63 Range 4 - 17 Average = 9.0

Candidates should take more care in reading the question, for example, some candidates read the words 'feed-back problems' in section (a) and produced an essay on feedback.

If a question begins with the word 'list', the candidate should make a list, and think carefully about the items which should be included in this list.

On the whole, section (b), was answered with more care than section (a).

Candidates should attempt to be accurate in their descriptions within the lists; the following examples did not adequately identify the type of the impression material.

'mix suitable impression material'

'use appropriate impression material'

'the impression material should be of the correct viscosity'

The type of impression material which should be used in this answer is: *'addition reaction silicone for best results (less shrinkage; better definition)'*

Candidates who wrote essay type answers risked the chance of deviating from the listed procedure which was required and often ran out of time by putting in statements such as *'ensure that the correct methods and techniques are adopted'* and *'take impression in accordance with BSA procedure'*.

The easiest way to answer this question was to accurately list each action, from washing hands to hygienic disposal of waste, and then repeat for section (b) including the inspection and actions required for safe practice. The candidates must clearly state the obvious such as, *'place the hearing aid and/or spectacles (if spectacles are worn all the time) behind the ear before the impression procedure.'* This important step was omitted by every candidate.

Candidates could have achieved higher marks on this question by visualising the procedure and recording the steps in taking an aural impression for a patient experiencing feedback with a behind the ear hearing aid.

Helen Belcher

Q2A4 & Q3A4

Using the blank pure tone audiogram provided, enter all necessary readings which would illustrate a case of bilateral, significant asymmetrical, sensorineural hearing loss. The degree of hearing loss in both ears should enable bilateral fitting.

With reference to the audiogram you have drawn, answer the following questions:

- (a) Complete audiogram as requested above. 4
- (b) Explain in detail what you would consider to be the two main hearing problems associated with the asymmetrical hearing. 5
- (c) If only a unilateral hearing aid system is being fitted, explain what factors you would take into account in deciding which ear to fit. 5
- (d) If fitting this case bilaterally with a programmable DSP hearing aid system, briefly explain how your amplification strategy may be different for each ear. 6

Number of scripts = 68

Range 0 - 14

Average = 9.93

Aptitude candidates = 8

Range 8 - 14

Average = 10.12

As a general comment on the answers to this question, a significant proportion of candidates did not do as requested and answer "with reference to the audiogram drawn".

For part (a), the audiograms drawn were mainly of an acceptable standard but it was very disappointing to see too many audiograms with not masked BC symbols used for the poorer ear or just one set of not masked BC. The absence of masked BC symbols for the poorer ear and/or plotting BC readings to show an air-bone gap lost candidates marks quite unnecessarily for what cannot be considered a difficult question.

For part (b), the standard of answers was disappointing and many did not have the requested “detail”. There were too few references to the importance of abnormal head shadow effects and, if there was reference to these, they were often not accompanied by any detail of an explanation. Many candidates answered this question as if it was on the effects of high frequency hearing loss ignoring the effects of a lack of balanced hearing.

For part (c), there was clearly disagreement about which ear should be fitted in a case of unilateral tinnitus for which there are arguments both ways. However, a reason for being categorical about aiding either the affected or unaffected ear was often missing. Otherwise, this section was generally well answered if often rather superficially when dealing with lifestyle considerations and dexterity.

For part (d), too often candidates did not state separate recommendations for the two ears but wrote more generally about the amplification strategies for sensorineural hearing loss. Again, there was the frequent failure to refer to the audiogram drawn.

Barry Downes

2006(1) Paper 2 Section B

Q2B1 & Q3B1:

- (a) You recommend that a client purchases a binaural system, but the client is adamant that he only wants a monaural system.
What must you do to comply with the Code? 4
- (b) What should you do if a client would benefit from a top of the range DSP system, but has limited financial resources? 4
- (c) What would you do if you notice that a colleague is not masking audiograms properly? 4
- (d) Your client cancels an order outside the agreed thirty day refund period specified on your receipt. You are able to return the aid to the manufacturer for credit. Is the client entitled to any refund? 4
- (e) Otoscopic examination reveals a wax build-up in the client’s ears.
Can you perform an audiogram? 4

Number of scripts = 96 Range 3 - 17 Average = 10.53
Aptitude candidates = 10 Range 4 - 16 Average mark = 10.3

Generally well answered. There was confusion over the rights of clients to refunds under clause 19, which does not refer to the retail price as some thought. Also candidates are reminded that it is permitted to perform an audiogram if the ears are blocked with wax, although the test would need repeating when the ears were clear.

Robert Rendell

Q2B2

New clients are advised that they need time to adapt to their new hearing aid instruments

- (a) Explain why this is and what processes need to occur. 5
- (b) What advice would you give a client to support them through this initial acclimatisation stage? 5
- (c) How would you advise a client to respond constructively when they fail to hear somebody talking to them? 5
- (d) List 5 other actions that are either to do with the environment, the speaker or the hearing impaired listener that will facilitate effective communication. 5

Number of scripts = 79 Range 7 - 18 Average = 12.1

Aptitude candidates = 10 Range 10 - 18 Average = 15.4

Many candidates relied upon prepared answers for this question that were not wholly appropriate. Most candidates included important details of auditory deprivation and auditory training but there was insufficient discussion of practical problems such as learning aid maintenance etc. and the range of hearing tactics discussed was generally limited.

Robert Rendell

Q2B3 & Q3A3

Dr Bertram aged 64yrs is a retired GP. She retired early due to increasing problems with hearing and vision but remains very active with charity work and various committees.

The cause of her hearing loss was identified as otosclerosis for which she had a unilateral stapedectomy ten years ago. Dr Bertram also complains of continuous tinnitus.

Dr Bertram comes to see you for a hearing assessment and informs you that she is really struggling to chair her meetings and to hold a conversation at social functions because she cannot hear effectively with her current aid provision. Her current aid provision is a monaural BTE fitted to her right ear.

- (a) What considerations must you make when calculating gain for someone with otosclerosis ? 3
- (b) Give 4 reasons why you think Dr Bertram may have been fitted with a monaural BTE only to her right ear 4
- (c) Give 4 reasons why you feel Dr Bertram would benefit from a hearing aid in both ears. 4
- (d) Explain why wearing bilateral hearing aids can often be an advantage for people with tinnitus 4
- (e) Would you choose a WDRC or compression limiting approach to this fitting ? Explain why you made this choice. 4
- (f) What earmould style would you use for the left ear ? 1

Number of scripts = 27 Range 6 - 15 Average = 11.48

Aptitude Candidate = 10 Range 12 - 15 Average = 13.4

Only 37 candidates attempted this question which is disappointing. The question essentially is looking at applying basic knowledge to a real life scenario. In this case

it called upon routine knowledge about gain for a mixed /conductive hearing loss, simple binaural benefits and amplification strategies. The question also required some discussion about fitting hearing aids to someone with tinnitus. Maybe this is a subject in which candidates need to develop their confidence. However even if this part had been poorly answered there was still enough opportunity within this question for candidates to score well, a point illustrated by the majority that did attempt this question.

Candidates that dropped marks did so because they didn't think about the conductive / mixed component of loss associated to otosclerosis and to the potential progressive nature which may require greater gain later on.

At no point in the question does it mention that Dr Bertram was fitted with a NHS aid and yet candidates were very happy to discuss NHS budgets and the monaural fitting policy. This was irrelevant and this perception should be discouraged as many NHS Trusts have a healthy approach to binaural fittings.

Most candidates missed the point about her vision and that she may have chosen a BTE for ease of use.

Few said that if fitted monaurally it could make her tinnitus appear worse. Further marks would have been awarded for a more detailed explanation on compression choice.

Karen Shepherd

Q2B4 & Q3A5

In order to achieve the most complete and satisfactory rehabilitation of an adult who has not worn hearing aids before, explain the importance of the following stages:

- | | |
|---|---|
| (a) The case history, | 4 |
| (b) The involvement of "significant others" during the first consultation, | 3 |
| (c) The explanation to the client and to any "significant other" about the audiogram, | 3 |
| (d) Selection of type of hearing aid system, | 3 |
| (e) The fitting of the hearing aid system, | 3 |
| (f) The first follow-up appointment after hearing aid fitting. | 4 |

Number of scripts = 87 Range 5 - 16 Average = 9.72
Aptitude candidates = 8 Range 8.12 Average = 10.36

1. Many candidates still fail to read the question fully e.g.
 - 'Explain' means more than just list.
 - If the question says 'an adult who has not worn aids before' then 'the client who has worn aids before' is irrelevant.
2. One or two candidates are still churning out the same old stuff.
A rote-learned answer has to be well-matched to the question to obtain good marks.
3. The number of points awarded to each part of the question should be viewed as a guide to the amount of time to spend on each part.
4. Relevant diagrams are useful but diagrams only add something if they are *relevant*.

5. Candidates should include basic information, e.g. selection of the aid to fit the loss, as well as that which is more advanced.
6. The answer should be written in the correct part e.g. information about the significant other should not be written about under 'f' but not included under 'b'. This makes it very difficult to mark fairly.

Maryanne Maltby

2006(1) Paper 3 Section A

- Q3A1 - see Q2A1
- Q3A2 - see Q2A2
- Q3A3 - see Q2B3
- Q3A4 - see Q2A4
- Q3A5 - see Q2B4

2006(1) Paper 3 Section B

- Q3B1 - see Q2B1

Q3B2:

- (a) You recommend that a client purchases a binaural system, but the client is adamant that he only wants a monaural system.
What must you do to comply with the Code? 4
- (b) What should you do if a client would benefit from a top of the range DSP system, but has limited financial resources? 4
- (c) What would you do if you notice that a colleague is not masking audiograms properly? 4
- (d) Your client cancels an order outside the agreed thirty day refund period specified on your receipt. You are able to return the aid to the manufacturer for credit. Is the client entitled to any refund? 4
- (e) Otoscopic examination reveals a wax build-up in the client's ears. Can you perform an audiogram? 4

Aptitude candidates = 10 Range 10 – 18 Average = 15.4

Well answered