

THE HEARING AID COUNCIL

EXAMINATION PAPER 1 – SEPTEMBER 2005 (2)

SECTION A

Answer **THREE** of the following four questions:

1A1

- a) Describe the anatomical and physiological features of the ear which serve to protect:-
- i) the tympanic membrane 6
 - and
 - ii) the cochlea 6
- b) How could sudden marked pressure changes affect these structures? 8

1A2

With reference to the anatomy and physiology of the normal cochlea and how this is affected by Presbycusis;

Describe why thresholds are elevated but the uncomfortable loudness levels are closer to the thresholds than normal. In other words explain abnormal loudness growth (recruitment or reduced dynamic range) 20

1A3

Discuss the cause (2), progression (10), audiometry (3) and possible treatments (5) of Otosclerosis. Include a diagram of a typical audiogram for the left ear. 20

1A4

- a) Why does the middle ear need an impedance matching mechanism? 2
- b) Describe the impedance matching mechanism. 8
- c) Name the middle ear muscles and describe their function. 5
- d) What information can be gained from middle ear **reflex** measurements? 5

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SECTION B

Answer **THREE** of the following four questions:

1B1

- a) What are the regular performance checks you can perform on an audiometer? What errors might you find for each of these checks? **9**
- b) The standard BS EN 60645-1: 1995 describes the characteristics of the levels for pure tone audiometer calibration. What are these? **6**
- c) Define the rise time and fall time in relation to pure tone audiometry. How could a too slow and too fast rise and fall time result in erroneous pure tone thresholds? **5**

1B2

- a) Explain the term 'cross-hearing' **5**
- b) Explain the audiometric **principles** (not rules) of masking. **5**
- c) The BSA recommended procedures describe two ways of achieving the effective masking level. Describe what these are. **5**
- d) **Briefly** discuss the occurrence of central masking. How might this be displayed on a masking chart? **5**

1B3

You are performing Pure Tone Audiometry.

- a) What should you do if your patient is frail and the test is taking a long time? **3**
- b) How might your test method vary if your patient is suffering from tinnitus? **3**
- c) How might your test method vary if your patient works in a noisy industry? **3**
- d) What are the three rules for masking in pure tone audiometry? **7**
- e) How do these rules for masking change if insert ear phones are used for testing instead of the usual headphones? **4**

1B4

- a) Define dBSPL, dBHL and dB(A). **3**
- b) What are the differences between these scales? **7**
- c) When would these decibel scales be used? **7**
- d) Using the dBSPL formula, work out the SPL of a sound of 0.02 pascals **3**

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EXAMINATION PAPER 2 – SEPTEMBER 2005(2)

SECTION A

Answer **THREE** of the following four questions:

2A1

A hearing aid has the following response at 2KHz;

| INPUT dB | OUTPUT dB SPL |
|----------|---------------|
| 20 | 50 |
| 30 | 60 |
| 40 | 70 |
| 50 | 75 |
| 60 | 80 |
| 70 | 85 |
| 80 | 90 |
| 90 | 95 |

- a) i) Draw the input / output graph for these figures
ii) What is the position of the knee point?
iii) What compression ratio is in operation? **5**
- b) For the same input levels and gain draw a fully labelled input / output graph for a hearing aid with a compression ratio of 10:1 and a knee point of 70dB. **8**
- c) What is the rationale behind using a hearing aid with multi channels? **3**
- d) **Briefly** explain what is meant by attack and release times. **2**
- e) What are the advantages & disadvantages of using a short an attack & release time? **2**

2A2

- a) Describe **three** general differences between linear and non-linear prescription rules. **12**
- b) Draw input-output graphs to illustrate how the prescription of gain can differ between a linear and a non-linear fitting formula. **6**
- c) Name **two** non-linear prescription rules. **2**

2A3

- a) Many DSP aids have an automatic programme selection feature. **Briefly** describe what this is and how it differs from a manual programme selection option. **5**
- b) **List three** typical environments that are likely to activate different, automatic settings in a hearing aid system and explain why the settings would vary in each example. **6**
- c) Discuss the advantages and disadvantages of an automatic program selection feature within a hearing aid system for a client as compared with a manual program selection option such as a push button, switch or remote control. **9**

2A4

- a) Describe how real ear (or probe microphone) measurements of hearing aid performance would be carried out. Include in your answer definitions of REUR, REIR and REAR. **12**
- b) **Briefly** describe how you might check the prescription of non-linear or WDRC aid using real ear measurements? **4**
- c) **Briefly** describe 2 advantages and 2 disadvantages of assessing aid performance using real ear measurements? **4**

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EXAMINATION PAPER 2 – SEPTEMBER 2005(2)

SECTION B

All candidates must answer question 2B1 and TWO out of the other three questions

2B1 [COMPULSORY QUESTION]

With reference to the Hearing aid Council's Code of Practice, write **short notes** on:

- a) The rights of clients to cancel orders and receive refunds. **7**
- b) The titles RHADs may use to describe themselves. **6**
- c) Employers' responsibility for the actions of their employees. **7**

2B2

- 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 the occlusion effect. **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**

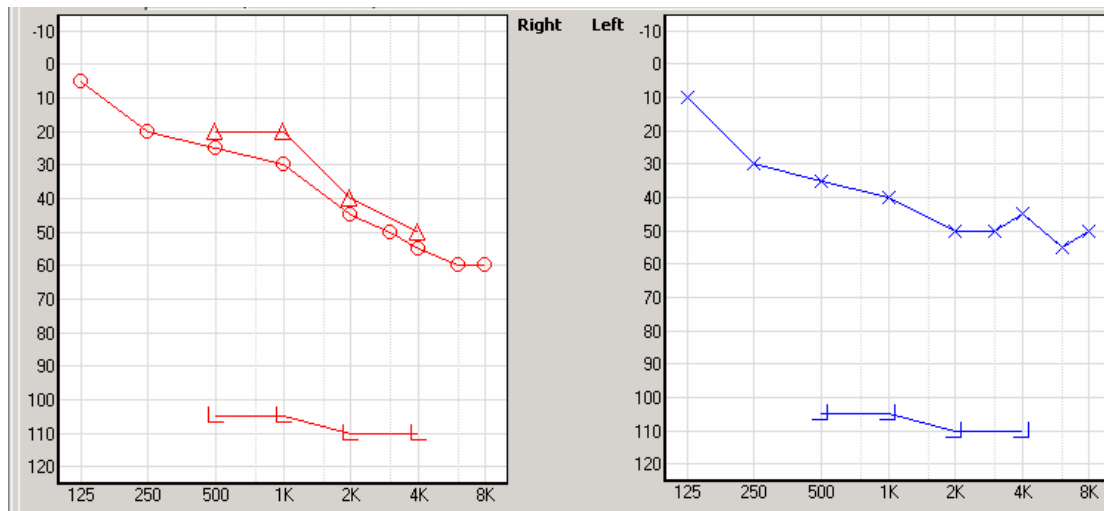
2B3

Write short notes on **FOUR** of the following:

- a) The use of neck loops. **5**
- b) Hearing Dogs for Deaf People. **5**
- c) Dry Aid Kits or de-humidifiers and their use. **5**
- d) 2 different wax traps commonly used on ITE aids. **5**
- e) The Glasgow Hearing Aid Benefit Profile **or** the Abbreviated Profile of Hearing Aid Benefit (**Not Both**). **5**

2B4

A client Mr Jones aged 45yrs comes to see you for a hearing assessment. He tells you he is a teacher and a keen sportsman (football & golf). He has had the loss for approximately 5yrs and the cause of his loss is not known, although has been seen by ENT. In the past he has tried an NHS BTE aid but was self conscious, he then tried a monaural ITE but was irregular with its use. Mr Jones tells you that he is struggling socially but particularly at work especially in a noisy classroom. After testing his hearing you record the following audiogram.



- a) i) Give **3** reasons why you think Mr Jones did not wear his monaural ITE hearing aid regularly. **3**
- ii) Describe what **acoustic** challenges need to be considered when thinking of using hearing aids in a classroom and what could be done to the environment to reduce these challenges. **2**
- iii) Mr Jones is not keen on using hearing aids explain **3** reasons why he would benefit more from hearing aids if he wore two? **3**
- b) Would you choose a WDRC **or** compression limiting approach to this fitting? Explain why you made this choice. **6**
- c) Assuming your chosen aids have 3 programmes, describe how **you** might use these programmes and how you would help Mr Jones to use them. **6**

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EXAMINATION PAPER 3 – SEPTEMBER 2005(2)

SECTION A

Answer **FOUR** of the following five questions:

3A1

A hearing aid has the following response at 2KHz;

| INPUT dB | OUTPUT dB SPL |
|----------|---------------|
| 20 | 50 |
| 30 | 60 |
| 40 | 70 |
| 50 | 75 |
| 60 | 80 |
| 70 | 85 |
| 80 | 90 |
| 90 | 95 |

- a) i) Draw the input / output graph for these figures
ii) What is the position of the knee point?
iii) What compression ratio is in operation? **5**
- b) For the same input levels and gain draw a fully labelled input / output graph for a hearing aid with a compression ratio of 10:1 and a knee point of 70dB. **8**
- c) What is the rationale behind using a hearing aid with multi channels? **3**
- d) **Briefly** explain what is meant by attack and release times. **2**
- e) What are the advantages & disadvantages of using a short an attack & release time? **2**

3A2

- a) Describe **three** general differences between linear and non-linear prescription rules. **12**
- b) Draw input-output graphs to illustrate how the prescription of gain can differ between a linear and a non-linear fitting formula. **6**
- c) Name **two** non-linear prescription rules. **2**

3A3

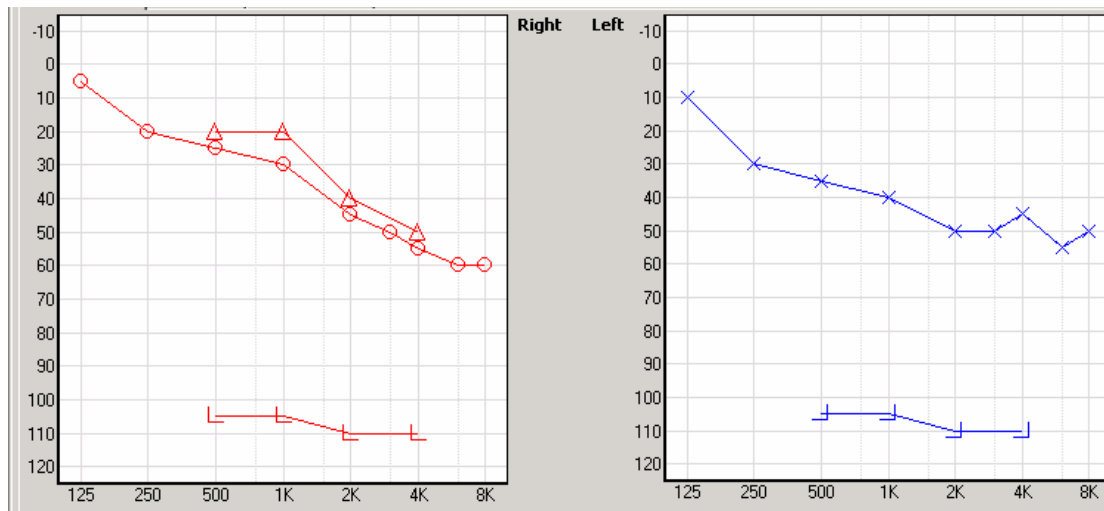
- a) Many DSP aids have an automatic programme selection feature. **Briefly** describe what this is and how it differs from a manual programme selection option. **5**
- b) **List three** typical environments that are likely to activate different, automatic settings in a hearing aid system and explain why the settings would vary in each example. **6**
- c) Discuss the advantages and disadvantages of an automatic program selection feature within a hearing aid system for a client as compared with a manual program selection option such as a push button, switch or remote control. **9**

3A4

- (a) Describe how real ear (or probe microphone) measurements of hearing aid performance would be carried out. Include in your answer definitions of REUR, REIR and REAR. **12**
- (b) **Briefly** describe how you might check the prescription of non-linear or WDRC aid using real ear measurements? **4**
- (c) **Briefly** describe 2 advantages and 2 disadvantages of assessing aid performance using real ear measurements? **4**

3A5

A client Mr Jones aged 45yrs comes to see you for a hearing assessment. He tells you he is a teacher and a keen sportsman (football & golf). He has had the loss for approximately 5yrs and the cause of his loss is not known, although has been seen by ENT. In the past he has tried an NHS BTE aid but was self conscious, he then tried a monaural ITE but was irregular with its use. Mr Jones tells you that he is struggling socially but particularly at work especially in a noisy classroom. After testing his hearing you record the following audiogram.



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- ii) Describe what **acoustic** challenges need to be considered when thinking of using hearing aids in a classroom and what could be done to the environment to reduce these challenges. **2**
- iii) Mr Jones is not keen on using hearing aids explain **3** reasons why he would benefit more from hearing aids if he wore two. **3**
- b) Would you choose a WDRC **or** compression limiting approach to this fitting? Explain why you made this choice. **6**
- c) Assuming your chosen aids have 3 programmes, describe how **you** might use these programmes and how you would help Mr Jones to use them. **6**

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SECTION B

Answer **BOTH** questions:

3B1

With reference to the Hearing aid Council's Code of Practice, write **short notes** on:

- a) The rights of clients to cancel orders and receive refunds. **7**
- b) The titles RHADs may use to describe themselves. **6**
- c) Employers' responsibility for the actions of their employees. **7**

3B2

With reference to the Hearing aid Council's Code of Practice;

- a) What are the details of the '10-day rule' in clause 10 and when do they apply? **5**
- b) What are the instructions regarding surveys in clause 17 and how do you think they protect the client? **5**
- c) Under the Registration Rules what must a former dispenser do to re-register following a voluntary absence from the profession, and what do you think is the purpose of this rule? **5**
- d) What are the minimum academic requirements for someone wishing to become a notified trainee? **5**