

**THE HEARING AID COUNCIL
EXAMINATION PAPER 1 – March 2004 (1)**

SECTION A

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

1A1

- (a) Draw a cross-section of one turn of the cochlea and label its parts. **8**
- (b) Explain how the passage of vibrations through the cochlea results in the production of an action potential. **6**
- (c) List 3 ototoxic drugs. **3**
- (d) List 3 effects of ototoxic drugs on the cochlea. **3**

1A2

- (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. **(4)**
- (d) What information can be gained from middle ear reflex measurements? **(6)**

1A3

Write short notes on 4 of the following:

- (a) Otitis externa; **(5)**
- (b) Chronic otitis media; **(5)**
- (c) Diplacusis; **(5)**
- (d) Abnormal loudness growth (recruitment) **(5)**
- (e) Barotrauma. **(5)**

1A4

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

EXAMINATION PAPER 1 – March 2004 (1)

SECTION B

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

1B1

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

1B2

Otoscopy on two clients shows that each has intact tympanic membranes. The completed audiograms of these clients give similar air conduction hearing threshold levels, with normal hearing in the right ear and approximately 45dB hearing threshold levels across the frequency range in the left ear. Client A has a sensorineural hearing loss and Client B has a totally conductive hearing loss due to dislocation of the ossicular chain.

For each client draw out your findings of the following tests, and explain the results

- (a) masking charts for bone conduction at 1000Hertz **10**
- (b) uncomfortable loudness levels **5**
- (c) tympanogram **5**

1B3 Write short notes on the following:

- (a) signal-to-noise ratio **5**
- (b) speech spectrum **5**
- (c) resonance **5**
- (d) equal loudness contours **5**

1B4 Explain in full the terms dB SPL; dB HL; 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**

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**

EXAMINATION PAPER 2 – March 2004(1)

SECTION A

Answer THREE of the following four questions:

2A1 (&3A1)

- (a) Describe three situations which present difficult listening conditions for a person with a bilateral, sensorineural hearing loss. **6**
- (b) What features exist in currently available hearing aid systems which are designed to assist in each of the three situations? **11**
- (c) How can hearing tactics assist in the three situations? **3**

2A2 (&3A2)

- (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) How might you check the prescription of a 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**

2A3 (&3A3)

Write notes on FOUR of the following:

- (a) Loudness scaling (or loudness mapping) and its use in aid selection and programming. **(5)**
- (b) Real Ear Insertion Gain **(5)**
- (c) Equivalent Input Noise Level **(5)**
- (d) Reference Test Gain and its use **(5)**
- (e) Real Ear Coupler Differences (RECD) and their use in programming aids **(5)**

2A4 (&3A4)

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**

3A5

You have a client who is considering acquiring a hearing aid system and whose audiogram has typical presbycusis characteristics for a person in their mid seventies. This client has an active social and family life as well as being a regular churchgoer.

- (a) Describe this client's likely hearing impairment. **4**
- (b) Detail the hearing problems, which this client is likely to experience, based on the lifestyle described. **6**
- (c) Explain your recommendations for a programmable, digital hearing aid system. Include any specific technical features, which may be beneficial to this client, and the reasons why they may be helpful. **10**

SECTION B

All candidates must answer question 2B1 and 2 out of the other 3 questions

2B1 (& 3B1)

With reference to the *current* Code of Practice:

- (a) What are the requirements of clause 10 regarding home visits? **10**
- (b) Under clause 11 what written information must be provided before a new aid is supplied. **10**

2B2

You have a client who is considering acquiring a hearing aid system and whose audiogram shows a typical presbycusis pattern for a person in their mid seventies. This client has an active social and family life as well as being a regular churchgoer.

- (a) Describe this client's likely hearing impairment. **4**
- (b) Detail the hearing problems, which this client is likely to experience, based on the lifestyle described. **6**
- (c) Explain your recommendations for a programmable, digital hearing aid system. Include any specific technical features, which may be beneficial to this client, and the reasons why they may be helpful. **10**

2B3

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**

2B4

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

- a) Explain why this is and what processes need to occur **(5)**
- b) What advice would you give the 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)**

3B2

In short note form, explain each of the following and include in your answer how these protect the consumer.

- (a) The restrictions on surveys regarding hearing loss (clause 17) **(4)**
- (b) The requirements for dispensers to service hearing aids (clause 18) **(4)**
- (c) Guarantee period for new hearing aids (clause 19) **(4)**
- (d) How dispensers may refer to their premises (clause 16) **(4)**
- (e) The requirements for a calibrated audiometer (clause 8) **(4)**