

BSc Audiology**AUDL 4007 Auditory Perception (Year 4)****Examination 2008****Time Allowed: 2 hours**

Please answer ALL of the following six questions. All carry equal weight towards your grade. You are encouraged to use simple diagrams to illustrate your answers as much as possible.

1. What is the main function of outer hair cells? Name the three main ways in which outer hair cell damage is reflected in human psychoacoustic measurements. What changes in physiological functioning are supposed to underlie these changes? How do current hearing aids attempt to ameliorate each of the deficits that arise from these changes?
2. What is a temporal modulation transfer function (TMTF) and how is it measured using white noise? What units is the TMTF typically expressed in? Sketch a typical set of results that would be obtained with a white noise carrier. Why is a white noise carrier preferable to a sinusoidal one?
3. Outline the contributions of auditory place and time coding in determining the perceived pitch of a 250 Hz train of very narrow pulses that is passed through the following two systems before presentation to the listener. Assume all the filters have extremely steep slopes outside the passband.
 - a. 400 Hz low-pass filter
 - b. 3 kHz high-pass filter
4. Sketch the audible area of a normal human listener, including absolute thresholds and uncomfortable loudness levels. Define the notions of MAF, MAP, threshold and dynamic range.
5. What is a 'dead region' in the cochlea and what physiological damage is thought to underpin it? How would a psychophysical tuning curve (PTC) from a 'dead region' be different from one obtained in a frequency region that was not 'dead'? Make representative sketches of what you would expect to find.
6. What interaural differences do we use to localize sound sources in the horizontal plane? How do these interaural differences arise, and how do they depend upon frequency?

End of Paper