Q1: Most students got at least 50% on this question, which is intended to cover the course syllabus in ten short questions.

A) Most students remembered sampling and quantisation, but several forgot about anti-alias low-pass filtering, and some who remembered put this after sampling (though this was allowed as the question did not specifically ask for the correct order.)

B) Most answers here were OK - there is a strong clue in the "slotted" ALOHA name!

Some did not clearly state that the slotted system reduces collisions.

C) Quite a few students failed to "describe briefly" and just offered advantages and disadvantages.

D) Relatively few students explained that as power is proportional to $f$ and compute time is proportional to $1/f$, so energy = power x time = $f \times 1/f = 1$ i.e. independent of $f$. However, some fuzzier explanations were allowed where the gist was there.

E) Most answers got somewhere on this part, though many lacked clarity.

F) Many people seemed to know what the ITU '4G IMT-Advanced' specified and that they have not yet been realised.

G) Have to mention that interleaving caters for 'bursty' error. Most did, and understood interleaving reasonably well.

H) Have to mention that the variable length codes are 'self terminating'. Some people lost marks, and/or wasted some time by describing the algorithm by which Huffman codes are derived from the statistics sometimes without answering the actual question. Sorry to disappoint those who expected the algorithm to come up again this year.

I) Waveform/parametric coding: guess this was not explained very well in the answers. No marks for just stating that parametric coding 'uses parameters'.

J) Spectrograph: generally not well explained. Some people thought it was a magnitude spectrum (forgetting the time dimension). The term spectrograph (or –gram) is widely used and accepted in literature.

Q2: About a third of the students attempted this question, and marks were somewhat bipolar - some good to very good, some very poor.

A) Generally acceptable answers from most attempts.

B) This is all standard stuff, but the answers were very variable.

C) Generally OK answers, though a few forgot the “stereo” factor of 2. As usual, poor arithmetic skills were in evidence.

D) Very much as with c)

E) Quite a lot of answers focussed on digital compression techniques and ignored the psychoacoustic aspects specific to audio compression/mp3. Very few were close in detail to the model answer, so marking had to be improvised to give credit for sensible deviations.

Q3: There were a significant number of very poor answers to this question that brought down the average. For those that had prepared adequately for the exam, the main challenge was putting the words together to explain the answers.

A) Remember to mention ‘seamless handover’ – it is important.

B) We discussed this so often in the lectures that the challenge was just explaining the point clearly for 3 marks.

C) Again in explaining the issue clearly was the challenge, thought some attempts just made it clear that there were fundamental misunderstandings about circuit/packet switching in mobile telephony.

D) Apart from the very poor attempts, most people had some idea about CDMA and its use in 3G mobile telephony. The second and third advantages listed in the marking scheme were usually mentioned, but only the very best answers discussed the first coherently.

Q4: This question about perceptual image coding error control for mobile phones was quite well done on the whole.

A) The two main aspects were understood, but not always well explained.

B) Some people answered that the JPEG image must be sensitive to bit-errors simply because it is compressed and each bit therefore carries more information. This answer has some merit, but does not address the question "To what extent do you expect a compressed image to be more sensitive..." It does not explain the catastrophe that can occur with Huffman and run-length coding as used in JPEG.

C) Hamming distance and its significance appeared to be generally understood.

D) The Hamming codes were generally well remembered and/or understood. Many correct answers were different from the instance given in the lecture notes which meant that they had to be worked out from scratch and based on a clear understanding. Some explanation of the methodology was needed to get full marks.