

**1. Topic: Images (27 marks)**

**a) Explain by highlighting the relevant parts of the algorithm, why the GIF format is not the most compact format for representing images with natural content. (9 marks)**

- Not covered.

**b) JPEG (baseline) is a standard for lossy compression of still images. Describe the elements of the JPEG (baseline) compression algorithm that discard data while maintaining perceived image quality. (9 marks)**

- Answered in Sample-13.

**c) Image Quality Assessment is a measure of perceived image degradation. Describe how a JPEG encoder could incorporate a quality assessment metric to indicate the quality of the output image it creates. Describe any weaknesses in the scheme that you describe. (9 marks)**

- Couldn't find in notes.

**2. Topic: Video (27 marks)**

**a) Explain how the operation of a block-based difference encoder can be improved through the use of motion compensation. (9 marks)**

- Answered in Summer-12.

**b) An encoder when encoding a macroblock in a P- or B- picture can decide to encode it as an INTER mode or INTRA mode macroblock.**

- **Explain why the MPEG standard allows such a choice. (3 marks)**

- Answered in Sample-12.

- **Describe an algorithm for choosing the macroblock mode. (6 marks)**

- Not covered.

**c) For chromakey content, explain why the presence of flesh colours in the foreground causes difficulties for extracting the uncomposed foreground colour. Describe a technique for overcoming this problem. (9 marks)**

- Not part of test (Say's John O'Mullane)

### **3. Topic: Audio (27 marks)**

**a) Describe how an audio signal is digitised, be sure to describe the role of Nyquist's Theorem in the digitisation process. (9 marks)**

- Answered in Sample-12.

**b) For encoding music content list (giving reasons) a suitable sampling rate, bit depth and format for storing a good quality digital audio representation. (9 marks)**

- Answered in Sample-12.

**c) When performing lossy audio encoding there is a trade-off between the amount of space used and sound quality. Describe the MPEG approach to lossy audio compression. (9 marks)**

- Answered in Sample-12.

### **4. Topic: Delivery (27 marks)**

**a) Explain how HTTP Live Streaming differs from RTSP Streaming. (9 marks)**

- Live streaming covered in Sample-12. RTSP not covered.

**b) It is not always possible to reliably deliver a media stream via a data network such as the internet. Describe techniques at the server and client that can be used to add resilience to the media stream. (9 marks)**

- Answered in Sample-13 (FEC, client playout buffer).
- Answered in Sample-12 (Resynchronisation markers and reversible variable length codes (VLC) ).

**c) A media player can conceal errors in a video frame using spatial and temporal error concealment techniques. Describe how these can be implemented. (9 marks)**

- Answered in Sample-12 (Spatial concealment).
- Temporal Concealment: Use temporally neighbouring areas to conceal lost regions e.g. Previous Frame Concealment (PFC)
- PFC: Use previous corresponding data to copy to current frame. Works best when there is low motion. Widely used due to simplicity of implementation.