Coláiste na Tríonóide, Baile Átha Cliath
Trinity College Dublin
Ollscoil Átha Cliath | The University of Dublin

EE5C1-1

FACULTY OF ENGINEERING, MATHEMATICS & SCIENCE

SCHOOL OF ENGINEERING

Electronic & Electrical Engineering

Engineering **Hilary Term, 2018**

MAI

CLASS TEST

Digital Video Processing (5C1)

Date:3rd Apr 2018 **Venue: EEE Dept** **Time: 11:00-13:00**

Prof. A. C. Kokaram

Instructions to candidates:

Answer ALL questions. Please answer questions in separate answer books.

Materials Permitted for this Examination:

Calculator

Drawing Instruments

Any printed material

1. Write down the `coded_picture_number` for the first 15 frames of the water-world sequence and explain why consecutive frames are not necessarily encoded consecutively. [10 marks]

2. Explain why a hybrid video encoder includes a decoder in its system design. [5 marks]

3. One strategy for transcoding video involves decoding the input sequence to raw data and then re-encoding at the desired bitrate. Explain how the performance of this strategy changes with the quality of the input sequence. Propose one alternate process and comment on its relative performance wrt to the raw-decode strategy at high input bitrates. [10 marks]

4. Both Netflix and YouTube use a procedure they call *normalisation* that they apply to uploaded video files before transcoding. Discuss the possible nature of this step in each company bearing in mind the differing use cases. [10 marks]

5. Using single pass rate control, the H.264 codec, and `ffmpeg`, choose a sensible maximum bitrate that could be used to encode the `riverbed` sequence with the minimum degradation in encode quality. This is a raw YUV sequence of resolution 1280×720. Bear in mind the need to minimise filesize. Explain your algorithm and discuss how this number might be determined in the case of large scale demand e.g. to process 500 hours of video per minute. [20 marks]