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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2014/2015**

COURSE NAME : MULTIMEDIA TECHNOLOGY
AND APPLICATION

COURSE CODE : BEC20202

PROGRAMME : BEJ

EXAMINATION DATE : DECEMBER 2014 / JANUARY 2015

DURATION : 2 HOURS AND 30 MINUTES

INSTRUCTION : ANSWER ALL QUESTIONS.

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

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- Q1** A digital image is a numeric representation (normally binary) of a two-dimensional image. Depending on whether the image resolution is fixed, it may be of vector or raster type. If digital image captured from full HD video stream that is 1920 x 1080 pixels. Answer (a) to (d).
- (a) What is the resolution of the monitor A and monitor B be if the size displayed are 6.4 inches height, 3.6 inches width and 12.8 inches height, 7.2 inches width respectively? Show your calculation. (10 marks)
- (b) Conclude your findings for which monitor is suitable for AutoCAD designing work and which is suitable for advertisement display at airport based on Q1(a). (2 marks)
- (c) Calculate the uncompressed image's size in kilobytes (KB) if it uses:
- (i) CMYK color mode
(ii) 8-bit Grayscale color mode (10 marks)
- (d) All digital images are represented digitally by pixels. Discuss two (2) different approaches to graphical modelling and its characteristic. (3 marks)
- Q2** (a) Two major compression categories for images is lossy and lossless. Distinguish between lossy and lossless compression by giving an example. (5 marks)
- (b) Run-length encoding performs lossless data compression and is well suited to palette-based bitmapped images such as computer icons. The following is sequences to be generated using Run-length Encoding (RLE) scheme. Answer (i) to (iii).
- 255 255 255 255 243 243 243 243 243 243 240 240 255 255 255 238
238 238 238 238 240 240 240
- (i) Produce the run-length encoding for the above sequence. (6 marks)
- (ii) Find the size in bytes for the given RLE code. Show your works. (3 marks)
- (iii) Calculate its compression ratio. Show your works. (4 marks)

- (c) RLE schemes are simple and fast, but their compression efficiency depends on the type of image data being encoded. By using an example, illustrates a case where the encoding scheme did not result in a smaller file. (7 marks)

- Q3** (a) (i) Differentiate using diagram or equivalent between analog signals and digital signals? (2 marks)
- (ii) Differentiate using diagram or equivalent between loud and normal sound wave? (2 marks)
- (iii) Differentiate using diagram or equivalent between noise and pleasant audio wave? (2 marks)
- (b) An *audio-CD* is a compact disc that stores sound information such as music or speech. Assume that you have an *audio-CD* which its sampling is done at 44.1 kHz, 16-bit resolution and stereo mode. The audio-CD has 30 seconds sound clip. Answer (i) to (iii).
- (i) Calculate the uncompressed audio's size in kilobytes. (5 marks)
- (ii) Recommend storage space needed to store file in Q3(b)(i). (2 marks)
- (iii) Suggest bit-rate that should be supported by the system for smooth playback. Show your calculation in Mbits/sec. (6 marks)
- (iv) Now compare your findings in Q3(b)(i) to (iii) with another audio-CD that has the same amount of sound clip but the sampling is done at 5.5kHz, 8-bit resolution and mono mode. The comparison must be consist of:
- uncompressed audio's size produced
 - size of storage required
 - bit rate needed for smooth playback
- (6 marks)

- Q4** (a) The question (i) and (ii) evolved around video technology.
- (i) Describe the definition of video. (2 marks)
 - (ii) List and briefly describe three (3) basic characteristics of digital video. (6 marks)
- (b) Describe in one sentence for each of the following terms.
- (i) composite video (3 marks)
 - (ii) component video (3 marks)
- (c) 24p True Cinema is a mode that allows films to be watched as intended by the director for the big screen, at 24 frames per second. Until now, movies watched at home play back 'faster' than they do in the cinema. When a film is shown on TV or sold on DVD it has to be adjusted to be compatible with the PAL format. The difference is that films are shot at a rate of 24 frames per second, whereas standard TV uses 25 frames per second. If you have a 2-hour video 24p True Cinema with a frame size of Full HD, a color depth of each frame is 16 bits. measure the uncompressed file size in Megabytes. (11 marks)

- END OF QUESTIONS -