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**University Examinations 2015/2016**

THIRD YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE

AND

FOURTH YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN MATHEMATICS AND COMPUTER SCIENCE

**CIC 3476: MULTIMDEDIA SYSTEMS AND APPLICATION**

**DATE: NOVEMBER 2015 TIME: 2 HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two*** *questions*

**QUESTION ONE (30 MARKS)**

1. The term multimedia is interdisciplinary. Explain this concept. (2 Marks)
2. With suitable examples, discuss any three multimedia elements (3 Marks)
3. Multimedia systems can be grouped into 3 key domains. List and give examples of each

(3 Marks)

1. With the use of a diagram, explain the global structure of multimedia systems (5 Marks)
2. Why is 4.41 kHz a popular sampling rate for digitizing sound? (5 Marks)
3. Distinguish between the following terms:
4. Analogue v/s Digital (4 Marks)
5. Quantisation v/s Sampling (4 Marks)
6. Aliasing v/s noise (4 Marks)

**QUESTION TWO (20 MARKS)**

1. You hard disk has 256 Mbytes of free space. You are going to record a speech with a sampling rate of 11 kHz, 8-bit resolution and a single channel. What is the length of the recording that can be stored in the hard disk? (Answer in seconds) (4 Marks)
2. A multimedia presentation has 30 minutes of CD-quality digital audio an.wav files. What is the storage required for these files? (4 Marks)
3. You are developing a network voice communication program. It uses the Internet to connect two remote users and allows them to talk to each other in real time. What is the most appropriate sampling rate for recording their voice? (4 Marks)
4. Explain four sound compression technologies available in the market today (4 Marks)
5. Distinguish between digital audio and MIDI (4 Marks)

**QUESTION THREE (20 MARKS)**

1. Briefly describe/explain any three attributes of a digitised image (3 Marks)
2. Complete the RGB model table below. (4 Marks)

|  |  |  |  |
| --- | --- | --- | --- |
| **R** | **G** | **B** | **COLOUR** |
| 255 | 255 | 0 |  |
| 255 | 0 | 255 |  |
| 0 | 255 | 255 |  |
| 128 | 128 | 128 |  |

1. Explain **four** ways of acquiring digital images (4 Marks)
2. Discuss the **3** popular languages for describing vector graphics (3 Marks)
3. A photograph of 3x4 inches is scanning in 300dpi resolution and 8-bit colour. The image is then saved in a jpeg file with 1:20 compression ratio. It is used on a web page. If a viewer connecting to the Internet using a modem with typical transfer rate of 800bytes/sec, how long will it take to download the image to his/her computer? (3 Marks)
4. A bitmap image has resolution 460x480 pixels. Each pixel is 24-bit deep. What is the size of the bitmap in bytes? (3 Marks)

 **QUESTION FOUR (20 MARS)**

1. Distinguish between the terms font and type face (4 Marks)
2. Briefly discuss the digitization process of text (3 Marks)
3. Explain the meaning of the term encoding systems and give two examples (3 Marks)
4. With the use of a bounding box, illustrate the measurement of the type for the letter ‘g’

 (3 Marks)

1. With the use of a table, distinguish between bitmap fonts verses outline fonts (4 Marks)
2. Explain the term TEXT and explain why it is the most widely used multimedia element.

 (3 Marks)

**QUESTION FIVE (20 MARKS)**

1. Visual representation of video and animation is governed by two phenomena. Explain each phenomenon. (4 Marks)
2. Describe the **three** main traditional television broadcasting standards (3 Marks)
3. Discuss any **3** popular video compression techniques. (3 Marks)
4. Explain what is meant by the term ‘digital television broadcast’? (2 Marks)
5. Periodic fluctuation of brightness perception causes a flicker. How can this problem be resolved? (4 Marks)
6. Consider a PAL TV at 25 frames per second. If we sample at 352x288 with 16 bits per pixel, what will be the file size of the raw video in Mega Bytes? (4 Marks)