

《多媒体技术》期末试题 (B 卷)

(考试形式: 闭卷 考试时间: 2 小时)



《中山大学授予学士学位工作细则》第六条

考试作弊不授予学士学位

方向: _____ 姓名: _____ 学号: _____

General Directions:

The exam consists of 4 parts on pages 1 to 3. Please make sure you have all the pages. Enter all your work and your answers on the answer sheets. Please make sure your name is on all sheets. All sketches must be adequately labeled. Unless indicated otherwise, answers must be derived or explained, not just simply written down. For all the problems, you can answer in either English or Chinese. Either language is of the same value to your mark. This examination is closed book.

Part I Fill in the blanks (15%)

1. CIE defined 3 important color characteristics which are _____、_____、_____;
2. Broadcast analog TV systems usually are divided into _____、_____ and SECAM;
3. The Nyquist Theorem states that a signal must be sampled at a rate greater than twice _____ frequency component of the signal to accurately reconstruct the waveform.
4. Image compression methods generally are divided into two kinds: _____、_____;
5. The JPEG standard support four commonly modes _____、_____、_____ and Lossless Mode;

Part II Choose the best answer from the choices (15%)

1. Which software tool is used to create audio? ()
A、FLASH B、premier C、cooledit D、winamp
2. Light is an electromagnetic wave. Its color is characterized by the
A. wavelength of the wave; B. amplitude of the wave;
C. types of the wave; D. frequency of the wave;
3. A 640*480, 256 color image would require of () storage without any compression.
A. 921.6 kB B. 307.2kB C. 2457.6 kB D. 36.9kB
4. Which color model dose use PAL? ()
A. YUV B.CMYK C. RGB D. YIQ

- 5、 If a set of ear protectors reduces the noise level by 20 dB, how much do they reduce the intensity (the power)? ()
- A. 100 B. 20 C. 40 D. 1000

Part III Answer the following questions: (35 %)

1. What are the advantages and disadvantages of digital audio?
2. Describe differences between vector and bitmapped graphics.
3. Color inkjet printers (彩色喷墨打印机) use the CMY model. When the cyan ink color is sprayed onto a sheet of white paper, why does it look cyan under daylight?
4. Is it true that any color can be produced by mixing red, green and blue light in variable proportions? Why?
5. What is the difference between a character and a glyph?
6. The R, G and B components of each pixel can be stored as separate value. The three arrays of values can be treated as greyscale images, called channels. Suppose a pixel with RGB(225,128,90), give its red channel, green channel and blue channel.

Part IV Calculation & Discussion (35%) :

1. a) Show the main steps of audio are digitization (5%);
b) What is sampling? What is quantization? (4%)
c) Suppose a sampling rate of 44.1 kHz and sample size of 16 bits, Stereo signal for one minute, without compression, the audio signal will occupy Kbytes? (6%)
2. JPEG uses the Discrete Cosine Transform (DCT) for image compression. In JPEG, the Discrete Cosine Transform is applied to 8 *8 blocks in an image. DCT-8 is defined as:

$$F_N(u, v) = \frac{2C(u)C(v)}{N} \sum_{i=0}^{N-1} \sum_{j=0}^{N-1} \cos \frac{(2i+1)u\pi}{2N} \cos \frac{(2j+1)v\pi}{2N} f(i, j)$$

$$C(\xi) = \begin{cases} \frac{\sqrt{2}}{2} & \text{for } \xi = 0 \\ 1 & \text{otherwise} \end{cases}$$

Given f(i,j) as below, show your work for deriving all pixel values of F(u,v).(7%)

200	202	189	188	189	175	175	175
200	203	198	188	189	182	178	175
203	200	200	195	200	187	185	175
200	200	200	200	197	187	187	187
200	205	200	200	195	188	187	175
200	200	200	200	200	190	187	175
205	200	199	200	191	187	187	175
210	200	200	200	188	185	187	186

3. a) Show the main steps of JPEG Image Compression (8%);
b) What are the advantages and disadvantage of JPEG compression standards? (5%);