

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0510

Roll No.

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B. Tech.

(SEM. VIII) THEORY EXAMINATION 2010-11

MULTIMEDIA SYSTEM

Time : 3 Hours

Total Marks : 100

Note : (1) Attempt all questions.

(2) All questions carry equal marks.

1. Attempt any **four** parts of the following : (4×5=20)
 - (a) What factors determine the quality of the sound file ? Why isn't it always best to use the highest sampling rate and highest resolution when recording sound files ?
 - (b) What is the difference between analog and digital video ? How do you digitize analog video ?
 - (c) Discuss the Problems encountered using text across computer platform and in different Languages.
 - (d) List the four main sampling rates and the two sampling depths. Briefly describe what each is most useful for. How does mono versus stereo come into the equation ?
 - (e) Explain various video file formats.
 - (f) Discuss the relative advantages of arithmetic coding over Huffman coding. In what way would you consider Huffman algorithm superior than arithmetic coding ?

2. Attempt any two parts of the following : (10×2=20)

- (a) Suppose a message is composed of twelve distinct characters. The various symbols and their frequency is shown below :

Symbol	Frequency
A	12
B	15
C	9
D	27
E	25
F	14
G	10
H	30
I	8
J	35
K	14
L	17

- (i) Complete the following :
- (1) Entropy of character.
 - (2) Entropy of a message containing 1000 symbols.
- (ii) Generate the static code and compare the size of coded message with ASCII codes.
- (iii) Develop a Shannon-Fanno tree for this problem. Show all the steps involved.
- (iv) Generate Shannon-Fano codes for each symbol and calculate the size of whole message. Compare its performance with static code and ASCII code.
- (v) Compression Ratio obtained in Shannon-Fano coding.

- (b) Explain the principle of operation of the LZW compression algorithm and how this is different from the LZ algorithm.
- (c) You have been assigned to design and produce the audio portions of a multimedia project. The Program will be delivered on a CD-ROM, and video clips will take up most of the CD. You have only 50 MB of storage space to store 20 one-minute clips of speech, 10 songs averaging three minutes long, and a background sound loop. What sampling rates and depths should you use for the speech, for the music, and for the background sound ? Why ? Roughly calculate the file size totals for these specifications and be sure that you end up with less than the 50 MB of storage space allotted. Discuss your reasoning.

3. Attempt any **four** parts of the following : (4×5=20)

- (a) What is a pixel ? Explain briefly the role of pixels in creating an image on a CRT screen.
- (b) What is meant by the statement "orange is comprised of 90% red, 40% green, 15% blue ? A 24-bit image has dimensions of 1024 by 768 pixels. Calculate the time taken to transmit the image using a 64 kbps line and its file size in MB.
- (c) Explain the basic difference between a WAV file and a MIDI file.
- (d) What are the merits of vector graphics format compared to the bitmap format ?
- (e) "Image compression always produce degradation in image quality"—Comment on the correctness of the statement.
- (f) Describe the technique of "interlacing" mentioning its merits and demerits.

4. Attempt any **two** parts of the following: (10×2=20)

- (a) List the types of fixed and removable storage devices available for multimedia, and discuss the strengths and weaknesses of each one.
- (b) Derive the bit rate that results from the digitization of a 525-line and a 625-line system using the 4 : 2 : 0 digitization format and interlaced scanning. Hence derive the amount of memory required to store a 2-hour movie/video.
- (c) Describe what MIDI is, what its benefits are and how it is best used in multimedia project. Differentiate Digital audio with MIDI.

5. Write short notes on any **two** of the following : (10×2=20)

- (a) Dictionary Based Compression
- (b) JPEG Compression
- (c) Multimedia streaming
- (d) Color look up table.