



Printed Pages : 4

TIT-012

(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) EXAMINATION, 2007-08

MULTIMEDIA SYSTEM*Time : 3 Hours]**[Total Marks : 100*

- Notes :**
- (1) Attempt all questions.
 - (2) All questions carry **equal** marks.
 - (3) Be precise in your answer.
 - (4) No second answer book will be provided.

1 Attempt any four parts:**5x4**

- (a) What are different multimedia objects? State the role of different hardware and software tools used for generation of these objects.
- (b) How do the limitations of human vision help us in compressing the Still images and Video?
- (c) What is the role of authoring tool in preparation of multimedia presentation? Distinguish between card and page based authoring tools.
- (d) Why do we need good memory capacity and microprocessor speed for multimedia applications? What will be the size of an image having 1024x768 resolution with 256 colors.
- (e) What is raster scanning process? How does it help in displaying images on screen?
- (f) Discuss the use of multimedia technology in business and education domains.



2 Attempt any four parts:**5x4**

- (a) What do you understand by MIDI? In relation to MIDI, distinguish between channel messages and system messages.
- (b) Briefly describe different elements of hypertext. Distinguish between the term 'Hypertext' and 'Hypermedia'.
- (c) With a diagram, show how a MIDI instrument can be interfaced with PC. How does the MIDI files differ from digital audio?
- (d) Calculate the file size in bytes for a 5 second recording at 20.05 KHz, 8-bits per sample stereophonic sound.
- (e) Discuss various types of audio file formats.
- (f) Explain the process of video digitization. How does it help in multimedia presentation?

3 Attempt any two parts:**10x2**

- (a) A series of messages is to be transferred between two computers over a PSTN. The messages comprise just the characters A through H. Analysis has shown that the probability (relative frequency of occurrence) of each character is as follows:
A and B = 0.25, C and D = 0.14,
E, F, G and H = .055
 - (i) Use Shannon's formula to derive the minimum average number of bits per character.
 - (ii) Use Huffman coding to derive a codeword set and prove this is minimum set by constructing the corresponding Huffman code tree.



- (iii) How do we use HF tree to perform decompression?
- (b) What are the roles of modeling and coding phases of compression? Discuss statistical modeling and dictionary based schemes. Distinguish between LZ77 and LZW compression schemes.
- (c) (i) Explain the meaning of following terms relating to text compression algorithms.
 - (a) Static coding
 - (b) Dynamic / Adaptive coding
- (ii) Use LZW to show the dictionary construction for following string:
"ABCDABEABCDABAABCE"

4 Attempt any two parts:

10×2

- (a) Assuming the bandwidth of a speech signal is from 50 Hz through to 10 kHz and that of music signal is from 15 Hz through to 20 KHz.
 - (i) Derive the bit rate that is generated by the digitization procedure in each case assuming the Nyquist sampling rate is used with 12 bits/sample for speech signal and 16 bits/sample for music signal.
 - (ii) Derive the memory required to store a 10 minute passage of stereophonic music.
- (b) (i) Explain the meaning of the following terms relating to sampling of an analog signal:
 - (a) Nyquist sampling theorem
 - (b) Quantization error
- (ii) What are the steps of audio digitization?



- (c) In context to sound, discuss the following:
- (i) Lossless compression
 - (ii) Lossy compression

5 Attempt any two parts

10×2

- (a) With an aid of diagram(s), identify the main stages associated with the operation of JPEG and give a brief description of the role of each stage.
- (b)
 - (i) Distinguish between
 - (a) bit-mapped and vector drawn images
 - (b) Video and Animation
 - (ii) With the aid of example frame sequences, explain the meaning of following types of compressed frames and the reasons for their use:
 - (a) I-frames
 - (b) P-frames
 - (c) B-frames
- (c) Write notes on the following:
 - (i) MHEG standard
 - (ii) Multimedia Broadcast Services

