TIT-012

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

PAPER ID : 0510   Roll No. [ ][ ][ ][ ][ ][ ][ ][ ][ ]

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 differnt 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: 10×2

(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) Dynaimc / 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