Sl. No.

C6-R4 : MULTIMEDIA SYSTEMS

NOTE :
1. **Answer question 1 and any FOUR questions from 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Time : 3 Hours   **Total Marks : 100**

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1. (a) Differentiate between synthesized and captured media. Describe in brief the concept of virtual environment in multimedia.

   (b) An analog signal has bandwidth that ranges from 15 Hz to 10 KHz. What is the rate of sampler   and the bandwidth of band limiting filter required if:
   (i) the signal is to be stored within computer memory.
   (ii) the signal is to be transmitted over a network which has a bandwidth from 200 Hz to 3.4 KHz.

   (c) Given the following Run Length Encoded (RLE) Sequence reconstruct the original 2D 8×8 (binary) data array.
   (0; 8),
   (0; 1); (1; 1); (0; 4); (1; 1); (0; 1),
   (0; 1); (1; 2); (0; 2); (1; 2); (0; 1),
   (0; 1); (1; 6); (0; 1),
   (0; 2); (1; 4); (0; 2),
   (0; 3); (1; 2); (0; 3),
   (0; 2); (1; 1); (0; 2); (1; 1); (0; 2),
   (0; 1); (1; 1); (0; 4); (1; 1); (0; 1)

   (d) What do you mean by QoS ?

   (e) What is Silence compression ?

   (f) What are the key differences between the JPEG and MPEG I-Frame Compression ?

   (g) In MPEG audio compression, what is frequency masking ?   **(7x4)**

2. (a) How much space will a one minute speech (stereo recording) take, if sampling rate 44Khz and sample size is 16 bits ?

   (b) Name any 4 multimedia authoring tools.

   (c) What Challenges are involved with multimedia communication ?   **(6+6+6)**

3. (a) What are the various audio - cards used in multimedia? Explain the steps involved in audio digitization.

   (b) With the aid of an example frame sequences, explain the meaning of following types of compressed frame and reasons for their use :
   (i) I-frames
   (ii) P-frames
   (iii) B-frames

   (c) What are some of the enhancements of MPEG-2, compared with MPEG-1 ? Why hasn't MPEG-2 standard superseded the MPEG-1 standard ?   **(5+6+7)**

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4. (a) What are the stages of a multimedia project development ?

(b) Explain the various multimedia building blocks.

(c) Explain at least two television broadcasting standards. **(7+3+8)**

5. (a) Explain JPEG Compression in detail.

(b) Differentiate between MIDI and digital audio. Give the formula to determine the size (in bytes) of a digital recording from a monophonic recording. **(9+9)**

6. (a) With the aid of suitable diagrams, explain the meaning of the terms :

(i) color gamut

(ii) Additive color mixing

(iii) Subtractive color mixing

(b) A text message contains 5 distinct symbols and their frequencies in the text are given below :

Symbol	A	B	C	D	E
Frequencies	15	7	6	6	5

Construct the Huffman tree and generate the Huffman code for each symbol.

(c) Briefly outline, with the aid of suitable diagrams, MPEG-1 video encoder and decoder. **(6+6+6)**

7. (a) Explain Multimedia communication over IP.

(b) Explain the hardware structure of MIDI. Explain the structure of MIDI messages.

(c) Enumerate any two applications of multimedia in Education. **(5+6+7)**

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