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BT-8/M-14 **8812**

MULTIMEDIA COMMUNICATIONS

ECE-406-E

Time : Three Hours] [Maximum Marks : 100

Note : Attempt any *Five* questions. All questions carry equal marks.

1. (a) Define the term Multimedia Communication ? With the help of a diagram explain telephone networks. 6

   (b) Briefly explain different multimedia applications ? 4

   (c) With the aid of diagrams explain the meaning of the terms :

   Color gamut, Adaptive color mixing, Subtractive color mixing. 10

2. (a) Show by means of a diagram how sampling of analog signal at a rate lower than the Nyquist rate can generate additional lower frequency alias signals to those present in the original waveform ? 8

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(b) Describe the terms :

   Unformatted text, formatted text, hypertext. 12

3. (a) A series of message is to be transferred between two computers over a PSTN line. The message comprises just the characters A through H. The probability of occurrence of each character is A and B = 0.14, C and D = 0.25, E, F, G, H = 0.055.

   (i) Use Shannon's formula to derive the min. average number of bits per character.

   (ii) Use Huffman coding to derive a codeword set and prove this the min. set by constructing the Huffman code tree. 10

   (b) Briefly explain some of the features of Video in multimedia applications and also explain the interlaced scanning principles. 10

4. (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 20 kHz, derive the bit rate that is generated by

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digitization procedure in each case assuming the Nyquist sampling rate is used with 12 bits per sample for the speech signal and 16 bits per sample for the music signal. Also derive the memory required to store a 20 min passage of stereophonic music ? **10**

(b) Expain in detail the meaning of digitized document with all its run-length possibilities ? **10**

5. (a) Why is the chrominance signal transmitted in the form of two color different signals ? Identify the color difference signals associated with the NTSC and PAL systems ? **8**

(b) Explain why modifications to the received (broadcast) TV signal have to be made if the signal is to be displayed in a window of a computer monitor. Hence assuming the SIF format, derive the spatial resolution required with :

(i) a 525-line and

(ii) a 625-line system. **12**

6. (a) Explain the principle of operation of LZW compression algorithm and how it differs from the LZ algorithm. **6**

(b) With the help of a diagram identify the 5 main stages associated with the baseline mode of operation of JPEG and give a brief description of the role of each stage ? **14**

7. (a) With the help of diagram explain the operation of a basic DPCM signal encoder and decoder. Also explain the sources of errors that can arise ? **10**

(b) With the help of diagram explain the operation of a basic MPEG-4 encoder and decoder schematics ? **10**

8. Explain the following : **5×4=20**

(a) H.261

(b) WWW

(c) DNS

(d) TIFF.