CBCS SCHEME

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16/17SCN21

# Second Semester M.Tech. Degree Examination, June/July 2018
## Multimedia Communication

Time: 3 hrs. Max. Marks: 80

***Note: Answer any FIVE full questions, choosing one full question from each module.***





### Module-1

1 a. What is multimedia? Explain two types of communication network that are used to provide multimedia communication service. **(08 Marks)**

b. Explain multipoint conferencing mode of operation with a suitable diagram. **(08 Marks)**

**OR**

2 a. Explain the concept of circuit switch network and packet switched network with a neat diagram. **(08 Marks)**

b. Determine the propagation delay associated with the following communication channels:
(i) A connection through a private telephone network of 1 km.
(ii) A connection through a PSTN of 200 km.
(iii) A connection over a satellite channel of 50000 km.
Assume that the velocity of propagation of signal in the case of (i) & (ii) is $2\times10^8$ $ms^{-1}$ **(08 Marks)**

### Module-2

3 a. Explain the principle of operation of the Lempel - Ziv compression algorithm. Hence assuming a dictionary of 4096 words and the average number of characters per words is 6, derive the average compression ratio that is achieved relative to using 7-bit ASCII codewords. **(08 Marks)**

b. Elaborate with an example the following terms relating to entropy encoding:
(i) Run length encoding
(ii) Statistical encoding **(08 Marks)**

**OR**

4 a. A series of message 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 of each character is as follows:
A & B = 0.25 ; C & D = 0.1 H ; E, F, G & H = 0.055.
(i) Use Shannon's formula to derive the minimum average number of bits per character.
(ii) Use Huffman coding to derive a codeword set & prove this is the minimum set by constructing the corresponding Huffman code tree.
(iii) Derive the average number of bits per character for your codeword set & compare this with
(a) The entropy of the message (Shannon's value)
(b) Fixed-length binary codewords
(c) 7-bit ASCII codewords. **(08 Marks)**

b. With a suitable steps relating to dynamic Huffman coding. Write down the actual transmitted bit pattern corresponding to the character string "This is simple". **(08 Marks)**

## Module-3

5 a. With the example frame sequences, explain the meaning of the following types of compressed frame and reasons for their use:
(i) I-frames (ii) P-frames (iii) B-frames **(08 Marks)**

b. With the help of schematic diagrams, explain the operation of the following two types of perceptual coder:
(i) backward adaptive bit allocation (Dolby AC-2)
(ii) Hybrid backward/forward adaptive bit allocation (Dolby AC-5) **(08 Marks)**

**OR**

6 a. With the aid of a graph, show how the sensitivity of the human ear varies with frequency. Explain clearly the dimensions of the y-axis of the graph. **(08 Marks)**

b. With the aid of a schematic diagram, explain the operation of a basic differential pulse code modulation (DPCM) signal encoder and decoder. **(08 Marks)**

## Module-4

7 a. With the help of the frame sequence diagram, explain the operation of H-263 ever tracking scheme. **(08 Marks)**

b. With example explain how the DCT blocks are derived from each macro block in an 1-frame (i) in the field mode, (ii) in the frame mode. State an application for each mode. **(08 Marks)**

**OR**

8 a. A digitized video is to be compressed using the MPEF-1 standard. Assuming a frame sequence of IBBPBBPBBPBBI..... and average compression ratio of 10 : 1(I), 20:1(P) and 50:1(B). Derive the average bit rate that is generated by the encoder for both the NTSC and PAL digitization formats. **(08 Marks)**

b. With the schematic diagram, explain the operation of the H.261 encoding formats. **(08 Marks)**

## Module-5

9 a. With diagram explain the following terms relating to reference model for multimedia synchronization :
(i) Clock synchronization
(ii) Multiple communication relations. **(08 Marks)**

b. With the next diagram, explain the classification of logical data units. **(08 Marks)**

**OR**

10 a. Define the term "Multimedia system". Explain in detail the classification of media use in multimedia systems. **(08 Marks)**

b. With the suitable examples, elaborate the concept of :
(i) Live synchronization
(ii) Synthetic synchronization **(08 Marks)**

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