



# CBCS SCHEME

17EC741

## Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Multimedia Communication

Time: 3 hrs.

Max. Marks: 100

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

### Module-1

- 1 a. List out the different types of multimedia networks used to provide multimedia services. Explain briefly about the telephone network and integrated services digital network with a neat diagram. (12 Marks)
- b. Find the maximum block size that should be used over a channel which has a mean BER probability of  $10^{-4}$ . If the probability of a block containing an error and hence discarded to be  $10^{-1}$ . (03 Marks)
- c. Discuss briefly about the communication modes available to transfer information stream. (05 Marks)

OR

- 2 a. Explain the operation of circuit switched and packet switched networks. (12 Marks)
- b. The web page size is 10 mbytes, calculate the minimum time required to transmit the file using:
  - i) PSTN and 28.8 kbps modem
  - ii) ISDN access line at 1.5mbps
  - iii) Cable modem at 27mbps. (03 Marks)
- c. Discuss briefly about multipoint conferencing. (05 Marks)

### Module-2

- 3 a. Explain the principle of operation of PCM speech codec with relevant block diagram and waveforms. (12 Marks)
- b. Assuming the bandwidth of a speech signal is from 50Hz through to 10kHz and that of a music signal is from 15Hz through to 20kHz, determine bit rate in each case, assuming Nyquist sampling rate is used, with 12 bits per sample for the speech signal and 1b bits per sample for the music signal. Derive the memory required to store a 10 minute passage of a stereophonic music. (04 Marks)
- c. Explain the following: i) Quantization intervals ii) Aspect ratio. (04 Marks)

OR

- 4 a. Explain 4:2:2 and 4:2:0 digitization formats. (10 Marks)
- b. Illustrate the different types of text data representation. (06 Marks)
- c. Calculate the time to transmit the following digitized images at both 64 kbps and 1.5MPbs.
  - i) A  $640 \times 480 \times 8$  VGA-compatible image
  - ii) A  $1024 \times 768 \times 24$  SVGA-compatible image. (04 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

**Module-3**

- 5 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 of each character is as follows:  
A and B = 0.25, C and D = 0.14, E, F, G and H = 0.055.
- Find the minimum average number of bits per character using Shannon's formula.
  - Construct Huffman code tree and derive a codeword set. (10 Marks)
- b. Explain briefly about the five main stages of baseline mode of operation of JPEG encoder with a neat block diagram. (10 Marks)

**OR**

- 6 a. Discuss multimedia operating system with respect to CPU management, memory management, I/O management and file system management. (10 Marks)
- b. Define distributed multimedia system with a neat block schematic and also highlight its features. (10 Marks)

**Module-4**

- 7 a. Explain linear predictive coding technique of audio compression with a neat block diagram. (10 Marks)
- b. Define: i) Group of pictures ii) Prediction span. (04 Marks)
- c. A digitized video is to be compressed using the MPEG-1 standard. Assuming a frame sequence of IBBPBBPBBPBB and average compression ratios 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 standards. (06 Marks)

**OR**

- 8 a. Discuss the principles of differential pulse code modulation with neat block diagram. (10 Marks)
- b. Explain the principles of video compression and also different frame types used. (10 Marks)

**Module-5**

- 9 a. Explain video streaming architecture with a neat block diagram. (10 Marks)
- b. Explain briefly about errors and losses in ATM. (10 Marks)

**OR**

- 10 a. Discuss about the NTI and CTI reconstruction schemes used in packet voice transmission. (10 Marks)
- b. Explain the multiplexing techniques used in ATM networks. (10 Marks)

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