

CBCS SCHEME

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BEC/BTE613A

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2026

Multimedia Communication

Time: 3 hrs

Max. Marks: 100

- Note:* 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

Module – 1		M	L	C
Q.1	a. What do you mean by multimedia? State the basic form of representation of text, image, audio and video.	6	L2	CO1
	b. List the different types of multimedia networks and explain any two of them in detail with relevant diagrams.	8	L2	CO1
	c. Find the maximum block size that should be used over a channel which has a mean BER probability of 10^{-4} , if probability of a block containing an error and hence being discarded is to be 10^{-1} .	6	L3	CO1

OR

Q.2	a. Determine the propagation delay associated with the following communication channels: i) A connection through a private telephone network of 1km. ii) A connection through a PSTN of 200 km iii) A connection over a satellite channel of 50,000 km Assume the velocity of propagation for (I) $2 \times 10^8 \text{ ms}^{-1}$ and for (II) $3 \times 10^8 \text{ ms}^{-1}$.	6	L3	CO1
	b. Explain simplex, duplex, broadcast and multicast operational modes of communication with neat sketch.	6	L2	CO1
	c. Explain the working principle of circuit mode and packet mode of operation in multimedia networks.	8	L2	CO1

Module – 2

Q.3	a. Explain the signal encoder design and quantization operation of digitization principles in detail.	8	L2	CO2
	b. Illustrate the different types of text data representation.	6	L2	CO2
	c. Assuming the Bandwidth of a speech is from 50 Hz through 10 kHz and that of a music signal is from 15 Hz through 20 kHz, derive the bit rate that is generated by the digitization procedure in each case assuming that Nyquist sampling rate is used with 12 bits/sample for the speech signal and 16 bits/sample for the music signal. Derive the memory required to store a 10 min passage of stereophonic music.	6	L3	CO2

OR

Q.4	a. With the help of a diagram, explain how the digital image produced by a scanner (or) digital camera, captured and stored within the memory of a computer.	10	L2	CO2
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	b.	Derive the bit rate and memory requirements to store each frame that result from the digitization of both 525 and 625 line system assuring 4:2:2 format. Also, find the total memory required to store a 1.5 hr movie/video.	10	L3	CO2
Module – 3					
Q.5	a.	Discuss in detail about the following techniques: i) Runlength encoding ii) Statistical encoding iii) Differential encoding iv) Transform encoding v) Lossy and lossless compression	10	L2	CO3
	b.	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 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 = 0.055. i) Develop codeword set using Huffman coding tree. ii) Derive the average number of bits per character for your code set and compare with entropy and fixed length binary codeword and 7 bit ASCII codewords.	10	L3	CO3
OR					
Q.6	a.	A message comprising of a string of characters with probabilities: e = 0.3, n = 0.3, t = 0.2, w = 0.1, * = 0.1 is to be encoded. The message sent is 'went'. Construct the encoded version of the character 'went' using Arithmetic coding principles.	10	L3	CO3
	b.	Explain in detail with neat sketch JPEG encoder and decoder.	10	L2	CO3
Module – 4					
Q.7	a.	Explain in detail the technique of DPCM with neat diagram.	10	L2	CO3
	b.	Explain in detail about the concept of perceptual coding with required diagrams.	10	L2	CO3
OR					
Q.8	a.	With the help of frame sequence, explain the following types of compressed frame and reason for their use i) I-frame ii) B-frame iii) P-frame	10	L2	CO3
	b.	Describe the working principle of MPEG4 with encoder-decoder schematic.	10	L2	CO3
Module – 5					
Q.9	a.	Explain in detail about the working principle of CSMA/CD with neat sketch.	10	L2	CO4
	b.	Explain in detail about the operating principle of Token Ring network with relevant diagrams.	10	L2	CO4
OR					
Q.10	a.	Explain the architecture of transparent bridge with illustrative sketch.	10	L2	CO4
	b.	Explain in detail about FDDI network configuration and ring fault detection and isolation process with diagrammatic illustration.	10	L2	CO4