U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: V**

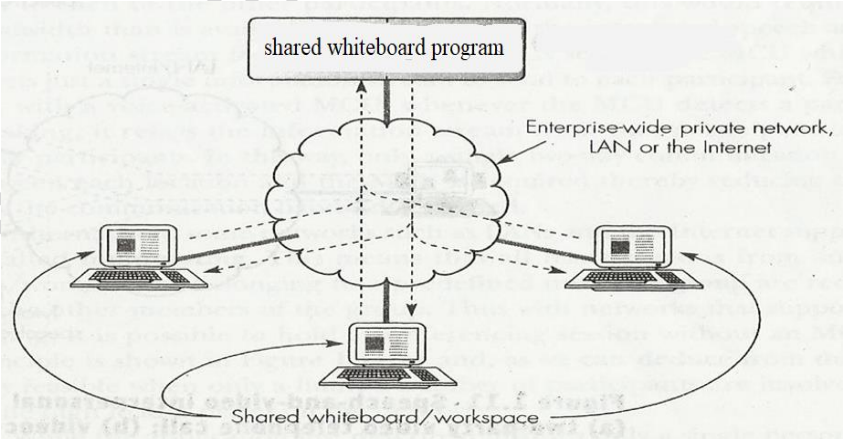
Branch: Electronics & Telecommunication Engineering **Duration: 3 hrs.**

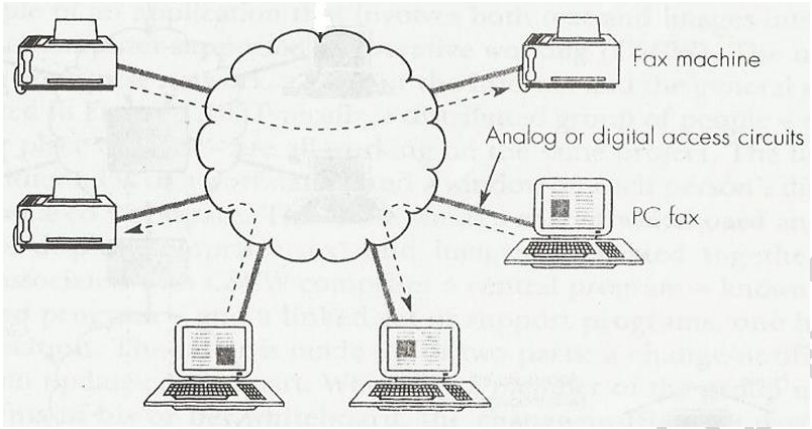
Course Code: 23ET5PCMMC **Max Marks: 100**

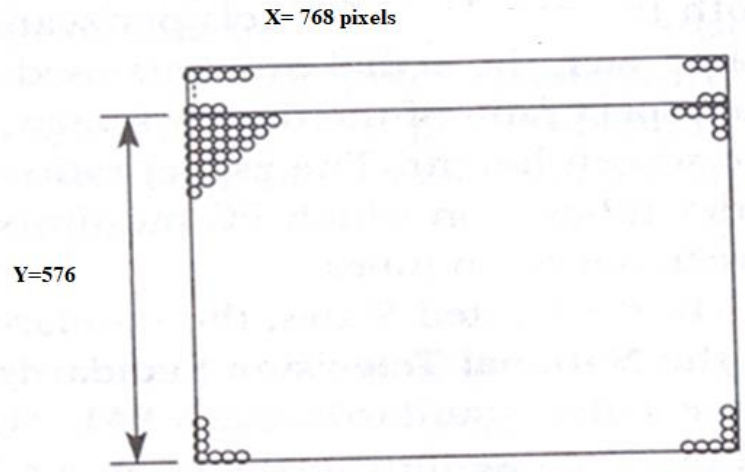
Course: MULTIMEDIA COMMUNICATION

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	*CO*	*PO*	Marks
1	a)	Explain with neat diagram how a high bit rate channel can be provided in addition to the speech channels with the same access circuit used for telephony? Mention the achievable low and high bit rates.	*CO2*	*PO1*	**06**
	b)	Explain the interpersonal communication of transmission of the live seminar with the neat diagram. Identify the media types and the network involved in the communication.	*CO2*	*PO1*	**06**
	c)	Analyse the given figure 1(c) to identify the multimedia application from the given figure. Specify the role of the different components in the application and the media types involved?  figure 1(c)	*CO3*	*PO2*	**08**
		OR			
2	a)	With the neat diagram, explain how the services are provided by cable distribution network.	*CO2*	*PO1*	**06**

		b)	With neat diagram, illustrate i.) Two party video phone call ii) Video conferencing call using MCU and iii) Video conferencing call using broadcast.	*CO2*	*PO1*	**06**
		c)	Analyze the given figure 2(c) to identify the application of multimedia. Justify. Identify the type of network and the media type involved.  figure 2(c)	*CO3*	*PO2*	**08**
			UNIT - II			
	3	a)	Differentiate between lossy and lossless compression.	*CO2*	*PO1*	**04**
		b)	Derive the Adaptive Huffman tree for the character string INTERNET. Decode the encoded message to get back the original information. Compute the efficiency of coding.	*CO2*	*PO1*	**10**
		c)	Assume that a character set comprises 128 characters and the dictionary is limited to 4096 entries. Show the building up of the dictionary at the encoder and the decoder using the LZW algorithm.	*CO2*	*PO1*	**06**
			OR			
	4	a)	Differentiate between formatted and unformatted text in multimedia.	*CO2*	*PO1*	**04**
		b)	Consider the transmission of the message containing the character string 'bbbc'. The character set and the associate probabilities are given as a= 0.5, b=0.4 and c = 0.1. Derive the code word value for the given character string, using Arithmetic coding Assuming this is received by the destination, explain how the decoder determines the original string from the received code value.	*CO2*	*PO1*	**10**
		c)	Explain the principle of operation of the LZ compression algorithm. Assuming LZ algorithm is used to compress the text file If the average number of character per word is 6 and the dictionary contain 4096 words, derive the average compression ratio that is achieved relative to using 7 bit ASCII code words.	*CO2*	*PO1*	**06**

			UNIT - III			
	5	a)	With the neat diagram, explain the three methods of colour image capture within a camera or scanner.	*CO2*	*PO1*	**06**
		b)	With suitable expression show how the transformed coefficients are computed in the JPEG standard. Explain the process of quantization, how the values are represented in the form of a single dimension vector and the type of scanning adopted to achieve compression.	*CO2*	*PO1*	**08**
		c)	Given is the resolution of two digitized images. Analyze to identify the standards and derive the time taken to transmit the given digitized images at both 64kbps and 1.5Mbps i) 640 X 480 X 8 ii) 1024 X 768 X 24	*CO3*	*PO2*	**06**
			OR			
	6	a)	With the basic mode of operation of GIF, show how LZW coding algorithm can be applied to the image data in relation to GIF.	*CO2*	*PO1*	**06**
		b)	Derive the flow chart of the coding procedure adopted in the Modified Modified Read (MMR) standard.	*CO2*	*PO1*	**08**
		c)	Analyse the figure in terms of the screen resolution. Identify the number of horizontal scan lines in a frame, frame refresh rate, number of lines used to carry control and other information and Derive the munber of pixels per scan line that are used to obtain square pixels assuming 4/3 aspect ratio. Use PAL system..  	*CO3*	*PO2*	**06**
			UNIT - IV			
	7	a)	Consider the digital storage devices for stereophonic music. Indicate the audible bandwidth and the minimum sampling rate of the music. If one of the sampling rate used is 44.1Ksps, derive the bit rate used with the device used for stereophonic music. Mention the standard associated with these devices for multimedia information streams.	*CO2*	*PO1*	**06**
		b)	With neat diagram, explain the linear predictive coding.	*CO1*	-	**07**

		c)	With neat diagram, explain the operation of fixed bit allocation mode as used with a Dolby AC-I coder.	*CO1*	-	**07**
			OR			
	8	a)	Consider the CD-DA standard is used. Derive storage capacity of a CD – ROM to store 60 minute multimedia title. Find the time required to transmit a 30 second portion using a transmission channel of bit rate 64kbps and 1.5Mbps.	*CO2*	*PO1*	**06**
		b)	With neat diagram explain the generation of the synthesized audio used in multimedia applications. Compare it with the digital audio.	*CO1*	-	**07**
		c)	With neat diagram, explain the operation of hybrid backward/forward adaptive bit allocation mode of coding.	*CO1*	-	**07**
			UNIT - V			
	9	a)	With neat diagram, explain the principles of interlaced scanning.	*CO1*	-	**04**
		b)	Derive the bit rate that results from the digitization of the 525-line and 625-line system using the 4:2:0 digitization format and interlaced scanning. Hence derive the amount of memory required to store a 2-hour movie/video.	*CO2*	*PO1*	**08**
		c)	With neat diagram, explain how the motion vector and prediction error are computed for a P-frame.	*CO1*	-	**08**
			OR			
	10	a)	With neat diagram, explain the different frame types used in video compression.	*CO1*	-	**04**
		b)	With neat diagram, explain how two colour difference signals are transmitted within the same frequency band as that used for the luminance signal in both NTSC and PAL system. Derive the scaling factors used for the two color difference signal in terms of R,G and B color signals.	*CO2*	*PO1*	**08**
		c)	With neat implementation schematic, explain the encoding of B-frame.	*CO1*	-	**08**

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