CMR Institute of Technology
Department of ECE
17EC741- Multimedia Communication
IAT-2- November 2020
Scheme and Solution

S.no	Question	Answer	Marks	CO	Bloom's Level
1	Total Bit rate for CD quality Audio with the sampling rate 44.1 ksps for a standard 16 bits per sample to avoid quantization noise.	1.411 Mbps	1	CO1	L3
2	Standard that defines a range of inputs from different instruments	Music Instrument Digital Interface (MIDI)	1	CO1	L1
3	----- is the original digitization format used in CCIR	4:2:2	1	CO1	L1
4	In 635 line system 4:2:2 formats the number of visible lines is	576	1	CO4	L2
5	------- is not the main property of a color source	RGB	1	CO1	L1
6	Luminance is used to refer to the -----------of a source	Brightness	1	CO1	L1
7	Derive the memory requirement to store each frame that result from the digitization of 525 lines assuming a 4:2:2 format	691.2 Kbytes	1	CO4	L3
8	The line sampling rate for chrominance in 4:2:2 format	6.75 MHz	1	CO4	L2
9	Derive the bit rate and the memory requirements to store each line that results from the digitization of both a 525-line system, assuming a 4:2:0 format with C information	1440 bytes	1	CO4	L3
10	The resolution of Luminance and two chrominance components for 4:2:0 standard for 525-line system	Y= 720 x 480; Cb=Cr=360 x	1	CO4	L2

		are 240			
11	In Huffman coding, data in a tree always occur?	Leaves	1	CO5	L1
12	From the following given tree, what is the computed codeword for 'c'?	110	1	CO5	L3
13	The type of encoding where no character code is the prefix of another character	Prefix encoding	1	CO5	L1
14	An alphabet consists of the letters A, B, C and D. The probability of occurrence is P (A) = 0.4, P (B) = 0.1, P(C) = 0.2 and P (D) = 0.3. The Huffman code is	A = 0, B = 100, C = 101, D = 11	1	CO5	L3
15	Huffman coding is an encoding algorithm used for	Lossless data compression	1	CO5	L1
16	A Huffman code: A = 1, B = 000, C = 001, D = 01P(A) = 0.4, P(B) = 0.1, P(C) = 0.2, P(D) = 0.3The average number of bits per letter is	1.9 bits	1	CO5	L3
17	Which of the following is not a lossy compression technique?	Arithmetic Coding	1	CO5	L1
18	Quantization Matrix in JPEG compression was introduced because	It allows better differentiation of DC and AC coefficients in the 8x8 block matrix than a scalar	1	CO5	L1

		quantization			
19	Chrominance signal carries	Color information	1	CO5	L1
20	Information per source is called	Entropy	1	CO5	L1
21	Compression is done for saving	Both Storage and Bandwidth	1	CO5	L1
22	The statistical encoding method which uses variable-length strings of characters?	Lempel Ziv Coding	1	CO5	L1
23	In Joint Photographic Experts Group (JPEG), a gray scale picture is divided into blocks of	8 x 8 Pixels	1	CO5	L1
24	Huffman coding achieves the Shannon value, only if the symbol probabilities are all integer powers of	1/2	1	CO5	L1
25	---------- is normally used for the data generated by scanning the documents, fax machine, typewriters etc.	Run Length Encoding	1	CO5	L1
26	Lempel- Ziv Coding algorithm is also known as	Dictionary-Based Coding	1	CO5	L1
27	Lossy techniques are generally used for the compression of data that originate as analog signals, such as	Both Speech and Video	1	CO5	L1
28	Which of the following are Lossless methods?	(Run Length, Huffman, Lempel Ziv)All of the above	1	CO5	L1
29	Which of the following is the first phase of JPEG?	DCT Transformation	1	CO5	L1
30	A coding scheme that takes advantage of long runs of identical symbols is called as	Run-Length Coding	1	CO5	L1
31	In JPEG, blocking is the act of dividing the image into 8 x 8 pixel blocks in order to	reduce the number of calculations	1	CO5	L1

32	The sequence of Operations in JPEG are:	Image/Block Preparation, DCT, Quantization, Entropy encoding, Frame Building	1	CO5	L1
33	Zig-Zag Scanning is used in ------------ Operation of JPEG	Vectoring	1	CO5	L1
34	Which of the following are Image Compression methods?	(GIFF, TIF, JPEG)All of the above	1	CO5	L1
35	The LZ algorithm is to be used to compress a text file prior to its transmission. If the average number of characters per word is 4, and the dictionary used contains 4096 words, derive the average compression ratio that is achieved relative to using 7-bit ASCII codewords.	2.33 : 1	1	CO5	L3
36	A series of messages is to be transferred between two computers over a PSTN. The messages comprise just the characters A through E. Analysis has shown that the probability of each character is as follows: A = 0.3, B= 0.25, C and D = 0.125, E = 0.2.Find the entropy and using Huffman coding, derive the optimum codewords.	Entropy = 2.23; A = 11, B = 10, C = 011, D = 010, E = 00	5	CO5	L3
37	A message comprising of a string of characters with probabilities t=0.2, o=0.4, g=0.2, a=0.1,. =0.1 is to be encoded. The message is "goat."The arithmetic code word range is	Codeword is between 0.4702-0.4704	5	CO5	L3

38	Overall Operation in PCM is called _____	Both Companding, Compressor & Expander	1	CO1	L1
39	Two field are integrated together in the television receiver using a technique known as -------	Interlaced scanning	1	CO1	L1
40	Which of the following statements is true?	Ear Is More Sensitive To Noise On Quite Signals Than Loud Signals.	1	CO2	L1
41	A video consists of a sequence of	Frames.	1	CO2	L1
42	Moving Picture Experts Group (MPEG) is used to compress	Video	1	CO2	L1

35. Index for dictionary with 4096 words is calculated as

$$4096 = 2^{12}$$

Using 7 –bit ASCII codewords and an average of 4 characters per word requires 28 bits.

Hence Compression ratio = 28 /12 = 2.33: 1

36.

3. $P(A) = 0.3$ $P(B) = 0.25$) $P(C) = 0.125$ $P(D) = 0.125$
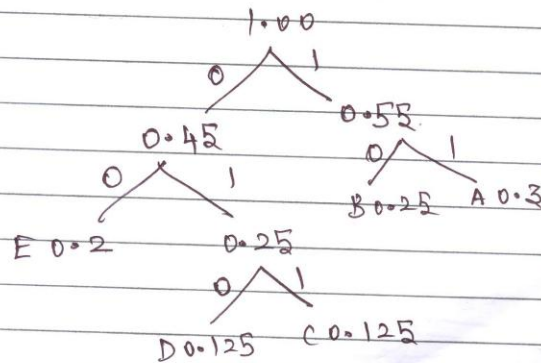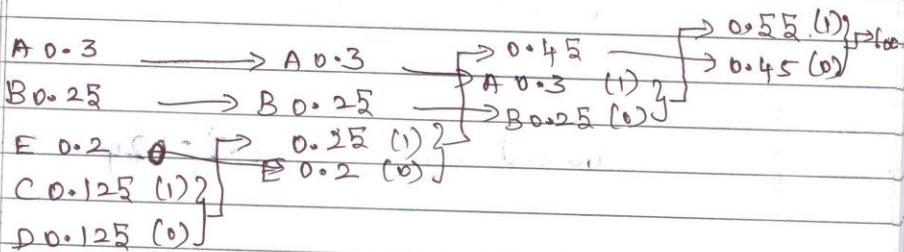$P(E) = 0.2$

Entropy:

$$H = - \sum_{i=1}^{n} P_i \log_2 P_i$$

$$= - \left[0.3 \log_2 0.3 + 0.25 \log_2 0.25 \right.$$
$$+ 0.125 \log 0.125 + 0.125 \log_2 0.125$$
$$\left. + 0.2 \log_2 0.2 \right]$$

$$= - \left[-0.521 - 0.5 - 0.375 - 0.375 - 0.464 \right]$$

$$= 0.521 + 0.5 + 0.375 + 0.375 + 0.464$$

$$= 2.235.$$

A 0.3 ———→ A 0.3 ⟶ 0.45 ⟶ 0.55 (1) ⟶ 1.00
B 0.25 ———→ B 0.25   A 0.3 (1)   0.45 (0)
E 0.2 ⟶ 0.25 (1)   B 0.25 (0)
C 0.125 (1)   E 0.2 (0)
D 0.125 (0)

1.00
0 ⟋⟍ 1
0.45   0.55
0 ⟋⟍ 1   0 ⟋⟍ 1
E 0.2   0.25   B 0.25   A 0.3
0 ⟋⟍ 1
D 0.125   C 0.125

Codewords

$A = 11$

$B = 10$

$C = 011$

$D = 010$

$E = 00$

4. Arithmetic coding

goat.

$t = 0.2$
$o = 0.4$
$g = 0.2$
$a = 0.1$
$\cdot = 0.1$

Codeword range is $0.47024 - 0.4704$

37.