KUMARAGURU college of technology
character is life

Register Number:……..…

M.E DEGREE EXAMINATIONS: JUNE 2016

(Regulation 2015)

Second Semester

APPLIED ELECTRONICS

P15AETE14: Multimedia Compression Techniques

COURSE OUTCOMES

CO1: Discuss data formats for different multimedia data.

CO2: Illustrate compression/decompression of text,image,audio and video.

CO3: Compare data compression algorithms.

CO4: Apply different compression techniques for image and video.

CO5: Design multimedia systems according to the requirements of applications.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The following items consists of two statements, one labeled as the "Assertion (A)" and the other as "Reason (R). You are to examine those two statements carefully and select the answers to these items using the codes given below: CO2 [K_2]

Codes:

a. both A and R are individually true and R is the correct explanation of A
b. both A and R are individually true but R is not the correct explanation of A
c. A is true but R is false
d. A is false but R is true.

Assertion (A) : In an optimum code,symbols that occur more frequently will have shorter codewords than symbols that occur less frequently.

Reason (R) : In an optimum code, the two symbols that occur least frequently will have the different length.

a) a b) b

c) c d) d

2. Consider the following statements. CO2 [K_2]

1.The endpoints of the intervals are known as reconstruction levels.
2.Representative values are called reconstruction levels.
3.A quantizer which does not have zero as one of its representation levels is called a midrise quantizer.
4.Forward adaptive approach is also called as off line method.

Which of these are correct?

a) 1,2 b) 2,3

c) 1,3 d) 3,4

3. The steps in A law decoder is CO2 [K_2]

1. Bit P is then used to determine the sign of the output.
2. If the segment code is nonzero, the decoder multiplies the quantization code by 2 and increments this by the bias.
3.It inverts bit P
4. It then inverts even numbered bits of the codeword.

The correct sequence of steps are

a) 4,3,2,1 b) 2,1,3,4

c) 3,4,2,1 d) 1,4,3,2

4. Match list I with list II and select the correct answer using the codes given below. CO2 [K_2]

List I	List II
A.Squared error measure and absolute difference measure	i.External node .
B.Leaf node	ii.Difference distortion measures
C.Nodes that give rise to other nodes.	iii.Adaptive Huffman coding scheme.
D.Sibling property	iv.Internal node

Codes:.

	A	B	C	D
(a)	1	3	4	2
(b)	1	2	3	4
(c)	2	1	4	3
(d)	4	3	1	2

a) a b) b

c) c d) d

5. Match list I with list II and select the correct answer using the codes given below. CO2 [K_2]

List I	List II
A.Single pixel occupies	i.Pitch
B.Range of human voice	ii.One bit and three byte
C.Period of fundamental harmonic. .	iii.Consecutive occurrences of a data item.
D.Run length	iv. 500 Hz to 2KHz.

Codes:.

	A	B	C	D
(a)	1	3	4	2
(b)	1	2	3	4
(c)	2	1	4	3
(d)	2	4	1	3

a) a b) b

c) c d) d

6. Consider the following statements. CO2 [K_2]

1. In CELP the interval from zero to one is divided according to the probabilities of the occurrences of the intensities.
2. Backward temporal masking occurs for only a short duration prior to the masking

sound in mp3.
3. Dolby AC3 is now used for DVDs.
4. Image is measured in units of dB SPL.

Which of these are correct?

a) 1,2 b) 2,3

c) 1,3 d) 3,4

7. Consider the following statements to assign bits in Quantization and coding of transform coefficients in transform coding. CO2 [K_2]
   1. Decrement R_b by 1. If R_b = 0, then stop.
   2. Increment R_I by 1 and divide σ_θ^2 by 2.
   3. Sort the variances.
   4. Set $R_K = 0$ For all k and set R_b = MR, Where R_b is the total number of bits available for distribution.
   5. Compute σ_θ^2 for each coefficient.

   Which of these are correct?

a) 4,5,3,2,1 b) 5,4,3,2,1

c) 2,3,1,4,5 d) 4,3,5,2,1

8. The following items consists of two statements, one labeled as the "Assertion (A)" and the other as "Reason (R). You are to examine those two statements carefully and select the answers to these items using the codes given below: CO2 [K_2]

Codes:

a. both A and R are individually true and R is the correct explanation of A
b. both A and R are individually true but R is not the correct explanation of A
c. A is true but R is false
d. A is false but R is true.

Assertion (A) : The current JPEG standard provides excellent performance at rates above 0.25 bits per pixel.

Reason (R) : However at lower rates there is not a sharp degradation in the quality of the reconstructed image.

a) a b) b

c) c d) d

9. ---------- is the sequence in which the video sequence is displayed to the user. CO2 [K_2]

a) Group of pictures b) I frame

c) Display order d) P frame

10. If the enhancement layer contained a coded bitstream corresponding to frames that would occur between frames of the base layer ,the system could be called ---------- CO2 [K_2]

a) Temporally scalable b) Spatially scalable

c) Field prediction d) Prime prediction

PART B (10 x 2 = 20 Marks)

11. Why is data compression necessary for Multimedia signals? CO2 [K_2]

12. What are the basic components in source coding? CO2 [K_2]

13. Write any one condition for optimality of Huffman codes. CO2 [K_2]

14.	List any two dictionary techniques.	CO2	[K_2]
15.	Compare DPCM with PCM.	CO3	[K_4]
16.	Draw the format of G.711 μ-law codeword.	CO2	[K_2]
17.	What is sub band coding?	CO2	[K_2]
18.	Draw the block diagram of encoder of lossless predictive coding model.	CO2	[K_2]
19.	What is the necessity for Motion estimation?	CO2	[K_2]
20.	What is the basic concept of Block Matching?	CO2	[K_2]

PART C (6 x 5 = 30 Marks)

21.	Explain Taxonomy of compression techniques.	CO2	[K_2]
22.	Discuss about run length encoding.	CO2	[K_2]
23.	Describe the sub band coding algorithm.	CO2	[K_2]
24.	Write short notes on JPEG 2000 standard.	CO2	[K_2]
25.	Explain the steps to decode the data using μ-law decoder.	CO2	[K_2]
26.	Summarize the LZ78 approach.	CO2	[K_2]

Answer any FOUR Questions
PART D (4 x 10 = 40 Marks)

27.	Discuss vector quantization in detail.	CO2	[K_2]
28.	Explain arithmetic coding with an example.	CO2	[K_2]
29.	Describe the concept of CELP vocoder in audio compression.	CO2	[K_2]
30.	Generate bit stream and decode the image shown below using SPHIT algorithm.	CO4	[K_3]

26	6	13	10
-7	7	6	4
4	-4	4	-3
2	-2	-2	0

31.	Give a detailed comparison among MPEG-1, MPEG-2, MPEG-4 and MPEG-7.	CO3	[K_4]

****