Enrollment No : _____

KADI SARVA VISHWAVIDYALAYA

B.E. SEMESTER – VII ATKT EXAMINATION APRIL 2016

SUNJECT CODE:- IT-702 **SUBJECT NAME:- DATA COMPRESSION**

DATE:- 10/11/2016 **TIME: - 10:30AM to 01:30PM** **MARKS:-70 Marks**

Instructions:

1. Answer each section in separate Answer Sheet.
2. Use of scientific calculator is permitted.
3. All questions are compulsory.
4. Indicate clearly, the options you attempted along with its respective question number.
5. Use the last page of main supplementary for rough work.

SECTION-I

Q1 A Explain Compression and Decompression with the help of Run length encoding, and find compression ratio. **[5]**

B What is data modeling? Describe any two mathematical models used for data modeling. **[5]**

C Explain generic compression scheme with the help of block diagram. What are the distortion criteria for Lossy coding? **[5]**

OR

C Pick one of the image files and compute its second order entropy. Comment on the difference between the first and second order entropies. **[5]**

Q-2 A A source emits letters from an alphabet A={a1,a2,a3,a4,a5} with probabilities P(a1)=0.15, P(a2)=0.04, P(a3)=0.26, P(a4)=0.05, P(a5)=0.50. Calculate the entropy and Huffman code of this source **[5]**

B Compare LZ77 and LZ78 approach with the help of an example in details. **[5]**

OR

Q-2 A An alphabet A={a1,a2,a3,a4} with probabilities P(a1)=0.1, P(a2)=0.3, P(a3)=0.25, P(a4)=0.35, Calculate the Shannon-Fano and Huffman code of this source **[5]**

B Compare Arithmetic Coding and Huffman coding with the help of an example in details. **[5]**

Q-3 A A sequence is encoded using LZW algorithm and the initial dictionary shown in table **[5]**

Index	Entry
1	a
2	b
3	r
4	t

The output of LZW encoder is the following sequence

3,1,4,6,8,4,2,1,2,5,10,6,11,13,6

Decode this sequence.

B Where we use dictionary techniques of encoding? Also explain various types of dictionary techniques. **[5]**

OR

Q-3 A Consider a three letter alphabet A={a1,a2,a3} with P(a1)=0.6, P(a2)=0.3, P(a3)=0.1. Using arithmetic coding, generate a code for the sequence a1a2a3. [5]

B Explain physical and probability model. [5]

SECTION-II

Q4 A What is lossy data encoding? Write down the distortion measure criterias to check the fidelity of a reconstructed source sequence to the original one in such type of encoding techniques. [5]

B Compare scalar quantization and vector quantization. What are the advantages of vector quantization over scalar quantization? [5]

C Explain zip, gzip, bzip. with the help of an example in details. [5]

OR

C Explain GIF, JBIG with the help of an example in details. [5]

Q-5 A What do you understand by vector quantization? Also explain the procedure of vector quantization. [5]

B Explain WinZip and WinRar with the help of an example in details. [5]

OR

A Compare JPEG and MPEG with the help of an example in details. [5]

B What is Quantization? Describe the quantization problem with the help of an example in details. [5]

Q-6 A Explain sliding window compression technique with an example. [5]

B Explain Discrete Cosine Transform. [5]

OR

A Explain Speech Compression with appropriate diagrams. [5]

B Explain wavelet based compression. [5]

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KADI SARVA VISHWAVIDYALAYA

B.E. Semester – VII Regular EXAMINATION Nov-Dec 2015

Subject Code:- IT-702 **Subject Name:- Data Compression**

DATE:- 24/11/2015 **DURATION:- 3 Hours**

TIME: - 10:30AM to 01:30PM **MARKS:-70 Marks**

Instructions:

1. All questions are compulsory.
2. Make suitable assumptions wherever necessary
3. Figures to the right indicate full marks.
4. Give Diagrams wherever required.

SECTION-I

Q1 A What is Data Modeling? Give brief description of any two mathematical models used for data modeling. **[5]**

B What is the difference between a fixed length code and variable length code. In variable length code, define the term rate of the code. **[5]**

C Let Huffman code of a source S with three letters {X1, X2,X3} is {0,11,10} respectively. Find the extended Huffman Code of the same source taking two letters at a same time. Compare the average code word length in both cases. **[5]**

OR

C A source emits letters from an alphabet B={b1,b2,b3,b4,b5} with P(b1)=P(b2)=0.3, P(b3)=P(b4)=0.1,P(b5)=0.2. Find the Huffman code of the source. **[5]**

Q-2 A Explain LZ78 method with example. **[5]**

B Given an alphabet A = {a1, a2, a3, a4}, find the first order entropy in the following cases: **[5]**

1. P(a1) = ½, P(a2) = ¼, P(a3) = P(a4) =1/8
2. P(a1) = 0.505, P(a2) = ¼, P(a3) = 1/8 and P(a4) =0.12

OR

Q-2 A What do you understand by Markov Models. Discuss the role of Markov Models in text compression. **[5]**

B What is Dictionary coding? Compare and construct LZ77 and LZSS algorithms. **[5]**

Q-3 A Define the following terms: **[5]**

1. Compression ratio. 2. Distortion. 3.Compression Rate

B What do you understand by vector quantization? Also explain the procedure of vector quantification. **[5]**

OR

A Difference between :- **[5]**

1. Lossy and Lossless Data Compression.
2. Audio Compression and Image Compression.

B Explain GIF and JBIG with example. **[5]**

SECTION-II

Q4	A	Explain Lossless Encoding and Decoding method. Explain gzip and bzip.	[5]
	B	Explain WinZip and WinRar with example.	[5]
	C	Explain usage of Discrete Cosine Transformation (DCT) in JPEG.	[5]
		OR	
	C	What are the difference between Huffman coding and Shannon fano coding? Prove by a suitable example that Huffman is better than Shannon fano coding.	[5]
Q-5	A	Explain Wavelet based compression.	[5]
	B	Describe the features of Video compression as compared to image compression. Explain MPEG industry standards for video compression.	[5]
		OR	
	A	Explain Multi Resolution analysis and scaling function.	[5]
	B	How JPEG is different from JPEG 2000. Discuss the application of JPEG 2000.	[5]
Q-6	A	What is Discrete Cosine Transformation? Explain it in brief.	[5]
	B	How do you generate the tag value in Arithmetic Coding? Generate the tag value considering the three alphabets A = {a1, a2, a3} with given probabilities as P(a1)=0.7, P(a2)=0.1 and P(a3)=0.2	[5]
		OR	
	A	Answer the Following 1. Inverse DCT 2. Statistical Modeling.	[5]
	B	What is quantization? Explain the process of quantization in JPEG.	[5]