

APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER

Q. P. Code : CSP0819211A-I

(Pages: 2)

Name:

Reg. No:

THIRD SEMESTER M.TECH. DEGREE EXAMINATION December 2019

Branch: ELECTRONICS AND
COMMUNICATION ENGINEERING

Specialization: COMMUNICATION
ENGINEERING AND SIGNAL PROCESSING

08EC7211(A) SIGNAL COMPRESSION THEORY AND METHODS

(Common to Communication Engineering and Signal Processing and Electronics & Communication Engineering)

Time:3 hours

Max. marks: 60

Answer all six questions.

Modules 1 to 6: Part 'a' of each question is compulsory and answer either part 'b' or part 'c' of each question.

Q.no.	Module 1	Marks
1.a	Let C be a code with N codewords with lengths l_1, l_2, \dots, l_N . What is the condition for C to be uniquely decodable. Elucidate your answer with an example.	3
Answer b or c		
b	State and Prove source coding theorem	6
c	Write the comparison between Lossy Compression and Lossless Compression	6
Q.no.	Module 2	Marks
2.a	Write properties of run-length coding.	3
Answer b or c		
b	Code the following sequence using LZW algorithm. Given sequence is WED\$WE\$WEE\$WEB\$WET and the initial dictionary is \$:1,B:2,D:3,E:4,T:5,W,6	6
c	Compare and contrast the redundancy and variance of a Normal Huffman code and Minimum variance Huffman code for a source that puts out letters from an alphabet $A=\{a_1, a_2, a_3, a_4, a_5\}$ with $P(a_1)=P(a_3)=0.2$, $P(a_2)=0.4$, and $P(a_4)=P(a_5)=0.1$.	6

Q.no.	Module 3	Marks
3.a	Calculate the rate distortion function $R(D)$ for a binary source	3
Answer b or c		
b	Calculate the Rate distortion function for a Gaussian source	6
c) State and prove Rate Distortion theorem	6
Q.no.	Module 4	Marks
4.a	What is A-law companding? Explain	3
Answer b or c		
b	Write a short note on differential encoding schemes	6
c	Explain in detail about the vector quantization and structures for VQ	6
Q.no.	Module 5	Marks
5.a	Write the properties of discrete cosine transform.	4
Answer b or c		
b	Give the algorithms of the Karhunen-Loeve Transform.coding method	8
c	Discuss on basic Subband Coding algorithm.	8
Q.no.	Module 6	Marks
6.a	Enumerate the data compression standards. Elucidate their most important features	4
Answer b or c		
b	Compare the data compression standards Zip & Gzip.	8
c	Give the classification of speech coders. Explain the design procedure of a CELP Vocoder	8