K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

~~Nov - Dec 2024~~ Jan / Feb 2025

B. Tech Program: Artificial Intelligence and Data Science Scheme IIB

~~Regular~~ Supplementary Examination: TY Semester: V

Course Code: AIC504 and Course Name: Information Theory and Coding

Date of Exam: ~~25/11/2024~~ 01-02-2025 Duration: 02.30 Hours Max. Marks: 60

Instructions:
(1)All questions are compulsory.
(2)Draw neat diagrams wherever applicable.
(3)Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
Q 1	Solve any **two** questions out of three: (05 marks each)	10		
a)	Illustrate linearity and cyclic property of cyclic codes.		6	U
b)	What is JPEG? What are different goals and different modes of operation of JPEG?		4	U
c)	Explain Shannon Fano Coding		2	U
Q 2	Solve any **two** questions out of three: (05 marks each)	10		
a)	Explain Frequency masking and Temporal masking		5	U
b)	An event has six possible outcomes with probabilities, P1=1/2, P2= ¼, P3=1/8, P4=1/16, P5=P6=1/32. Find the rate of information, if there are 16 outcomes per second.		1	U
c)	Compare Static Dictionary and Dynamic Dictionary		3	U
Q.3	Solve any **two** questions out of three. (10 marks each),	20		
a)	Explain H.261 Encoder and Decoder block diagram		4	U
b)	i) Explain the need of data compression with examples. ii) Compare lossy and lossless compression methods		1	U
c)	Explain following terms related to error control coding a)Code vectors and sketch code vector for 3 bit code, b)Hamming Distance, c)Hamming weight of a code word, d)Code efficiency, e) Minimum distance dmin.		6	U
Q.4	Solve any **two** questions out of three. (10 marks each)	20		
a)	Explain LZW dictionary technique with example		3	U
b)	Construct Huffman code for the given symbols. {x1, x2 , ... x8} with probabilities P(x) = {0.07,0.08,0.04,0.26,0.14,0.09,0.07,0.25}. Find the		2	A

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	code efficiiency.			
c)	Explain JPEG 2000 algorithm steps in details.		4	U

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