

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(MID SEMESTER EXAMINATION MO/2024)

CLASS: BTECH  
BRANCH: ECE

SEMESTER : VII  
SESSION : MO/2024

SUBJECT: EC411R1 SPEECH AND AUDIO PROCESSING

TIME: 02 Hours

FULL MARKS: 25

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

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		CO	BL
Q.1(a)	What is speech signal? Explain its representation in time and frequency domains.	[2]	1 2
Q.1(b)	Explain the process of speech production and perception in human beings.	[3]	1 2
Q.2(a)	Discuss the speech sounds and its features in American English.	[2]	1 2
Q.2(b)	Briefly explain the classification of speech coding techniques.	[3]	2 2
Q.3(a)	What are the requirements of speech codecs? Explain briefly.	[2]	2 2
Q.3(b)	Explain the fundamentals of Speech signal processing.	[3]	1 2
Q.4(a)	What is the pitch of an audio signal. Explain different methods for extracting pitch from an audio recording.	[2]	3 2
Q.4(b)	What is all-pole and all-zero filters? Explain with some suitable examples.	[3]	3 2
Q.5(a)	Write a report on each of the following. i. Convolution, ii. Power Spectral Density	[2]	4 2
Q.5(b)	Compare frequency transformation (FT) and short time frequency transformation (STFT). Also explain the advantage and limitations of STFT.	[3]	4 4

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