GUJARAT TECHNOLOGICAL UNIVERSITY
ME- SEMESTER II– EXAMINATION – SUMMER 2015

Subject Code: 2720504   **Date: 30/05/2015**
Subject Name: Speech Signal Processing
Time: 2:30 PM – 5:00 PM   **Total Marks: 70**
Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain the mechanism of speech production with neat sketch.	**07**
	(b)	With neat block diagram explain different speech communications applications.	**07**
Q.2	**(a)**	Write a short note on Speech Vs Silence discrimination using energy and zero-crossings.	**07**
	(b)	Write a short note on co-articulation and prosody.	**07**

OR

	(b)	What can be interpreted from spectrogram? Draw narrowband and wideband spectrogram with annotation.	**07**
Q.3	**(a)**	Define short-time autocorrelation function and explain the pitch detection method using it.	**07**
	(b)	Define : (1) Phonemes (2) Pitch (3) Formants. Classify acoustic phonetics.	**07**

OR

Q.3	**(a)**	Write a short note on autocorrelation function for speech processing and give your comments on modified autocorrelation function.	**07**
	(b)	Explain challenges in pitch detection and list its applications.	**07**
Q.4	**(a)**	Explain characteristic system for homomorphic deconvolution. Also explain inverse characteristic system for homomorphic deconvolution.	**07**
	(b)	Explain difference between complex cepstrum of voiced speech and unvoiced speech.	**07**

OR

Q.4	**(a)**	Derive the equation of Filter Bank Summation (FBS) constraint.	**07**
	(b)	What is the need of STFT? Explain any one approach of STFT.	**07**
Q.5	**(a)**	What is speech coding? Explain need of speech coding. Explain how LPC can be used for speech coding.	**07**
	(b)	What is application of Linear Predictive Coding? Briefly explain difference between different methods of Linear Prediction.	**07**

OR

Q.5	**(a)**	Explain with neat diagram: General discrete ótime model for speech production.	**07**
	(b)	Explain spectral estimation via LPC in detail.	**07**

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