Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– II(New course) • EXAMINATION (Remedial) – WINTER- 2015

Subject Code: 2720504 **Date: 10/12/2015**

Subject Name: Speech Signal Processing

Time:2:30 pm to 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)**	With neat block diagram explain different speech communications applications.	**07**
	(b)	Define : (1) Phonemes (2) Pitch (3) Formants. Classify acoustic phonetics.	**07**
Q.2	**(a)**	What is meant by :1) diphthongs 2) unvoiced fricatives 3) voiced stop 4) affricates Explain how they are produced in vocal apparatus with examples.	**07**
	(b)	Explain following terms with respect to speech processing 1) Short time energy 2) average magnitude function 3) short time zero crossing rate 4) average magnitude difference function	**07**
		OR	
	(b)	Give the detail of various methods of speech recognition.	**07**
Q.3	**(a)**	Explain the Acoustic theory of speech production in detail.	**07**
	(b)	What are the effects of losses in the vocal tract and effects of radiation at the lips?	**07**
		OR	
Q.3	**(a)**	Explain the linear filter interpretation of short time Fourier transform(STFT).	**07**
	(b)	Explain the filter bank summation method of short time synthesis.	**07**
Q.4	**(a)**	What is speech coding? Explain need of speech coding. Explain how LPC can be used for speech coding.	**07**
	(b)	Explain the harmomorphic de convolution of speech using a block diagram showing clearly the subsystem and litter.	**07**
		OR	
Q.4	**(a)**	Explain one mechanism of speech period estimation.	**07**
	(b)	Explain block diagram and related equation implementation of system for hamomophic filtering of speech.	**07**
Q.5	**(a)**	What is application of Linear Predictive Coding? Briefly explain difference between different methods of Linear Prediction.	**07**
	(b)	Explain with neat diagram: General discrete ï time model for speech production.	**07**
		OR	
Q.5	**(a)**	Explain liner prediction and harmonic noise models in speech coding.	**07**
	(b)	Explain difference between complex cepstrum of voiced speech and unvoiced speech.	**07**

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