Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Sem-II Examination July 2010

Subject code: 710406 **Subject Name: Speech Processing**

Date: 07 / 07/ 2010 **Time: 11.00am – 1.30pm**

Total Marks: 60

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Define following terms briefly **06**
1) Spectrogram
2) Formant
3) Pitch period

(b) What is speech coding? What is basic goal of speech coding? Give the classification of speech coding techniques according to bit-rate. **06**

Q.2 **(a)** Explain different physiological systems involved for speech production. **06**

(b) Briefly explain the difference between nasal consonants and fricative consonants in terms of **06**
1) How they are produced physically and
2) Their acoustics characteristics.

OR

(b) Explain the classification of acoustics phonetics in brief. **06**

Q.3 **(a)** Consider an ideal lossless two-tube model for speech production. Assume that terminations at the glottis and lip are completely lossless. For the above conditions obtain system function of the lossless model. **06**

(b) Explain the following: **06**
1) Short-Time Average Energy and Magnitude
2) Short-Time Average Zero-crossing rate
3) Short-Time Autocorrelation function

OR

Q.3 **(a)** Discuss the various area of application for speech processing. **06**

(b) Explain the different time domain techniques for speech analysis. **06**

Q.4 **(a)** Explain the general area of man-machine communication by voice. **06**

(b) Write a short note on voice response systems. **06**

OR

Q.4 **(a)** Draw and explain discrete-time model for speech production. **06**

(b) Write a short note on speech recognition systems. **06**

Q.5 **(a)** What is speech enhancement? State the different speech enhancement techniques and explain any one of them. **06**

(b) Give the basic principle of linear predictive analysis? What is the advantage of LPC coding? Also find out basic LPC parameters. **06**

OR

Q.5 **(a)** Explain the principle of speech synthesis. Also state different synthesis methods and discusses any one of them in detail. **06**

(b) State the different frequency domain coders. Explain sub-band encoder and decoder. **06**

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