

**B.TECH.**

**THEORY EXAMINATION (SEM-VIII) 2016-17**

**SPEECH PROCESSING**

**Time : 3 Hours**

**Max. Marks : 100**

**Note : Be precise in your answer. In case of numerical problem assume data wherever not provided.**

**SECTION A**

**1 Attempt all parts:**

**(10X2=20)**

- a. Why is pitch? Explain.
- b. Explain acoustic phonetics.
- c. Why sampling is required? Explain.
- d. Define channel vocoder.
- e. What do you mean by frequency domain? Explain.
- f. Define correlation function with example.
- g. What do you understand by filter? Explain.
- h. Differentiate between speech and silence.
- i. Define convolution with an example.
- j. What is linear predictive coding? Explain.

**SECTION B**

**2 Attempt any FIVE parts:**

**(10X5=50)**

- a. What do you mean by sampling and quantization as related to speech signal? Discuss it with the help of an example.
- b. Write a note on the digital models for speech signals using example.
- c. Draw the block diagram of a speech processing system and enumerate the applications of speech processing.
- d. Describe the short term pitch detection using block diagram and also discuss its working with an example.
- e. Discuss voiced/unvoiced system model for speech signal detection using block diagram.
- f. What are the various speech parameters? Discuss the relation between these parameters.
- g. Write a note on spectrographic display with suitable block diagram.
- h. Describe Homomorphic speech processing with example.

**SECTION C**

**Attempt any TWO questions:**

**(15X2=30)**

- 3 What is speech synthesis? Explain. Discuss the significance of LPC in speech synthesis system. Derive mathematical expression linear predictor coefficients.
- 4 What is short-time Fourier analysis? Explain the properties of short-time Fourier analysis. Discuss the filter bank interpretation of short-time Fourier analysis and synthesis in detail.
- 5 Write note on the following:
  - a. Autocorrelation method.
  - b. Normalized mean square error.
  - c. Formant estimation.