Printed Pages: 1 Roll No. NEC043

B.TECH. THEORY EXAMINATION (SEM–VIII) 2016-17

Time: 3 Hours Max. Marks: 100

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

SECTION A

SPEECH PROCESSING

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)

- What is speech synthesis? Explain. Discuss the significance of LPC in speech synthesis system. Derive mathematical expression linear predictor coefficients.
- 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.