



Code No. : 5168/M

**FACULTY OF ENGINEERING**  
**B.E. 4/4 (ECE) II Semester (Main) Examination, May/June 2012**  
**SPEECH PROCESSING (Elective – III)**

Time: 3 Hours]

[Max. Marks: 75

**Note:** Answer *all* questions from Part A, Answer *any five* questions from Part B.

**PART – A**

**(25 Marks)**

1. Distinguish between vowels and semi-vowels from the articulatory point of view. 2
2. Briefly differentiate between syllabic and instantaneous adaption. 2
3. Define short-time energy function. 2
4. Draw the block diagram of text-to-speech system. 3
5. Briefly explain CELP coders. 3
6. How is speaker identification different from speaker verification ? 3
7. What is isochronous foot theory ? 2
8. How is covariance method of linear prediction different from the autocorrelation method ? 3
9. Briefly explain the mechanism of speech production. 3
10. What is the first quarter-wave resonant frequency of a vocal tract system. Assume speed of the sound to be  $34 \times 10^3$  cm/sec. 2

**PART – B**

**(50 Marks)**

11. a) Define cepstrum. Explain cepstral analysis in detail. 5
- b) With the help of neat block diagram explain ADPCM. 5
12. Illustrate Gold-Rabiner algorithm for pitch estimation in detail. 10
13. a) What is Articulatory speech synthesis ? 4
- b) Explain linear predictive synthesisers. 6



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14. a) With the help of neat block diagram explain transform coding. 6
- b) List the advantages and disadvantages of sub-band coding over other coding techniques. 4
15. Explain Dynamic Time Warping in detail. 10
16. a) What are Formants ? Explain formant tracking. 6
- b) Give LPC-10 algorithm. 4
17. Write short notes on :
- a) Problems associated with ASR 5
- b) SIFT algorithm. 5