VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
M.E. I Year (ECE) II-Semester (Make Up) Examinations, Sept./Oct.- 2015
(Communication Engineering and Signal Processing)

Speech Signal Processing

Time: 3 hours

Max. Marks: 70

*Note: Answer ALL questions in **Part-A** and any **FIVE** questions from **Part-B***

Part-A (10 X 2=20 Marks)

1. Briefly describe about the resonances of vocal tract & their significance in speech signals.
2. Define Schur algorithm.
3. Explain voiced/unvoiced detection based on autocorrelation function.
4. What are the advantages of Vector quantizer coders?
5. Explain Homomorphic speech processing with a block diagram.
6. Discuss Cepstrum in Homomorphic speech processing.
7. Differentiate HMM and DTW.
8. Discuss Speaker Identification/ Verification Systems.
9. Explain the concept of content based audio retrieval system.
10. Differentiate transform and sub-band coding of audio signals.

Part-B (5 X 10=50 Marks)
(All bits carry equal marks)

11. a) Explain Human speech production system with a neat diagram.
    b) Illustrate the different methods used to compute Linear prediction coefficients, explain any one method with relevant equations.

12. a) Differentiate Time-domain and Frequency-domain coding methods.
    b) Explain Rabiner-Gold Pitch extraction algorithm.

13. a) Explain Audio source separation with examples.
    b) Explain the concept of Time-scale modification using PSOLA algorithm.

14. a) Explain about various challenges associated with ASR.
    b) Explain HMM based Isolated word recognition system.

15. a) Explain Audio processing of non speech and music signals.
    b) Discuss Psychoacoustic models for high quality audio coding.

16. a) Describe the terms Psychoacoustics, Masking, Critical bands as applied in auditory Perception.
    b) Explain Articulatory speech synthesis.

17. Write short notes on any **two** of the following:
    a) Various methods of sound mixture separation.
    b) Limited vocabulary and large vocabulary Speech recognition systems.
    c) Music production in bowed string instrument.

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