Hall Ticket Number:

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Code No. : 22506

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
M.E. (ECE: CBCS) II-Semester Main Examinations, July-2017
(Communication Engineering & Signal Processing)

Audio and Speech Signal Processing

Time: 3 hours   Max. Marks: 70

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

Part-A (10 × 2 = 20 Marks)

1. Describe Hair cell and auditory nerve functions.
2. List the organs responsible for speech.
3. Define the following terms:
   a) Average ZCR   b) Average magnitude
4. How to identify the speech and silence part for a given signal?
5. Define a Formant.
6. Analyze the use of Homomorphic Vocoder.
7. Describe the major hurdles in designing Automatic Speech Recognition system.
8. Discuss are three basic problems associated with HMMs.
9. Expand "MPEG" and describe the applications.
10. Compare MPEG-1, MPEG-2, MPEG-4 and MPEG-7 Audio.

Part-B (5 × 10 = 50 Marks)

11. a) Describe spectrogram. What are their types and explain its significance and applications in speech processing?   [5]

    b) Derive the pair of wave equation in terms of pressure and velocity.   [5]

12. a) Derive Durbin's recursive solution for the autocorrelation equations.   [6]

    b) Describe applications of LPC parameters with examples.   [4]

13. a) Discuss speech enhancement. Explain the spectral subtraction method of speech enhancement technique in detail.   [6]

    b) Analyze wiener filter. Explain the method of speech enhancement using wiener filtering.   [4]

14. a) Draw and Describe Speaker Identification system. Also explain different performance measurement parameters used for speaker recognition.   [6]

    b) List out different features used for speaker recognition system and explain.   [4]

15. a) Describe MPEG-1 Audio compression standard.   [5]

    b) Discuss MPEG-2 Audio compression standard.   [5]

16. a) Design a discrete-time model based on tube concatenation. Give the drawbacks.   [6]

    b) Distinguish between Cholesky decomposition solution and Durbin's recursive solution.   [4]

17. Answer any *two* of the following:
    a) Describe the method of speech enhancement by resynthesis and compare with other methods.   [5]

    b) Compare speaker identification system and speaker verification system.   [5]

    c) Discuss MPEG-4 Audio compression standard.   [5]

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