Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh Semester B.Tech Degree Regular and Supplementary Examination December 2021 (2015 Scheme)

Course Code: EC463

Course Name: SPEECH AND AUDIO SIGNALPROCESSING

Max. Marks: 100   Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks. Marks

1 a) Explain acoustic model of speech production? Discuss the production of voiceless fricative sounds and plosives , voiced fricatives and plosives and nasal sounds (10)

 b) Describe short-term-energy and short-term zero crossing rate of speech signal? (5)

2 a) Define MFCC of speech signal. Explain the step involved in obtaining MFCC coefficients of a speech signal. (10)

 b) Define STFT and why it is used for speech processing (5)

3 a) Explain principle of linear prediction and its application in speech processing? (8)

 b) Explain the basic blocks in a speech recognition system (7)

PART B

Answer any two full questions, each carries 15 marks.

4 a) List various steps involved in language identification (7)

 b) What is the role of speech enhancement technique? Explain any one method of speech enhancement technique with block diagram (8)

5 a) Explain principles of speaker identification & speaker verification and Discuss the constrains faced in identification & verification? (10)

 b) What are the different types of frequency masking? (5)

6 a) Explain the functioning of human ear ?What reason can you give to explain why a low frequency tone is better able to mask a tone of higher frequency than vice versa ? (10)

 b) Explain the critical band structure of auditory filter. (5)

PART C

Answer any two full questions, each carries 20 marks.

7 a) Explain MPEG 2 AAC encoder and decoder with neat block diagrams. (10)

   b) Explain the relation between sampling rate and quality of digital audio?   (5)

   c) Calculate the sampling rate and bandwidth required for CD quality digital audio   (5)

8 a) Explain any one lossless audio coding technique.   (10)

   b) Explain the physical and pshyco–acoustical basis of sound localization.   (10)

9 a) Describe the PEAQ method for analyzing audio quality   (10)

   b) Explain the analysis method using MUSHRA score with the help of block diagram   (10)

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