Name :
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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

07 THRISSUR CLUSTER

THIRD SEMESTER M.TECH. DEGREE EXAMINATION DEC 2017

Electronics and Communication Engineering

Communication Engineering

07EC7231 SPEECH AND AUDIO PROCESSING

Time : 3 hours **Max.Marks: 60**

Answer all six questions. Part 'a' of each question is compulsory.

Answer either part 'b' or part 'c' of each question

Q.no.	Module 1	Marks
1a	Draw and explain the acoustic model of speech production.	**4**
	Answer b or c	
b	"Coarticulation is important in speech processing". Justify this statement.	**5**
c	What is spectrogram? Two speech signals $s_1(t)$ and $s_2(t)$ represent a pure male voice and a pure female voice respectively. How is spectrogram useful to distinguish these speech signals?	**5**

Q.no.	Module 2	Marks
2a	What is the use of windowing in speech analysis?	**4**
	Answer b or c	
b	Define a rectangular window. Why is a rectangular window not preferred in speech processing?	**5**
c	Derive the system response of an AR LPC Model.	**5**

Q.no.	Module 3	Marks
3a	How does the human ear respond to a fricative just after a vowel?	**4**
	Answer b or c	
b	How is the voiced class of obstruents being processed by the ear?	**5**
c	Draw the structure of human ear.	**5**

Q.no.	Module 4	Marks
4a	What are the necessities of coding in speech processing?	**4**
	Answer b or c	
b	An analog sinusoidal signal with V_{pp} = 12V is to be converted into binary code. What is the type of modulation to be used? Explain the steps.	**5**
c	What is meant by critical band? Calculate the start and end frequencies of the 4^{th} bark.	**5**

Q.no.	Module 5	Marks
5a	Define speech enhancement. Illustrate its necessity using a block diagram approach.	**5**
	Answer b or c	
b	Explain Adaptive Noise Cancellation method.	**7**
c	What are the methods of Compression amplification in hearing aids?	**7**

Q.no.	Module 6	Marks
6a	List the difference between ASR and TTS. Name some of the famous ASR algorithms.	**5**
	Answer b or c	
b	Illustrate how the 'endpoint detection' segments speech, using a random example.	**7**
c	How does the variability in speech signals affect human user and a machine?	**7**