(3 Hours) [Total Marks: 80]

N.B: 1. Question No 1 is Compulsory
2. Answer any 3 questions from the remaining questions

Q1	Answer **any four** questions		
	a.	With examples, describe basic discrete signals.	**05**
	b.	What are stops and fricatives? How are they produced?	**05**
	c.	How do we use audio processing for musical applications?	**05**
	d.	What are the different properties of STFT?	**05**
	e.	What is the need for auditory modelling? Discuss any two models with neat diagrams	**05**
	f.	Compare Hamming window with rectangular window.	**05**
Q2	a.	Derive Goertzel algorithm. What is the use of Goertzel algorithm?	**10**
	b.	With neat block diagram, analyze human speech production mechanism	**10**
Q3	a.	Derive the transfer function for uniform lossless tube model. Plot the response.	**10**
	b.	What are adaptive quantizers? Differentiate feed forward adaptation from feed backward adaptation. Support your answer with neat diagrams.	**10**
Q4	a.	Justify the need for direct digital code conversion. Discuss the steps involved in converting LDM to PCM.	**10**
	b.	How do you discriminate speech from silence?	**10**
Q5	a.	Define short time energy and zero crossing rate. How the voiced /unvoiced decision is taken using these parameters?	**10**
	b.	Justify the need for short time analysis in speech processing. Discuss the steps involved in short time autocorrelation calculation. What is the use of short time auto correlation?	**10**
Q6	a.	With necessary equations, implement linear filter interpretation.	**05**
	b.	What do you mean by Filter bank summation method for short time synthesis of speech signals?	**10**
	c.	Explain the working of voice excited LPC.	**05**

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