



**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

MAKEUP EXAMINATION – JAN 2023

Course Code: ECE 306

Course Name: SPEECH SIGNAL PROCESSING

Program : B.TECH

Date: 24 Jan 2023

Time: 1.00 PM to 4.00 PM

Max Marks: 80

Weightage: 40 %

Instructions:

- (i) Read the all questions carefully and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and Non-programmable calculators are permitted.

Part A [Memory Recall Questions]

Answer all the Questions. Each Question carries TWO marks.

(10Qx 2M= 20M)

1. Define Vowels and Nasals. (C.O.No.1) [Knowledge level]
2. There are _____ diphthongs in American English which includes _____ sounds
(C.O. No.1) [Knowledge level]
3. The total Sampling rate of STFT is _____ and Bandwidth B is _____.
(C.O. No. 3) [Knowledge level]
4. Speech sounds are classified into _____ distinct classes according to their mode of excitation, they are _____, _____ and _____ sounds. (C.O. No. 1) [Knowledge level]
5. Write time domain expression for Short time energy and short time average magnitude.
(C.O. No. 2) [Comprehension level]
6. Zero crossing is said to occur if successive samples have _____. The rate at which zero crossings occur is a simple measure of _____ content of a signal.
(C.O. No. 2) [Knowledge level]
7. If time index “n” is fixed then the short time fourier transform $X_n e^{j\omega}$ has the same properties of _____ and if the frequency variable “w” is fixed then $X_n e^{j\omega}$ is _____ interpretation
(C.O. No. 3) [Comprehension level]
8. Define Characteristic system for homomorphic Convolution (C.O. No.4) [Knowledge level]
9. The nasal tract begins at _____ and ends at _____. (C.O. No. 1) [Knowledge level]
10. Synthetic speech is produced by convolving _____ and _____ parameters
(C.O. No. 4) [Knowledge level]

Part B

Answer all the Questions. Each Question carries TEN marks.

(3Qx10M=30M)

11. Explain the concept of Speech Vs silence Discrimination using Energy and Zero Crossings.
(C.O. No.2) [Comprehension level]
12. Write the canonic form for Homomorphic convolution, Characteristic and inverse characteristic system along with its neat block diagram.
(C.O. No.4) [Application level]
13. a. Classify sounds of speech with an example (C.O. No.1) [Comprehension level]
b. With a neat block diagram explain Voice response system (C.O. No.4) [Application level]

Part C

Answer all the Questions. Each Question carries TEN marks.

(3Qx10M=30M)

14. With a neat block diagram explain the isolated digit recognition system(C.O. No.4) [Application level]
15. Give an example for a system which can serve 10 user request with a voice response at the same time with ADPCM encoder and decoder. What are the advantages of using such system.
(C.O. No.4) [Application level]
16. What are the types of phonemes in American English? Specify with one example atleast in each case.
(C.O. No.1) [Comprehension level]