



Name: Roll No.:

Branch: Signature of Invigilator:

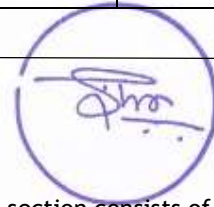
Semester: VIth

Date: 02/05/2022 (MORNING)

Subject with Code: EC357 SPEECH AND AUDIO PROCESSING

Marks Obtained	Section A (30)	Section B (20)	Total Marks (50)

INSTRUCTION TO CANDIDATE



1. The booklet (question paper cum answer sheet) consists of two sections. First section consists of MCQs of 30 marks. Candidates may mark the correct answer in the space provided / may also write answers in the answer sheet provided. The Second section of question paper consists of subjective questions of 20 marks. The candidates may write the answers for these questions in the answer sheets provided with the question booklet.
2. The booklet will be distributed to the candidates before 05 minutes of the examination. Candidates should write their roll no. in each page of the booklet.
3. Place the Student ID card, Registration Slip and No Dues Clearance (if applicable) on your desk. All the entries on the cover page must be filled at the specified space.
4. Carrying or using of mobile phone / any electronic gadgets (except regular scientific calculator)/chits are strictly prohibited inside the examination hall as it comes under the category of unfair means.
5. No candidate should be allowed to enter the examination hall later than 10 minutes after the commencement of examination. Candidates are not allowed to go out of the examination hall/room during the first 30 minutes and last 10 minutes of the examination.
6. Write on both side of the leaf and use pens with same ink.
7. The medium of examination is English. Answer book written in language other than English is liable to be rejected.
8. All attached sheets such as graph papers, drawing sheets etc. should be properly folded to the size of the answer book and tagged with the answer book by the candidate at least 05 minutes before the end of examination.
9. The door of examination hall will be closed 10 minutes before the end of examination. Do not leave the examination hall until the invigilators instruct you to do so.
10. Always maintain the highest level of integrity. Remember you are a BITian.
11. Candidates need to submit the question paper cum answer sheets before leaving the examination hall.

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: B.Tech.
BRANCH: ECE

SEMESTER: VI
SESSION: SP/22

SUBJECT: EC357 SPEECH AND AUDIO PROCESSING

TIME: 2hrs

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 7 questions. Question 1 is of MCQ type of 30Marks.
 2. Candidates may attempt all the questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
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- Q.1
- 1.1 The smallest distinctive unit of sound is [1.5]
(a) phoneme (b) formant (c) excitation (d) nasals
Ans:
- 1.2 The kind of signal is used in speech recognition is [1.5]
(a) Electromagnetic (b) Electric (c) Radar (d) Acoustic
Ans:
- 1.3 The fundamental frequency of the speech is produced at [1.5]
(a) pharynx (b) trachea (c) lungs (d) vocal fold
Ans:
- 1.4 The resonant frequency produced at vocal tract is called as [1.5]
(a) formants (b) pitch (c) timber (d) quotient
Ans:
- 1.5 A speech signal is sampled at a rate of 8 kHz and segmented to 20msec of frames. How many [1.5]
samples are there in each frame:
(a) 100 (b) 160 (c) 200 (d) 120
Ans:
- 1.6 Which is the high, front and unrounded vowel. [1.5]
(a) /o/ (b) /u/ (c) /æ/ (d) /i/
Ans:
- 1.7 Vowel sound is determined primarily by the position of the [1.5]
(a) tongue (b) lip (c) jaw (d) teeth
Ans:
- 1.8 Which is a nasal sound [1.5]
(a) /n/ (b) /s/ (c) /k/ (d) /t/
Ans:
- 1.9 The parameters of speech coding are [1.5]
(a) bitrate (b) quality (c) complexity (d) all of these
Ans:
- 1.10 Waveform coders have --- complexity and --- bitrate. [1.5]
(a) Low & Low (b) Low & Moderate (c) High & Moderate (d) High & High
Ans:
- 1.11 The error signal in liner prediction analysis of speech contains [1.5]
(a) Fundamental frequency (b) formants (c) both (d) None of these
Ans:

- 1.12 The phase change in IIR filter is [1.5]
 (a) Linear (b) Non-linear (c) both (d) None of these
- Ans:
- 1.13 Power spectral estimation is the Fourier transform of autocorrelation function [1.5]
 (a) True (b) False
- Ans:
- 1.14 Auto regressive model contains [1.5]
 (a) zeros (b) poles (c) both (d) none of these
- Ans:
- 1.15 In uniform quantizer, each bit in the codeword contribute approximately--- to the SNR. [1.5]
 (a) 2dB (b) 6dB (c) 8dB (d) 12 dB
- Ans:
- 1.16 In the unvoiced speech, the zero-crossing rate is [1.5]
 (a) Very Low (b) High (c) Low (d) None of these
- Ans:
- 1.17 The reflection coefficients in Linear prediction analysis are spectrally --- sensitive. [1.5]
 (a) High (b) Less (c) None of these
- Ans:
- 1.18 G. 728 speech coding standard uses which coding technique and provides how much bitrate. [1.5]
 (a) PCM & 64 Kbps (b) ADPCM & 16Kbps (c) LDCELP & 16kbps (d) None of these
- Ans:
- 1.19 The analog speech signals convert into digital signal using [1.5]
 (a) sampling (b) Quantization (c) both a & b (d) None of these
- Ans:
- 1.20 The residual error in linear prediction can be modelled as noise sequence of [1.5]
 (a) Gaussian (b) white (c) Raleigh (d) None of these
- Ans:
- Q.2 Explain the source filter theory of speech production. [2]
- Q.3 Define pitch. Explain the method of finding pitch of speech signal using autocorrelation method. [3]
- Q.4 Explain the of linear predictive analysis and autocorrelation method of coefficient estimation. [5]
- Q.5 State quantization in speech and compare the uniform quantizer with logarithmic quantizer. [3]
- Q.6 Describe the Linear prediction encoder and decoder. [4]
- Q.7 Explain the Code Excited Linear Prediction. [3]

::::: 02/05/2022 :::::