

Reg. No. :

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Question Paper Code: UEG78

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Professional Elective

21ADVG78-AI IN SPEECH PROCESSING

(Regulations 2021)

(Common to Mechanical and EEE Engineering branches)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART – A (5 x 20= 100 Marks)

1. (a) What is a language model in the context of speech recognition and explain the difference between an n-gram language model and a neural network-based language model? CO1 -U (20)
Or
(b) Explain the process of converting a speech input into a sequence of states using a finite state machine in a speech recognition model. CO1-U (20)
2. (a) Explain about the types of errors can be modeled by the Noisy Channel Model in spelling correction for speech processing? CO1 -U (20)
Or
(b) Describe in detail about the Hidden Markov Model (HMM) to the problem of part of speech tagging. CO1-U (20)
3. (a) Explain the role do phonetic features play in improving text-to-speech systems. CO1-U (20)
Or
(b) What are the practical applications of transducers in computational systems involving words or strings? CO1-U (20)
4. (a) Apply prosodic analysis to identify stress patterns in a given audio clip. What approach to be used, and how would you validate the accuracy of your analysis? CO2 -App (20)
Or

- (b) Infer the key components for phonetic analysis and how it contributes to tasks such as speech recognition and synthesis. CO2-App (20)
5. (a) Apply a multimodal speech recognition system that combines audio and visual inputs using DTW to improve the recognition accuracy by aligning the audio and visual data. Explain the steps involved, potential challenges. CO2-App (20)
- Or
- (b) Apply Vector Quantization in a speech recognition system operating in noisy environments. Describe VQ algorithm steps to improve robustness against noise and both noise reduction and feature extraction methods. CO2-App (20)