Reg. No. : | | | | | | | | | | | | |

Question Paper Code: UEG78

B.E. DEGREE EXAMINATION, NOV 2025

Professional Elective

21ADVG78 – AI IN SPEECH PROCESSING

(Regulations 2021)

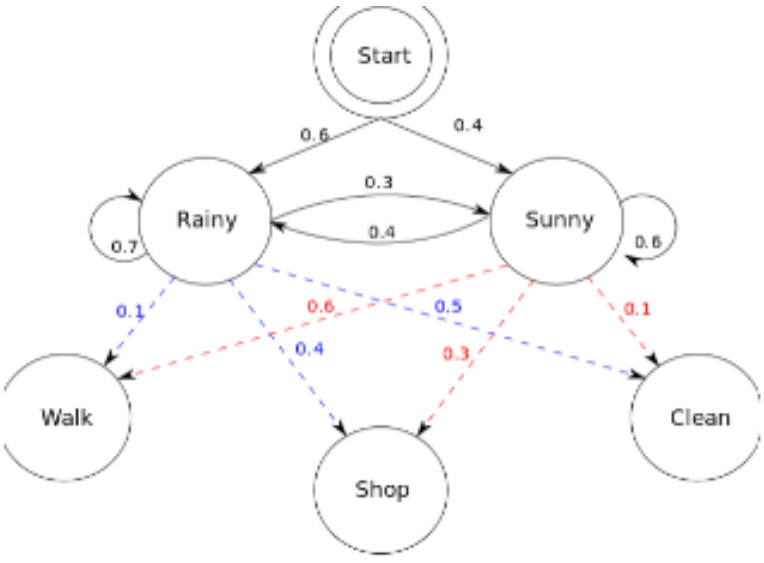
(Common to BME & Mechanical Engineering)

Duration: Three hours | Maximum: 100 Marks

Answer ALL Questions

PART - A (5 x 20 = 100 Marks)

1.	(a)	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)
		Or		
	(b)	Explain in detail the concept of word classes and the role of part of speech tagging in natural language processing.	CO1-U	(20)
2.	(a)	Solve the given Hidden Markov problem example	CO2-App	(20)



Or

	(b)	Given the misspelled word “recieve”, apply the Noisy Channel Model to generate the most likely correction. Show the probability calculations if provided with prior word frequencies.	CO2-App	(20)

3.	(a)	Evaluate the role of phonetic resources (such as IPA, spectrograms, and speech corpora) in improving automatic speech recognition systems.	CO3-Ana	(20)
		Or		
	(b)	Compare articulatory phonetics and acoustic phonetics in analyzing the difference between the sounds /p/ and /b/. Which method gives deeper insights and why?	CO3-Ana	(20)
4.	(a)	Apply the process of text normalization to the sentence: "Dr. Smith lives on 5th Ave. and was born on 12/10/1990." Show how it would be expanded for speech synthesis.	CO2-App	(20)
		Or		
	(b)	Analyze the differences between diphone waveform synthesis and unit selection waveform synthesis in terms of quality, flexibility, and computational cost.	CO2-App	(20)
5.	(a)	Explain the factors that can affect the accuracy of an ASR system in a spoken dialogue system. Discuss how aspects such as accent, background noise, and speech rate can impact recognition performance.	CO1-U	(20)
		Or		
	(b)	Explain Hidden Markov Models facilitate speech recognition tasks and explain the role in modeling phonemes.	CO1-U	(20)