22ELP422N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2025
(Fourth Semester)

Branch – **APPLIED ELECTRONICS**

DIGITAL SIGNAL PROCESSING

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Discrete time signal is derived from continuous time signal by _____ process. a) Addition b) Multiplying c) Sampling d) Addition and multiplication	K1	CO1
	2	Which of the following is an example of physical device which adds the signals? a) Radio b) Audio mixer c) Frequency divider d) Subtractor	K2	CO1
2	3	If R_1 is the region of convergence of x (n) and R_2 is the region of convergence of y(n), then the region of convergence of x (n) convoluted y (n) is _____ a) $R_1 + R_2$ b) $R_1 - R_2$ c) $R_1 \cap R_2$ d) $R_1 \cup R_2$	K1	CO2
	4	If G(f) represents the Fourier Transform of a signal g (t) which is real and odd symmetric in time, then G (f) is _____ a) Complex b) Imaginary c) Real d) Real and non- negative	K2	CO2
3	5	What is the duration of the unit sample response of a digital filter? a) Finite b) Infinite c) Impulse d) Zero	K1	CO3
	6	The roots of the equation H(z) must occur in _____ a) Identical b) Zero c) Reciprocal pairs d) Conjugate pairs	K2	CO3
4	7	In cascade form of realization, how many bits should be used to represent the FIR filter coefficients in order to avoid the quantization effect on filter coefficients? a) 5 to 10 b) 10 to 12 c) 12 to 14 d) 15 to 18	K1	CO4
	8	The error in the filter output that results from rounding or truncating calculations within the filter is called _____ a) coefficient quantization error b) adder overflow limit cycle c) round off noise d) limit cycles	K2	CO4
5	9	DSP algorithms are applied to speech signals for tasks like _____ a) speech recognition b) synthesis c) enhancement d) all of the above	K1	CO5
	10	Vocoders _____ the voice at the receiver. a) Analyse b) Synthesize c) Modulate d) Evaluate	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Classify the various types of discrete time systems.	K4	CO1
		(OR)		
	11.b.	Categorize signals, system and signal processing.		
2	12.a.	Compare the auto and cross correlation and list down the differences.	K4	CO2
		(OR)		
	12.b.	Analyze the operation of Radix 2 DIT with an example and explain.		
3	13.a.	Explain the working of simple FIR digital filters with diagrams.	K5	CO3
		(OR)		
	13.b.	Compare IIR and FIR filters.		
4	14.a.	Explain in detail about Direct form II realization.	K5	CO4
		(OR)		
	14.b.	Evaluate the concept of linear phase realization with an example.		
5	15.a.	Elaborate in detail about the analysis of speech.	K6	CO5
		(OR)		
	15.b.	Discuss in depth about the homomorphic vocoder.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions
ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Inspect and give a report about introduction of DSP processor.	K4	CO1
2	17	Distinguish between circular and linear convolutions.	K4	CO2
3	18	Explain the design of IIR filters from analog filters using bilinear transformation.	K5	CO3
4	19	Prove the importance of transversal structure in realization of FIR digital filters.	K5	CO4
5	20	Discuss in detail about the speech coding and sub band coding.	K6	CO5

Z-Z-Z END