

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-VII (NEW) EXAMINATION – WINTER 2020

**Subject Code:2172409**

**Date:30/01/2021**

**Subject Name:Digital Signal Processing for Power Electronics**

**Time:10:30 AM TO 12:30 PM**

**Total Marks: 56**

**Instructions:**

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
<b>Q.1</b>	(a) Give three examples of continuous time signals.	<b>03</b>
	(b) Explain the use of Fourier transformation in Power Electronics applications.	<b>04</b>
	(c) Explain DT, DTFT, DFT and Z transform in brief.	<b>07</b>
<b>Q.2</b>	(a) Explain Von-Neumann DSP architecture.	<b>03</b>
	(b) Explain Harvard Architecture of DSP.	<b>04</b>
	(c) Explain the concept of pipelining in DSP using suitable example.	<b>07</b>
<b>Q.3</b>	(a) Find the N point DFT of finite duration sequence of length L given as $x(n)=1$ for $0 \leq n \leq L-1 = 0$ otherwise; for $N=L$ .	<b>03</b>
	(b) What is reconstruction of signal? Explain the requirement of signal reconstruction.	<b>04</b>
	(c) Derive the relationship between Z and DFT transform.	<b>07</b>
<b>Q.4</b>	(a) What do you understand by frequency domain sampling?	<b>03</b>
	(b) Explain round-off effect in digital filters.	<b>04</b>
	(c) Derive the relationship between Z and Fourier transform.	<b>07</b>
<b>Q.5</b>	(a) How is scaling useful in DSP?	<b>03</b>
	(b) Explain ROC and list its properties.	<b>04</b>
	(c) Explain DIT FFT algorithm.	<b>07</b>
<b>Q.6</b>	(a) What is quantization effect in computation of DFT?	<b>03</b>
	(b) Explain in brief any two applications of DSP in Power Electronics.	<b>04</b>
	(c) Explain Radix-2 FFT algorithm.	<b>07</b>
<b>Q.7</b>	(a) Draw an example parallel form structure.	<b>03</b>
	(b) Find the mantissa and exponent required respectively to represent '5' in binary floating-point representation.	<b>04</b>
	(c) Discuss cascade realization of FIR system in detail.	<b>07</b>
<b>Q.8</b>	(a) Explain the interconnection of LTI systems in brief.	<b>03</b>
	(b) Sketch the signal represented by $x_1(t) = \delta \cos(t)$	<b>04</b>
	(c) Define: 1) ROC 2) Convolution 3) LTI system 4) Periodicity 5) Aliasing 6) State Space 7) Correlation	<b>07</b>

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