



B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2022

(Regulation 2018)

Fifth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U18EET5005: DIGITAL SIGNAL PROCESSING

COURSE OUTCOMES

CO1: Understand the different types of signals and systems and its applications.

CO2: Apply various methods of transformation techniques and analyze the systems.

CO3: Compute, simulate and analyze the DFT using FFT algorithms.

CO4: Design and realize digital IIR and FIR filters.

CO5: Understand the architecture and programming aspects of DSP processor.

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

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|---|-----|-------------------|
| 1. Draw the block diagram of a digital processing of an analog signal. | CO1 | [K ₂] |
| 2. Define unit sample and unit step signals. | CO1 | [K ₁] |
| 3. Write the equation of unilateral z-transform. | CO2 | [K ₁] |
| 4. List any two properties of ROC. | CO2 | [K ₁] |
| 5. Comment on zero padding. | CO3 | [K ₂] |
| 6. Compare DIF-FFT and DIT- FFT. | CO3 | [K ₂] |
| 7. Write any two differences between bilinear transformation method and IIM method. | CO3 | [K ₂] |
| 8. Write the relation between analog and digital frequencies in bilinear transformation method. | CO3 | [K ₁] |
| 9. Recall any two features of TMS 320F281 processor. | CO5 | [K ₁] |
| 10. Comment on event manager module in TMS 320F281 processor. | CO5 | [K ₂] |

Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

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|--|-----|-------------------|
| 11. a) Check the following system | CO1 | [K ₃] |
| 1. Causal or Non-Causal: $h(n) = (1/2)^n u(n)$, $h(n) = (1/2)^n u(n) + 3^n u(-n-1)$ | 5 | |
| 2. Linear or Non-linear: $h(n) = x(n^2)$, $h(n) = x^2(n)$ | 5 | |
| 3. Stable or not: $h(n) = 2^n u(-n)$, $h(n) = \sin(n\pi/2)$ | 6 | |

12. a) The impulse response of LTI system is $h(n) = \{1,2,1,2\}$. Determine the response of the system to the input signal $x(n) = \{3,2,1,2\}$ using graphical method. 16 CO2 [K₃]
13. a) Determine the $x(n)$ having the z-transform $X(z) = \left\{ \frac{1}{(1-2z^{-1})(1-z^{-1})^2} \right\}$ 8 CO2 [K₃]
- b) Find the z-transform for $x(n) = \cos n\theta u(n)$. 8 CO2 [K₃]
14. a) Compute the 8 point DFT of the given data sequence $x(n)=[1,2,3,4,4,3,2,1]$ using DIT algorithm. 16 CO3 [K₃]
15. a) Obtain the direct form I, canonic form and parallel form realization structures for the system given by the difference equation.
 $y(n) = -0.1y(n-1)+0.72y(n-2)+0.7x(n)-0.252x(n-1)$ 12 CO4 [K₃]
- b) Determine the order of the filter with the following details. $\alpha_p = 1$ dB, $\alpha_s = 1$ dB, $\Omega_p = 200$ rad/sec, $\Omega_s = 600$ rad/sec. 4 CO4
16. a) With neat diagram, enumerate the architecture of TMS 320F281 Processor. 16 C5 [K₂]
