QP CODE: 25020851

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Reg No : ..... Name : .....

# B.Sc DEGREE (CBCS) REGULAR / REAPPEARANCE / MERCY CHANCE EXAMINATIONS, FEBRUARY 2025

## Sixth Semester

B.Sc Electronics Model III

## **CORE COURSE - EL6CRT19 - DIGITAL SIGNAL PROCESSING**

2017 Admission Onwards

5DCD7D29

Time: 3 Hours

Max. Marks : 80

#### Part A

Answer any **ten** questions. Each question carries **2** marks.

- 1. Define unit step function.
- 2. Define analog and digital signals.
- 3. Write the expression for discrete convolution.
- 4. State and prove linearity property of Z Transform.
- 5. Write the difference equation governing the N<sup>th</sup> order IIR system.
- 6. What is zero padding? Why it is needed?
- 7. What is FFT?
- 8. What is the importance of poles in filter design?
- 9. How the poles of butterworth transfer function are located in the s-plane?
- 10. What is meant by VLIW architecture?
- 11. List any four features of TMS320C5x processor.
- 12. List the applications of DSP.

(10×2=20)

### Part B

Answer any **six** questions. Each question carries **5** marks.

13. Prove the commutative property of convolution.

- 14. Determine the Transfer function and impulse response of the system governed by the equation y(n) = 2y(n 1) + x(n).
- 15. Realise the given IIR filter in Direct Form II y(n) 4y(n-1) + 3y(n-2) = 2x(n) + 3x(n-1) + x(n-2).
- 16. Realize the FIR filter governed by the equation y(n) = 5x(n) + 6x(n-1) + x(n-2) in cascade form.
- 17. Explain the procedure for calculating the DFT of a 4 sample sequence using DIT- FFT.
- 18. What are the differences and similarities between DIF and DIT algorithms?
- 19. Sketch and explain the ideal and approximate magnitude response of low pass filter and band pass filter .
- 20. Explain the warping effect on magnitude and phase response of a filter with neat sketches.
- 21. Explain modified harvard architecture for Digital Signal Processors.

(6×5=30)

#### Part C

#### Answer any two questions.

Each question carries **15** marks.

- 22. Define Discrete time system. What are the different types of Discrete Time system? Explain each type with example.
- 23. Explain the different methods for the realization of LTI systems.
- 24. Derive the relation between DFT and Z- Transform. Find the Z Transform of the sequence x(n) = u(n) u(n 8), sampled at six points on the unit circle using the relation between DFT and Z- Transform.
- 25. Explain the functional units of TMS 320 C5x Digital Signal processors with a neat block diagram.

(2×15=30)