

# SATHYABAMA UNIVERSITY

(Established under section 3 of UGC Act, 1956)

Course & Branch: B.E - EEE

Title of the paper: Digital Signal Processing & ITS Application

Semester: V

Max. Marks: 80

Sub.Code: 514502

Time: 3 Hours

Date: 08-11-2008

Session: FN

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## PART – A

(10 x 2 = 20)

Answer All the Questions

1. List the advantages of digital filters.
2. What are the properties of IIR filter?
3. Compare FIR system with an IIR system.
4. Define phase delay and group delay.
5. What are the problems associated with IIR filters?
6. What is meant by limit cycle oscillators?
7. Compare microcontrollers and digital signal processors.
8. Write are special features of TMS320 family.
9. Write the instructions (DSP TMS320LF2407) to ADD and MULTIPLY.
10. List the applications of digital signal processor in Electrical Engineering.

## PART – B

(5 x 12 = 60)

Answer All the Questions

11. Design a digital Butterworth filter to meet the constraint

$$0.8 \leq |H(e^{j\omega})| \leq 1, \quad 0 \leq \omega \leq 0.2\pi$$

$$|H(e^{j\omega})| \leq 0.2 \quad 0.26\pi \leq \omega \leq \pi$$

Using (i) bilinear transformation and (ii) impulse invariant transformation.

(or)

12. Explain the design procedure for designing a Analog Low pass filter using Butterworth approximation.
13. Obtain a general expression for the frequency response of linear phase FIR filters.

(or)

14. (a) Distinguish between the IIR and FIR filters functions, giving an example of each.  
(b) Draw the direct form realization block diagram of an FIR filter.
15. (a) Explain the effects of finite register length in the implementation of a digital filter.  
(b) State and explain with sketch what is quantization noise.

(or)

16. Briefly explain the following errors which occur due to Finite word length effect in digital filters.
  - (a) input quantization error.
  - (b) Coefficient quantization error.

17. (a) Draw the block diagram of the architecture of DSP chip TMS320F2407.  
(b) Explain two typical DSP instructions from its instruction set.

(or)

18. (a) State the peripheral function available in the TMS320F2407 DSP chip.  
(b) Explain the use of the watchdog timer.

19. Draw the architecture of TMS320LF2407 and explain all the functional blocks.

(or)

20. Present the step by step procedure to implement V/f control in a PWM fed inverter induction motor system using TMS320LF2407 processor.