Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 50551

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2024.

Fifth/Sixth Semester

Electronics and Communication Engineering

CEC 337 — DSP ARCHITECTURE AND PROGRAMMING

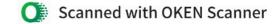(Common to : Electronics and Telecommunication Engineering)

(Regulations 2021)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. How is program execution controlled in a DSP processor?

2. Interpret the role of a bus architecture in a DSP system.

3. What is the primary purpose of a DSP starter kit in the context of TMS320C54xx processors?

4. Outline the key features of the TMS320CS54xx DSP processor architecture.

5. Differentiate between linear and circular addressing modes in TMS320C6x DSP processors.

6. What is the purpose of the instruction set in TMS320C6x processors?

7. What are the key differences between FIR and IIR filters in DSP applications?

8. List the key components of a DSP development system.

9. Mention the primary function of a graphic equalizer in audio systems.

10. List two common audio effects used in music production.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the programmability features of a DSP processor and the steps involved in program execution considering both assembly and high-level languages.

Or

(b) Discuss the data addressing capabilities of a DSP processor and how they enable efficient data manipulation in signal processing applications.

12. (a) Summarize the different addressing modes in the TMS320C54xx DSP processor's assembly language instructions. How do these addressing modes affect memory access and data manipulation?

Or

(b) Explain the interrupt handling mechanism in the TMS320C54xx DSP processor and how it influences the pipeline operation.

13. (a) Explain the concept of assembler directives and linear assembly in TMS320C6x programming. How do these directives affect code development and optimization?

Or

(b) Explain the features and applications of Multichannel Buffered Serial Ports (McBSP₅) in TMS320C6x processors and provide examples of scenarios where they are beneficial.

14. (a) Explain the role of Code Composer Studio (CCS) in DSP application development, including the use of support files and libraries. How do these tools facilitate the development process?

Or

(b) Explain the implementation of the FFT (Fast Fourier Transform) algorithm in TMS320C54xx and TMS320C67xx DSP processors for real-time frequency analysis. Discuss the steps involved and provide examples of use cases.

15. (a) Explain the principles and techniques behind adaptive noise cancellation in audio systems. Discuss the applications of this technology and its effectiveness in reducing background noise.

Or

(b) Explain the Linear Predictive Coding (LPC) technique for speech analysis and synthesis Discuss its role in speech processing applications and its advantages.

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16. (a) Discuss the on-chip peripherals available in the TMS320C54xx DSP processor and their functions. How do these peripherals enhance the processor's capabilities for various applications?

Or

(b) Describe the concept of automatic speaker recognition, including the methods and algorithms used. Discuss the practical applications and challenges of speaker recognition technology.

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