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**Question Paper Code : 10714**

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2026.

Fifth/Sixth/Seventh Semester

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Electronics and Communication Engineering

CEC337 – DSP ARCHITECTURE AND PROGRAMMING

(Common to Electronics and Telecommunication Engineering)

(Regulations 2021)

Time : Three hours

Maximum : 100 mark.

Answer ALL questions.

PART A — ( $10 \times 2 = 20$  marks)

1. List any two basic architectural features of DSP processors.
2. Define the Address Generation Unit and its role in DSP processors.
3. What is RPTB instruction?
4. What is pipeline operation in TMS320C54xx DSP processor?
5. State any two distinguishing features of the TMS320C6x DSP processor.
6. Differentiate between linear and circular addressing modes in TMS320C6x.
7. Give the significance of Code Composer Studio.
8. Write the formula for FFT computational complexity.
9. List two applications of adaptive noise cancellation.
10. What is DTMF signal detection used for?

PART B — ( $5 \times 13 = 65$  marks)

11. (a) Illustrate the operation of the Braun multiplier with a logic diagram.

Or

- (b) (i) Write short notes on On-chip memory. (6)
- (ii) With an example, explain circular addressing mode. (7)

12. (i) (i) Discuss briefly about absolute and accumulator addressing.  
 (ii) Draw the architecture of the TMS320C54xx processor.

Or

- (b) Describe in short about the on-chip peripherals of TMS320C54xx.
13. (a) Describe the instruction set of TMS320C6x processor with examples.
- Or
- (b) Explain the importance of various blocks of TMS320C67xx DSP Starter Kit.
14. (a) Discuss the implementation of FIR filters using TMS320C54xx DS processor and challenges in implementing.
- Or
- (b) Illustrate the procedure involved in implementing FFT for real-time frequency analysis.
15. (a) Explain the process of voice scrambling using filtering and modulation.
- Or
- (b) Discuss the principle and implementation of automatic speaker recognition using DSP processors.

PART C — (1 × 15 = 15 marks)

16. (a) Assuming the current contents of AR2 = 150h, what will be its content after each of the following TMS320C54xx addressing modes is used? Assume that the contents of AR1 = 10 h.
- (i) \*AR2+
  - (ii) \*AR2-
  - (iii) \*+AR2(08h)
  - (iv) \*AR2(AR1)
  - (v) \*-AR2
  - (vi) \*AR2+0
  - (vii) \*+AR2(-0Ah).

Or

- (b) Design a DSP-based voice recognition system for a smart home device. Explain the architecture, choice of processor, algorithms, and challenges in implementation.