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**Question Paper Code : 82452**

M.E. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

*Elective*

VLSI Design

VL 9265/VL 965/10244 CME 22 – DSP PROCESSOR ARCHITECTURE AND PROGRAMMING

(Common to M.E. Communication Systems and M.E. Digital Signal Processing)

(Regulation 2009/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the function of MAC unit?
2. What is pipelining?
3. Give any two examples for data transfer instructions in TMS 320C5X processor.
4. A barrel shifter is to be designed with 16 inputs for left shifts from 0 to 15 bits. How many control lines are required to implement the shifter?
5. What are the different data formats in TMS 320C3X processor.
6. Give two examples for instructions that use indirect addressing mode.
7. What is Host interface Port?
8. What is the use of IDLE n instruction in ADSP21XX?
9. Brief about accumulator addressing in TMS 320C54XX.
10. What is the function of  $\overline{\text{HOLD}}$  and  $\overline{\text{HLDA}}$  pins in TMS320C54XX?

PART B — (5 × 16 = 80 marks)

11. (a) Explain the Bus architecture and memory with suitable diagrams in DSP systems. (16)

Or

- (b) (i) Explain the special addressing modes in programmable DSP. (8)  
(ii) Explain in detail about VLIW architecture. (8)

12. (a) Draw the block diagram of a DSP starter kit and explain in detail. (16)

Or

- (b) (i) Write an assembly language program for TMS320C5X processor to find average of N numbers. (8)  
(ii) Explain in detail about the pipeline structure of TMS320C5X. (8)

13. (a) (i) Explain in detail about the addressing modes of TMS320C3X. (8)  
(ii) Write an assembly language program of TMS320C3X to find convolution of two sequences. (8)

Or

- (b) Design a FIR filter that allows frequencies between 0 and  $\frac{\pi}{2}$ , and write an assembly language program to implement it using TMS320C3X. (16)

14. (a) Explain in detail about interrupt structure in ADSP-21XX processor. (16)

Or

- (b) Explain in detail about different types of instructions used in ADSP-21XX processor. (16)

15. (a) (i) Explain on chip peripherals interface connected to TMS320C54. (8)  
(ii) Write short note on the following

- (1) Program controller (4)  
(2) On-chip memory. (4)

Or

- (b) (i) Write a TMS320C54 assembly language program to compute the sum of three product terms given by the equation  $y(n)=h_0x(n)+h_1x(n-1)+h_2x(n-2)$  where  $x(n)$ ,  $x(n-1)$  and  $x(n-2)$  are data samples stored at three successive data memory locations. (10)  
(ii) Compare the features of different DSP processors. (6)