

Code: R7420406

**R7****B.Tech IV Year II Semester (R07) Advanced Supplementary Examinations June 2012****DSP PROCESSORS AND ARCHITECTURES**

(Common to ECE and EIE)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions

All questions carry equal marks

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- 1 (a) Explain about digital signal processing system.  
(b) For the FIR filter  $Y(n) = (x(n)+x(n-1)+x(n-2))/3$ , determine the  
(i) System function. (ii) Magnitude response function.  
(iii) Phase response function. (iv) Impulse response.
- 2 (a) Show that the dynamic range of a signal increases by 6 db for each additional bit used to represent its value.  
(b) Compute the dynamic range and percentage resolution for a block floating point format with a 4 bit exponent used in a 16 bit fixed point processor.
- 3 (a) What distinguishes a digital signal processor from a general purpose micro processor with regard to basic capabilities?  
(b) 4 x 4 Broun multiplier.
- 4 (a) Distinguish between maskable and non-maskable, software and hardware and hardware interrupts.  
(b) Explain the concept of pipelining and how pipeline depth is measured. Explain various stages in pipeline structure.
- 5 (a) Write a 54XX program to compute the equation  $y=ax^1+bx^2+cx^3$ .  
(b) Explain the differences between the internal and external modes of clocking TMS320C54XX processors. How do you vary the clock frequency in each case?
- 6 (a) Write a program to implement FIR filters.  
(b) Determine the value of each of the following 16 bit numbers represented using the given Q-notation (i) 4400 h as a Q0 number (ii) 4400 h as a Q 15 number (iii) 4400 h as a Q7 number
- 7 (a) Determine the following for a 128-point FFT computation:  
(i) number of stages (ii) number of butterflies ion each stage (iii) number of butterflies needed for the entire computation (iv) number of butterflies that need no twiddle factors  
(v) number of butterflies that require real twiddle factors (vi) number of butterflies that require complex twiddle factors.  
(b) Draw the butterfly diagram for 2, 4 and 8 points using DIFFFT.
- 8 (a) How does DMA help in increasing the processing speed of a DSP processor?  
(b) Explain CODEC interface circuit and McBSP programming.

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