

Code No: C3703

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech I - Semester Examinations, March/April -2011

DSP PROCESSOR ARCHITECTURE AND APPLICATIONS

(CONTROL ENGINEERING)

Time: 3hours

Max. Marks: 60

**Answer any five questions**  
**All questions carry equal marks**

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- 1) a) Write a MATLAB Program for FIR filter implementation using different Windowing techniques. Use switch function for the appropriate selection of the technique.  
 b) Derive an expression for interpolation by a factor I, a process of sampling rate conversion both in time and frequency domain. [6+6]
- 2) a) Prove that the dynamic range of a signal increases by 6dB for each additional bit used to represent its value.  
 b) Compute the dynamic range and the percentage resolution for a block floating point with a 4-bit exponent used in a 16-bit fixed point processor. [6+6]
- 3) a) Explain the function of a MAC unit and also explain how overflow and underflow conditions can be avoided in MAC operations.  
 b) Explain how bit reversed addressing is achieved in TMS320C54XX Processor [6+6]
- 4) a) In TMS320C54XX Processor, how many address buses and data buses are present? What are their names? Explain about the complete bus architecture with data widths.  
 b) Explain how DSP Processors support the external Interface with all the features. [6+6]
- 5) a) Write an assembly Language program to multiply two Q15 numbers.  
 b) What values are represented by the 16-bit fixed point number  $N = 4000h$  in Q15 and Q7 notation. [6+6]
- 6) a) Implement an 8-Point FFT on TMS320C54XX Processor.  
 b) Explain the Implementation of a FIR Filter with the help of different steps and flowchart diagram on TMS320C54XX Processor. [6+6]
- 7) a) Explain how DMA concept is useful in DSP Processors.  
 b) Explain the mode control interface signal timing for the PCM3002 CODEC [6+6]
- 8) a) Explain about Multichannel Buffered Serial Port in DSPs.  
 b) Explain how the signal Spectrum is computed. [6+6]

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