B. Tech.
(SEM. VIII) EXAMINATION. 2006-07
ARCHITECTURE & APPLICATIONS OF
DIGITAL SIGNAL PROCESSORS

Time : 3 Hours] [Total Marks : 100

Note : Attempt all questions. All questions carry equal marks. Assume missing data, if any, suitably. Notations have their usual meaning unless otherwise stated.

1 Attempt any four parts of the following : 5×4

(a) Explain how a DSP processor is different from a normal processor. What is the GPP threat?

(b) Enumerate various applications of DSP processors.

(c) A digital system is defined by the I/O equation y (n) = x (n) + a y (n – 1). Complete the step that follows to : 
   (i) sketch the signal-flow diagram of the system  
   (ii) find the frequency response of the system.

(d) Write the evaluation of DSP processors. Write its limitations also.

(e) Explain pipelining and parallelism used in DSP processors.

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(f) Explain the following issues involved in DSP processors design:
   (i) speed   (ii) cost and
   (iii) accuracy.

2 Attempt any **four** parts of the following: 5×4
(a) Explain the quantization error in brief.
(b) Write the merits / demerits among TMS, Motorola and ADSP DSP processors.
(c) Discuss the various architectural options for making a DSP processors.
(d) Explain the addressing modes of DSP processors.
(e) Compare the analog signal processing with that of digital signal processing.
(f) Explain the working principles of fixed point and floating point DSP processors. Write their merits / demerits.

3 Attempt any **two** parts of the following: 10×2
(a) Explain the following:
   (i) Barrel shifter
   (ii) MAC.
(b) Describe in detail the architecture of any typical DSP processor and state the main feature of this processor.
(c) How will you interface a A/D chip and a D/A chip with DSP processor?

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4  Attempt any **two** parts of the following :  10×2

(a)  Draw the architecture of DSP processor ADSP 2100. Explain the function of each block. What are the special features of this architecture?

(b)  Draw the architecture of ADSP 21000 family of DSP processor and explain the function of each block.

(c)  How many types of instructions are available in ADSP 2100 DSP processor? Explain each in brief.

5  Write short notes on any **two** of the following :  10×2

(a)  FIR/IIR filters

(b)  Linear predictive coding

(c)  Software development tools of DSP processors.

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