APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST SEMESTER M.Tech DEGREE EXAMINATION DECEMBER 2015   **D**

ELECTRONICS AND COMMUNICATION ENGINEERING
Signal Processing

01EC6307 DSP SYSTEM DESIGN

Time 3 Hours   Max.Marks:60

Answer any two questions from each module

MODULE I & MODULE II

1. a) Give the basic computational blocks of a DSP Processor.   (4)
 b) Explain with example IEEE 754 Single and double precision floating point
representation format.   (5)

2. a) Given an RNS system (32/31/15/7) .
Represent the number x=168 & y=-23 in this RNS
Compute x+y , x-y , x*y.   (5)
 b) What is the limitation of Distributed Arithmetic?   (4)

3. Compute Sin 30 & Cos 30 to a precision of 5 bits by CORDIC Algorithm. (9)

MODULE III & MODULE IV

4. What is pipelining? Explain the performance issues in pipelining.   (9)
5. Show how the following code would look on MIPS. Compute the clock cycles
required per element processing.   (9)
i) Unscheduled
ii) scheduled
iii) loop-unrolled but unscheduled and
iv) loop-unrolled and scheduled   including any stalls or idle clock cycles, ignoring
delayed branches.

```
LOOP:    L.D        F0, 0(R1);
         ADD.D      F4,F0,F2
         S.D        F4,0(R1)
         DADDUI     R1,R1#-8
         BNE        R1,R2,LOOP
```

6. a) With a diagram, explain Tomasulo's algorithm for Dynamic Scheduling. (5)
    b) Differentiate hazard and dependency   (4)

MODULE V & MODULE VI

7. a) Assume a computer where the CPI is 1.0 when all memory accesses hit in the cache. The only data accesses are loads and stores, and these total 50% of the instructions. If the miss penalty is 25 clock cycles and the miss rate is 2%, how much faster would the computer if all instructions were cache hits?   (6)

b) Give any three optimization techniques to improve cache performance   (6)

8. a) Explain the limitations of ILP .   (6)
   b) Explain the features of code composer studio of TMS 320C 6713 Processor (6)

9) a) Explain the memory architecture of TMS 320C 6713 Processor.   (6)
   b) Write an assembly language program to implement
      $\sum_{n=1}^{10} a(n).x(n)$ (6)