Karunya University
(Karunya Institute of Technology and Sciences)
(Declared as Deemed to be University under Sec.3 of the UGC Act, 1965)

End Semester Examinations - 2015-16 Even Semester - May 2016

14EC3027 VLSIDigital Signal Processing

Set B

Time : 3 hrs
Total Marks: 100

1. a) Design a 3 level parallel 3 tap FIR filter and draw its structure. Derive the iteration period for this structure. (15 Marks)

   b) Write short notes on adaptive filters. (5 Marks)

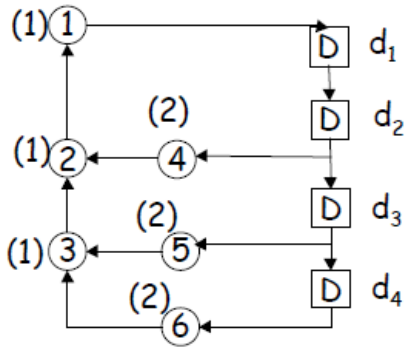
OR

2. a) Write the algorithm to convert a DFG with multiple input and output samples to a single rate DFG. (10 Marks)

   b) prove that when a system is pipelined by a factor M, its power also reduces by the factor β^2 (10 Marks)

   NOTE : 0<β<1

3. Mention the steps involved finding the iteration bound of a given DFG using Minimum Cycle Mean algorithm. Find the iteration bound of figure given below.



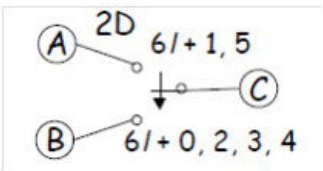
OR

4. a) Design and implement 2 parallel FIR filters using algorithmic strength reduction transformation. (12 Marks)

   b) Write the DCT and Inverse DCT algorithms in form of equations for any given sequence. (8 Marks)

5. Write the algorithm for unfolding.

   Unfold the following DFG by a factor 3 and also discuss the properties of unfolding.



OR

6. *Selection of proper Scheduling vectors enables the design and implementation of desired systolic array structure.* Support the above statement with an example and mention the steps involved in the design.

7. Consider a 2*3 linear convolution and construct an efficient realization using Winograd algorithm with m(p) = p(p-1)(p^2 +1).

OR

8. a) Write short notes on scaling operation and discuss how SNR is affected by scaling. (5 Marks)

   b) Derive a 2*2 convolution algorithm using the Cook Toom algorithm and compare the results with conventional

polynomial multiplication. (15 Marks)

9. Assume that the multipliers a,b,c and d must multiply a common multiplicand *x.* Determine the number of shifts and addtions requires to implement a* x ,b*x, c* x and d*x given the set of multiplier values.a = 93, b = 59, c = 55, d = 73.

   Apply MCM iterative matching algorithm to the multiplier set and determine the number of shifts and additions required after applying the algorithm.

Wishing you All the Best
