C BASED VLSI DESIGN: Question Bank

1. What are the steps involved in HLS?
2. For the 2nd order differential equation solver given below –
   Diffeq: (x, dx, u, a, clock, y)
   input: x, dx, u, a, clock;
   output: y
   while(x < a)
   u1 = u-(3*x*u*dx)-(3*y*dx);
   y1 = y+(u*dx);
   x1 = x+dx;
   x = x1, y = y1, u = u1;
   end, Perform Preprocessing and obtain the Data Dependency Graph
3. For Question No 2 perform Register allocation and Binding
4. What are the scheduling possibilities for Question No 2?
5. List the problems related to Scheduling.
6. Brief on –
   - **Loop fusion**
   - **Loop inversion**
   - **Loop interchange**
   - **Loop-invariant code motion**
   - **Loop nest optimization**
   - **Loop unrolling**
   - **Loop splitting**
   - **Loop unswitching**
   - **Software pipelining**
   - **loop tiling**
7. Brief on (i) Constant Propagation & (ii) Variable Propagation.
8. Brief on Tree Height Reduction.
9. List the unsupported C constructs in Hardware Efficient C Coding.
10. Brief on the two important steps involved in verifying the design.
11. You have only one Dual port RAM of 2K size 32bits width, execute the below code using one dual port RAM of 2K size 32bits width.
    int A1[1000] , A2[500] ;
    for (i = 1 to 1000)
    {
    A1[i] = value1;
    if (i<500)
    A2[i] = value2;
    }
12. Brief on Array Partitioning.

13. Brief on Force-Directed Scheduling with an example. Also, mention the two types of Force.
14. Why is Logic Locking/Obfuscation needed? Brief on Logic Obfuscation.
15. f = abc + abd + bcd, Find all the kernels for the function f.
16. List the various methods of logic transformations in MultiLevel Optimization
17. List the steps involved in Algebraic Method (MultiLevel Optimization)
18. What is the need for Multilevel Logic Optimization
19. What are the different forms to represent a Boolean function?
20. Brief on the Methods involved in Two-Level Logic Optimizations.