**EX/T/421A**

**Bachelor of Computer Science and Engineering 4th Year Examination – 2020**
**Subject: VLSI Systems**

**Full Marks: 50**

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1. (a) What is Moore's Law? Why and how was it modified in 1975? What is the impact of Moore's law on the development of VLSI?
   (b) What is verification in vlsi design? At which stage is it done?
   (c) What is semiconductor?

   [5+3+2]

2. (a) What are the problems of bipolar junction transistor?
   (b) In static condition, the current through CMOS is zero. Then how is power lost in CMOS IC?
   (c) What is λ–based design rule. What is its advantage?
   (d) Why is silicon used in fabrication? What is the role of silicon dioxide in fabrication?

   [2+2+3+3]

3. (a) What is the advantage of single complex cell design? Implement the Boolean function $f = ab + bc$ using single complex cell designs in four different ways
   (consider that for any input, its complement is available).
   (b) Draw the colored stick diagram for implementing $f = ab + bc$ using CMOS.

   [7+3]

4. (a) Obtain the rectangular dual of the following adjacency graph of nine nodes of Fig. 1. Is it sliceable?
   (b) Draw the horizon dependency graph of the floooplan shown in Fig.2 . How do this graph help to determine the width of the chip?

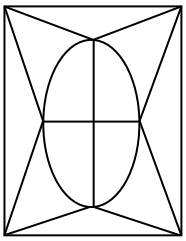

Fig.1

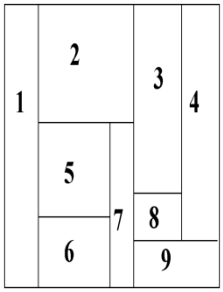


Fig.2

[6+4]

5. (a) Apply Kernighan-Lin heuristic to obtain the partitioning for Fig.3. Show each step.

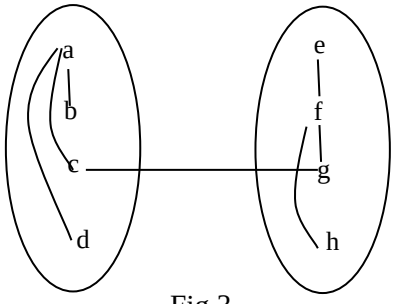


Fig.3

   (b) Apply Fiduccia-Mattheyses Algorithm for the above example.

   [6+4]