ST. XAVIER'S COLLEGE
KOLKATA
(AUTONOMOUS)

3rd SEMESTER EXAMINATION
DECEMBER 2021
M. Sc. COMPUTER SCIENCE

CMSM4323

VLSI DESIGN

Monday, December 13, 2021
12:00 NOON to 3:00 PM
3 hours
Full Marks : **80**

PLEASE READ THESE INSTRUCTIONS BEFORE YOU START WRITING:

1. Of the questions attempted, the answers to only the first required number of questions (as stipulated in the question paper) will be evaluated. **So please do not attempt extra questions**.
2. Use fountain pen or ball-point pen of **blue** or **black ink**.
3. Write **(not type)** the answers legibly, in your own words as far as practicable, on A4 size sheets.
4. Save the pages of your answer sheets (hand-written document) to a single PDF file and name the document accurately i.e. **Roll No_Paper Code.PDF** (example: 147_PH36141T).
5. Send the PDF file to the following email address **(in REPLY mode) within 30 minutes of the completion of the examination**: **CMSM43232122@SXCCAL.EDU**
6. The scanned answer scripts should have **enough clarity** to enable evaluation.
7. On top of each page **handwrite** the following information: **Name, Roll Number, Paper Code , Date,** and **Page Number**
8. No multiple submissions would be allowed.

The marks are given in **brackets [ ]** at the end of each question or part question.

The question paper consists of **2** pages.

Of the questions attempted, the answers to only the first required number of questions (as stipulated in the question paper) will be evaluated.
So, PLEASE DO NOT ATTEMPT EXTRA QUESTIONS.

Answer **QUESTION 1** and **ANY FOUR** from the rest.

1. Answer **ANY FOUR** **[4×5=20]**
   a) Explain the reasons for the increasing use of VLSI circuits.
   b) What are different chip design styles available? Compare any two.
   c) Explain the term Doglegging with an example.
   d) Explain the procedure of Lithography.
   e) Write down the working principle of pMOS.
   f) Write a short note on the following terms: Ad-hoc testing, Built-in-self-test

2. a) Differentiate between Detailed and Global routing. **[5]**
   b) Write a Line-Probe algorithm for global routing. State the advantages and disadvantages of this algorithm. **[6+4]**

3. a) What do you mean by Corner Stitching data structure used for IC layout editing? Write an algorithm using corner stitching to find a point. **[2+6]**
   b) Discuss the factors considered for the floorplanning and pin assignment. **[7]**

4. Explain the following terms:
   i) Slicing Floor-plan and slicing tree with an example,
   ii) Net and Netlist,
   iii) Capacity of a channel,
   iv) rat's nest **[(3+3)+3+3+3]**

5. a) State any group migration algorithm used for circuit partitioning. Discuss in detail. **[5+5]**
   b) Sketch a schematic of the given function [(AB)+(CD)]' using CMOS. Give explanation. **[5]**

6. a) What is the concept of partitioning? Write down the parameters that are present for increasing the efficiency of partitioning. **[3+4]**
   b) Discuss the factors considered for the floorplanning and pin assignment. **[8]**

7. a) State the Net-Ordering algorithm for detailed routing. **[5]**
   b) Write the VHDL implementation of XNOR gate. Comment on each statement. **[10]**

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