

**International Islamic University Chittagong**  
**Department of Electrical and Electronic Engineering**

<b>Final Examination Autumn-2020</b>	Program: B.Sc. Engg. (EEE)
Course Code: <b>EEE-4753</b>	Course Title: <b>VLSI-I</b>
Time: <b>5 hours</b> (Writing - <b>4 hours 30 minutes</b> + <b>30 minutes</b> submission time)	Full Marks: <b>50</b> (Written 30 + Viva/Viva-Quiz-20)

[Answer **each of the** questions from the followings; Figures in the right margin indicate full marks. **Answer script must be submitted through online method within 5 hours from starting time. Also, write down the Q. Set on the front page of your answer script]**

**Q. Set-1**

<b>1(a).</b>	“Doping levels and doping uniformity in selected areas of the surface of the wafer can be accurately controlled by ion implantation process”- justify it with explaining the operation of an ion implantation arrangement.	<b>CO1</b>	<b>E</b>	<b>03</b>
<b>1(b).</b>	Explain PMOS fabrication steps in detail with your own words. Also, differentiate between the process of NMOS and PMOS fabrication.	<b>CO1</b>	<b>U</b>	<b>03</b>
<b>2(a).</b>	Design and explain the layout diagram of a 6-input CMOS AND gate using lambda-based design rules.	<b>CO3</b>	<b>C</b>	<b>05</b>
<b>2(b).</b>	Differentiate between scalable design rules and micron rules.	<b>CO1</b>	<b>U</b>	<b>01</b>
<b>3.</b>	Design a static CMOS gate computing - <div style="margin-left: 40px;">(i) <math>Y = (A+B)(C+D+EF+G+HI+J)(K+L+M)</math></div> <div style="margin-left: 40px;">(ii) <math>Y = (ABC+D+E+FG+H+IJ)(K+L+M)</math></div>	<b>CO2</b>	<b>C</b>	<b>06</b>
<b>4(a).</b>	Make a comparative analysis among Full-custom design, Semi- custom design and Programmable Logic Array.	<b>CO1</b>	<b>E</b>	<b>02</b>
<b>4(b).</b>	What is stick diagram? Design a 4-input NOR gate using stick diagram with explaining the stick diagram rules.	<b>CO3</b>	<b>R, C</b>	<b>04</b>
<b>5(a).</b>	Compare the system verilog and VHDL code that illustrate the behavioral descriptions of a module computing a random Boolean function, $Y = \overline{A}BC + A\overline{B}C + ABC\overline{C} + \overline{A}B\overline{C}$	<b>CO3</b>	<b>E</b>	<b>04</b>
<b>5(b).</b>	Implement the following expression using PAL. $Y = \overline{A}BC + A\overline{B}C + ABC\overline{C} + \overline{A}B\overline{C}$	<b>CO3</b>	<b>C</b>	<b>02</b>
<b>6.</b>	Viva/Viva-Quiz: The time of viva/viva-quiz will be declared in google classroom.	<b>CO1</b>	<b>U</b>	<b>20</b>