M.Sc. 3rd Semester Examination, 2024

ELECTRONICS

(*VLSE-Design and Technology*)

PAPER – ELC-302

Full Marks : 50

Time : 2 hours

Answer **all** questions

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

GROUP – A

Answer any **four** questions : 2 × 4

1. What is a Y-chart ? Draw it. 1 + 1

2. Why do we scale MOS transistor ? 2

3. Draw the drain characteristics of an n-channel MOSFET operated in both enhancement and depletion modes. 1 + 1

4. What do you mean by isotropic and anisotropic etchings ? 1 + 1

5. How is polysilicon deposited ? 2

6. Write down CMOS methodology for digital logic circuits. 2

GROUP – B

Answer any **four** questions : 4 × 4

7. Draw the flow diagram of a typical VLSI design and explain. 2 + 2

8. What are dry and wet oxidations ? Explain dry-wet-dry oxidation cycle. 1 + 1 + 2

9. Explain intrinsic and extrinsic diffusions. 2 + 2

10. What are the problems involved in ion implantation ? How can they be solved ? 2 + 2

11. Mention the features that must be considered for metallization in VLSI. Mention the methods of depositing metal films in VLSI. 2 + 2

12. Draw and explain CMOS inverter gate. 2 + 2

GROUP – C

Answer any **two** questions : 8×2

13. Name the basic processing steps used in the fabrication of VLSI circuits and briefly explain them. 1 + 7

14. What are the different MOSFET capacitances ? Discuss each of them with their origins. 2 + 6

15. What do you mean by threshold voltage in a MOSFET ? Derive an expression for the same. 2 + 6

16. Implement the Boolean expression :

$$Y = \bar{A}\bar{B}C + \bar{A}B\bar{C} + A\bar{B}C + AB\bar{C}$$

using CMOS logic. Explain different steps of the implementation. 5 + 3

[Internal Assessment — 10 Marks]