

B.TECH.

THEORY EXAMINATION (SEM-VI) 2016-17
VLSI DESIGN

Time : 3 Hours**Max. Marks : 100****Note : Be precise in your answer. In case of numerical problem assume data wherever not provided.****SECTION – A**

1. Explain the following: **10 x 2 = 20**

- (a) Write the classification of all CMOS circuit types?
- (b) Define LSI, MSI, VLSI, and ULSI on number of transistor basis?
- (c) Define testing?
- (d) What are the three main domain of design?
- (e) What is body effect?
- (f) What are the AD HOC testable design techniques?
- (g) What are needs for low power VLSI chips?
- (h) Differentiate between static logic circuits and dynamic logic circuits?
- (i) Define interconnection?
- (j) Why scaling has a great importance in VLSI circuits?

SECTION – B

2. Attempt any five of the following questions: **5 x 10 = 50**

- (a) Draw a CMOS inverter and explain its transfer characteristics. How is a CMOS inverter different from a characteristics. How CMOS inverter different from a resistive load inverter?
- (b) Explain read/write operation of SRAM memory cell.
- (c) With a neat sketch of cross section of n-channel depletion type MOS transistor, explain the operation and draw the V-I characteristics of the device?
- (d) What are FPGAs? Discuss the salient features of FPGAs?
- (e) Describe the polysilicon gate self-aligning NMOS fabrication process?
- (f) Explain the issues involved in BIST testing?
- (g) Describe the stick layout design style for CMOS circuit design.?
- (h) Define transconductance and output conductance of MOS transistor. Also find expression for Trans-conductance?

SECTION – C

Attempt any two of the following questions: **2 x 15 = 30**

- 3 What are the different types of faults in logic circuits? How is the logic gates tested for stuck-at-fault.
- 4 Discuss a combined voltage and dimension scaling model. Compare the scaling factors for the following device parameters : Gate area, Gate capacitance, channel resistance, current density and power dissipation for the different scaling models.
- 5 What are the important parameters of good VLSI design ? Enlist the various design techniques and explain fully the cell based design technique.