

Please check whether you have got the right question paper.

- N.B:**
1. Question No. 1 is **compulsory**.
  2. **Attempt any three questions from remaining five questions.**
  3. **Assume suitable data where required.**
  4. **Figures to the right indicate full marks.**

**Q.1 (solve Any 4)**

- a) Compare NMOS & CMOS technology in VLSI design. 05
- b) Implement the following function using Dynamic CMOS logic. 05  

$$Y = A(B + C)$$
- c) Compare Ripple carry adder with CLA. 05
- d) Explain working Principle of flash memory. 05
- e) Explain importance of low power design. 05

- Q.2**
- a) Compare the full scaling & constant voltage scaling models of MOSFETS. Demonstrate the effects of scaling on the area, delay, power consumption and current density of the device 10
  - b) Explain transfer characteristics for NMOS. Inverter showing different regions. What is the effect of variation in W/L ratio? 10

- Q.3**
- a) Draw 1T DRAM cell and explain it's write, read, hold & refresh operation. 10
  - b) Explain scheme for multiplication of  $101 * 010$ . 10

- Q.4**
- a) Explain various techniques of clock generation & clock distribution. 10
  - b) Consider a CMOS Inverter circuit with following parameters. 10

$$V_{DD} = 3.3v.$$

$$V_{T0,n} = 0.6v.$$

$$V_{T0,p} = -0.7v.$$

$$K_n = 200 \mu A/V^2$$

$$K_p = 80 \mu A/V^2$$

Calculate noise Margins of the circuit Consider  $K_R = 2.5$  &  $V_{T0,n} \neq V_{T0,p}$ .

- Q.5**
- a) Draw JK Flip Flop using CMOS and explain the working. 10
  - b) Draw CLA (carry lookahead adder) carry chain using dynamic CMOS logic. 10

- Q.6** Write Short notes on (any three) 20
- a) Latch up in CMOS
  - b) Sense Amplifier.
  - c) Interconnect scaling.
  - d) 4\*4 Barrel Shifter.

Q.P. Code :08431

[Time: 3 Hours]

[ Marks:80]

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- N.B:
1. Question no. 1 is compulsory.
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Q.1 Explain in brief

- |                            |    |
|----------------------------|----|
| a) Integral controller     | 05 |
| b) Temperature transmitter | 05 |
| c) Telemetry               | 05 |
| d) I-P converter           | 05 |

- Q.2
- |   |    |
|---|----|
| a) What are the different types of control valve actuators? Explain the working of any two actuators in detail. | 10 |
| b) What are the different types of hydraulic pumps? Explain with neat sketch                                    | 10 |

- Q.3
- |   |    |
|---|----|
| a) Explain loading of valves in pump application with diagram.  | 10 |
| b) Explain control valve characteristics. An equal percentage valve has maximum flow of $50\text{cm}^3/\text{s}$ and a minimum of $2\text{cm}^3/\text{s}$ . If the full travel is 3cm; find the flow at a 1 cm opening. | 10 |

- Q.4
- |   |    |
|---|----|
| a) Explain in details construction and working of time delay valve.   | 10 |
| b) What are the different applications of a flapper nozzle system? With neat diagram explain the flapper nozzle system and its characteristics. | 10 |

- Q.5
- |   |    |
|---|----|
| a) Explain the need of controller tuning. What are the different methods of controller tuning?            | 10 |
| b) Explain compressed air receiver unit. What are the different control strategies for air receiver unit? | 10 |

- Q.6
- |  |    |
|--|----|
| a) Compare conventional and smart transmitters. Explain the working of DP transmitter. | 10 |
| b) Write short note on:  | 10 |
| i. Data logger   |    |
| ii. Pressure regulation valve.   |    |

TE ELX / SEM-VI / CBSGS / DT. 26/5/2017 Q. P. Code: 10416

**Time: 3 Hours****Marks: 80**

N.B : (1) Question No.1 is compulsory.

(2) Attempt any three questions from remaining questions.

(3) Figures to the right indicate full marks.

Q1(a) Multiply using Booth's algorithm  $(-7) * (3)$ . 5

(b) Explain parallel processing. 5

(c) Write a note on IA-32 register model. 5

(d) Compare Horizontal and Vertical organization. 5

Q2(a) What is cache coherency? Explain various methods to achieve it. 10

(b) Explain microprogramming. Draw and explain microprogrammed control unit. 10

Q3(a) Consider a 4-way set associative Cache Mapping with Cache Block Size=16 bytes

Cache size=8k, Main Memory Size =64k. Design a cache structure and show how the Processor address is interpreted. 10

(b) Why is page replacement algorithm required. Explain how pages are replaced between cache and main memory using replacement policies. 10

Q4 (a) Explain various access methods for I/O devices. 10

(b) Explain how a virtual address is converted into physical address using paging. Also explain Translation Look-aside Buffer. 10

Q5 (a) Explain with examples different addressing modes of IA-32. 10

(b) Write microinstructions for the instruction Add  $R_0, [R_3]$ . 5

(c) Explain in brief about Nanoprogramming. 5

Q6(a) Write a note on Flynn's classification. 10

(b) Explain the Hazards in Pipelining and solutions to overcome them. 10

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Dt - 2/08/20/7

TE/ELX / Sem - VI / CBSGS

Q. P. Code : 13680

**REVISED COURSE**  
( 3 Hours )

[ Total Marks : 80

Lib  
05

**N.B.**

- 1) Question No-1 is Compulsory.
- 2) Attempt any Three (03) Questions from remaining Five (05) Questions.
- 3) Assume suitable data where ever necessary.

**1. Attempt the following Questions (any4)**

- |        |   |    |
|--------|---|----|
| a)     | Draw the Two Transistor Model Of SCR? State all the currents Equations of $I_{C1}$ , $I_{C2}$ & $I_A$   | 5  |
| b)     | Why forced commutation is required in DC to AC converters.  | 5  |
| c)     | Calculate output voltage for a step down chopper with $V_{in}=200$ V and Duty Cycle =0.25   | 5  |
| d)     | What is the Need of freewheeling diode in rectifiers state with example   | 5  |
| e)     | Explain brief why harmonic Neutralization is necessary in output of inverter.   | 5  |
| f)     | Define and explain performance parameter of controlled rectifier  | 5  |
| 2. (a) | What do you mean by Commutation of SCR? State the various methods of commutation of SCR, Explain force method in detail.  | 10 |
| (b)    | What is difference between a cycloconverter and an ac voltage controller, Explain single phase converters with waveforms  | 10 |
| 3. (a) | Explain the Basic Structure & static characteristics of IGBT with creation of inversion layer & conductivity modulation   | 10 |
| (b)    | Draw and Explain Buck-Boost Converter with the help of circuit diagram and waveforms Derive the relation for load voltage.  | 10 |
| 4. (a) | A three phase bridge inverter is operated in $180^\circ$ conduction mode is operating from a 560V DC supply ,Find out the following (I)RMS Value of output line and phase voltage (II)RMS Value of fundamental components of line and phase Voltages                              | 10 |
| (b)    | Explain the Static I-V Characteristics of TRIAC? State Forward and Reverse Characteristics, Compare DIAC- TRIAC.  | 10 |
| 5. (a) | Why the protection of SCR is Necessary? State the various protection of SCR, Explain any one method in detail.  | 10 |
| (b)    | State comparison between control strategies of chopper 1.PWM control 2.Variable Frequency Control 3.Current limit control. A step down chopper feeds a resistive load of 10 ohms from 100V DC supply .Calculate duty cycle required so that power dissipation in load is 100watts | 10 |
| 6.     | <b>Write short note on ( any 4 ) :</b>  | 20 |
| (a)    | Half wave controlled rectifiers with R load with waveforms  |    |
| (b)    | full bridge inverter with waveforms   |    |
| (c)    | Cuk regulators  |    |
| (d)    | Construction & operation of GTO   |    |
| (e)    | Compare IGBT and Power BJT  |    |

