

(3Hours)

[Total Marks:80]

N.B.: (1) Question No. 1 is compulsory.(2) Solve **any three** questions out of remaining **five** questions.

(3) Figures to the right indicate full marks.

(4) Assume suitable data if required.

1. Attempt the following :-

- (a) Explain the need of harmonic neutralization in the output of inverter. **20**
- (b) Discuss the principle of phase control in single phase full wave a.c. voltage controller.
- (c) Explain the importance of Snubber circuit with neat diagram.
- (d) Explain the principle of operation of cyclo converter. Enumerate some of its industrial applications.

2. (a) Explain with neat diagram and waveform the operation of single phase full bridge voltage source inverter. **10**(b) Explain the operation of single phase dual converter with neat diagram and waveforms. **10**3. (a) Explain the working of three phase bridge inverter in 120° conduction mode with circuit diagram and associated waveform. **10**(b) Draw and explain the switching characteristics of SCR during its turn on and turn off processes. **10**4. (a) With the help of neat diagram and associated waveforms discuss the operation of Cuk converter. **10**(b) Explain with neat circuit diagram and waveforms the operation of three phase fully controlled rectifier with R load. **10**5. (a) Explain the operating principle of an IGBT on the basis of : **10**

1. Creation of an inversion layer
2. Conductivity modulation of the drift layer

(b) Explain the need of commutation in thyristor circuits. Enumerate the various commutation techniques used for thyristors. Describe class 'D' commutation with relevant waveforms. **10**6. (a) Explain the various triggering modes of Triac with neat diagram. Also draw its V-I characteristics. **10**(b) Explain the operation of single phase, half controlled bridge converter with RL load. Derive the expression for average load voltage and load current. **10**

Time: 3 hours

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(2) Attempt any three questions from remaining questions.

(3) Figures to the right indicate full marks.

- Q1(a) Draw register structure of IA-32 family 5
- (b) Compare RISC and CISC architectures. 5
- (c) Explain restoring division algorithm and draw its flowchart. 5
- (d) Compare paging and segmentation. 5
- Q2(a) Explain any one hardwired technique of control unit design. 10
- (b) Explain various modes of DMA transfer. 10
- Q3(a) Explain the advantages of pipelining. Explain various types of pipeline hazards and their solutions. 10
- (b) Explain various architectures of cache memory. 10
- Q4 (a) Explain various page replacement policies. 10
- (b) Explain the structure of serial and parallel ports. What are the methods to access it? 10
- Q5 (a) What is virtual memory? Explain how paging is useful in implementing virtual memory. 10
- (b) Explain execution of a complete instruction with details. How are branch instructions executed? 10
- Q6(a) What are different addressing modes of IA-32 family? Explain with examples. 10
- (b) Explain single bus and multiple bus organization. 10

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- Q.1) Explain in brief
- a) Composite controller 5M
 - b) I-P converter 5M
 - c) Pneumatic logic gates 5M
 - d) Electronic type temperature transmitter 5M
- Q.2) a) Explain the installation procedure of control valve. 10M
b) Explain flapper nozzle system. Explain any two applications of flapper nozzle system for industrial use. 10M
- Q.3) a) What are the different types of hydraulic pumps? Explain with neat sketch. 10M
b) What is the necessity of proportional control? Explain proportional controller in detail. 10M
- Q.4) a) Give the classification of compressors. Explain any two rotary compressors with diagram. 10M
b) Draw the control valve characteristics and explain. An equal percentage valve has maximum flow of $40\text{cm}^3/\text{s}$ and a minimum flow of $4\text{cm}^3/\text{s}$. If the full travel is 3 cm, find the flow at 1 cm opening. 10M
- Q.5) a) Draw the diagram of sequence valve and explain it in detail. 10M
b) Draw the block diagram of multichannel data acquisition system and describe the working of it. 10M
- Q.6) a) Explain methods for local pressure control with diagram. 10M
b) What is Transmitter? Give the classification details of transmitters. Draw and Explain a process loop with transmitter. 10M

Duration:3 hrs

Maximum Marks :80

- Note:** 1.Question 1 is compulsory.
2.Solve any three out of remaining .
3.Assume suitable data if necessary
4.Draw proper diagrams

Q.1. Solve any four.

- (a) Explain briefly about transfer characteristics of CMOS inverter. [5]
- (b) Design a 4:1 MUX using NMOS transmission gates. [5]
- (c) Implement two I/P NOR gate using CMOS inverter and Pseudo NMOS Logic. [5]
- (d) Compare Ripple carry adder with Carry Look Ahead adder. [5]
- (e) Compare ROM and RAM. [5]

Q.2 (a) Explain different inverter circuits and compare their performance .What is the benefit of using active load? [10]

(b)Compare the full scaling model with constant voltage scaling model for MOSFETS. Demonstrate clearly the effects of scaling on the device density, speed of the circuit, power consumption and current density of the gates [10]

Q.3 (a)Implement JK FF using Static CMOS. What are other design methods for it? [10]

(b)Explain Read Write operation of 6-T SRAM cell in detail. [10]

Q.4 (a) What is ESD protection? Explain with example. [10]

(b)How multiplication operation is carried out? Explain with example. [10]

Q.5 (a) What is importance of Global and Local clock? Explain different clock distribution schemes? [10]

(b) What is NOR based ROM and NAND based ROM? Hence explain any one decoder. [10]

Q.6 Write short notes on (any three) [20]

- (a) Programming techniques used for EEPROM
- (b) Array Multiplier
- (c) CMOS latch-up and its prevention
- (d) Interconnect scaling and RC delay

Duration: 2 Hours

Marks:-40

Note:

- i. Q1 is compulsory.
- ii. Attempt any three questions from remaining five.
- iii. Each question carries **10** marks.

1. Answer any five.

- a. Write a short note on structured cabling. 2
- b. What is data mining? 2
- c. Differentiate between DBMS and RDBMS. 2
- d. Illustrate the four layered reference model for TCP/IP. 2
- e. Explain any four top security concerns. 2
- f. Explain E-governance framework. 2
- g. Explain CIA triangle in brief. 2

2.

- a. Define OSI layer. 5
- b. Define topology. Explain any 3 common topologies. 5

3.

- a. Explain following IP Addressing Mechanism 5
 - i. IP V4-Address System
 - ii. IPV6 Address system
 - iii. User Datagram Protocol
- b. Write detailed note on SNMP. 5

4. Write a note on following terms related to IT audit. 10

- a. Information Audit.
- b. Audit Schedule.
- c. Audit Plan.
- d. Audit Preparation.
- e. Internal Audit.

5.

- a. Explain the term business process outsourcing (BPO). 5
- b. Write a note on E-Commerce 5

6.

- a. Firewall. 10
- b. RFID systems.
- c. Biometric systems.
- d. IP-CCTV.
- e. End point security.
