QP Code : **6263**

(3 Hours) [Total Marks : 80

N.B. : (1) Question No.1 is compulsory.
(2) Attempt any three out of remaining.
(3) Assume suitable data wherever required.

1. (a) Draw CMOS implementation of D Flip Flop.
   (b) Implement $y = \overline{A + B \cdot C}$ using dynamic CMOS logic.
   (c) Explain latchup in CMOS inverter.
   (d) Define scaling. Explain significance of scaling in VLSI circuits. 20

2. (a) Draw CLA (carry lookahead adder) carry chain using. 10
   (i) Static CMOS logic
   (ii) Dynamic CMOS logic
   (iii) Pseudo NMOS logic
   (b) Draw 1T DRAM cell and explain it's read write and refresh operation. 10

3. (a) Explain clock generation networks and distribution networks used in VLSI 10
   circuits.
   (b) Give and explain CMOS input & output protection circuits. 10

4. (a) Implement 4x4 barrel shifter using transmission gate. Explain various 10
   operation using the same.
   (b) Explain programming techniques used for EEPROM. 10

5. (a) What are the drawbacks of dynamic CMOS logic. Show the modification 10
   in dynamic CMOS logic to over come it's drawback.
   (b) Explain operating regions of CMOS inverter with equations. 10

6. Write short notes on: 20
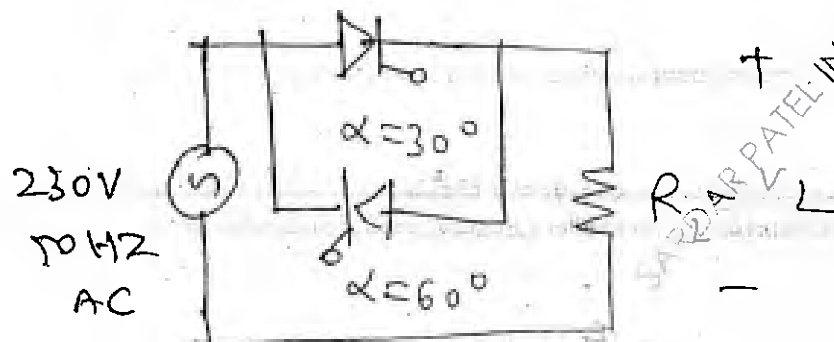   (a) Interconnect scaling
   (b) Cross talk
   (c) Array multiplier

MD-Con. 7328-15.

QP Code : **6390**

(3 Hours) [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**.

1. (a) Draw and explaian gate characteristics of SCR.
  (b) Differentiate between symmetrical IGBT and asymmetrical IGBT   5
  (c) Draw output voltage waveform for the circuit given below. Draw   5
     waveform with scale.

  (d) Explain in brief why harmonic neutrilisation is necessary in the output   5
     of inverter.

2. (a) Explain the working of dual converter with all far avadronts of operation.   10
     Draw circuit diagram and waveforms.
  (b) Draw and explain of working of buck boost converter with the help of   10
     circuit diagram and waveforms. Derive the relation for output voltage.

3. (a) Explain three phase bridge inverter with 120° conduction mode. Draw   10
     circuit diagram and waveforms.
  (b) With the help of circuit diagram and waveforms explain bi-directional   10
     AC control circuit using TRAC & DIAC.

4. (a) Explain semiconverter circuit for the conversion of AC to DC. Draw   10
     waveforms for α = 60°. Explain how it eliminates the need of
     prewheeling diode in case of R-L Load to increase the power factor.
  (b) Explain class D commutation circuit with the help of circuit diagram   10
     and waveforms.

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5. (a) Explain in detail SOA of MOSFET.   5
    (b) Explain multiple pulse width modulation to control the output of inverter   10
         with sine wave as a reference signal.
    (c) What do you understand by cycloconverter. Draw single phase   5
         cycloconverter with circuit diagram and waveforms.

6. (a) Draw and explain three phase fully controlled bridge rectifier with R   10
         load in contineous mode. Derive the relation for output voltage.
    (b) A single phase semiconverter is operated from 120V 50 HZ ac. supply   10
         The load resistance is 10 ohm. If the average output voltage is 25%
         of the maximum possible average output voltage. Determine.
         (i)   Firing angle
         (ii) RMS and average output current
         (iii) RMS and average thysistor current.

Q.P. Code : **6432**

(3 Hours)   [Total Marks : 80

N.B. : (1) Question No.1 is compulsory.
     (2) Answer any three questions from remaining five question.
     (3) All questions carry equal marks.

1. (a) Justify: In impulse invariance transformation method there is many to one 5
mapping of poles from s-plane to z-plane.

   (b) Find the number of computations required to compute 32 point DFT using 5
direct calculation and by using FFT algorithm. Also find the computational
complexity.

   (c) Compare DSP processor and microprocessor. 5

   (d) Compare fixed point arithmetic and floating point arithmetic. 5

2. (a) Find the DFT of the following sequence using Radix 2 DIF FFT algorithm 10
$x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$

   (b) Compute the circular convolution of the sequences using DFT and IDFT 10
approach.

$x_1(n)$ {1, 2, 0}
$x_2(n)$ = {2, 2, 1, 1}

3. (a) Design a Low pass FIR filter with 11 coefficients for the following 10
specifications. Passband frequency edge = 0.25KHz and sampling
frequency = 1 KHz
Use rectangular window in the design.

   (b) Explain frequency sampling method of designing FIR filter. 10

4. (a) Use bilinear transformation to obtain a digital filter of notch frequency 10
75Hz and sampling frequency of 200 Hz, for a given normalized second

order filter having transfer function $H(S) = \dfrac{S^2 + 1}{S^2 + S + 1}$

   (b) Design a Butterworth lowpass filter to meet the following specifications. 10
Passband gain = 0.89
Passband frequency edge = 30Hz
Attenuation = 0.20
Stopband edge = 75Hz

MD-Con. 11284-15.

5. (a) Explain with neat diagram architecture of TMS320C67XX DSP processor.   10
   (b) Explain the applications of the DSP processor in following fields.   10
      (i) Radar signal processing
      (ii) Speech recognition.

6. (a) Draw the quantization noise model for second order system.   10

$$H(z) = \frac{1}{1 - 2r\cos\theta z^{-1} + r^2 z^{-2}}$$

   find the steady state output noise variance.
   (b) Explain the following terms.
      (i)   Dead band   3
      (ii) Limit cycle oscillations   3
      (iii) Addressing modes of TMS320C67XX processor.   4