BE | ETRX | VII (OLD) 31/5/13

MSD.

AGJ 1st half (f+) 37

Con. 9678-13. **(OLD COURSE)** **GS–4978**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Solve any **four** questions out of remaining **six** questions.
(3) Assume **suitable** data wherever **necessary**.

1. (a) Explain MESI protocol used in pentium. **10**
   (b) For 16-bit device, explain data steering logic for pentium. **10**

2. (a) Explain pentium branch prediction logic. **10**
   (b) Explain various special cycles of pentium. **10**

3. (a) Draw and explain pentium Burst bus cycle with one wait state per Quadword. **10**
   (b) Explain code cache structure with split line access. **10**

4. (a) Master A wants to perform 2 transactions with 3 data phases and 1 data phase respectively. Master B wants to perform only one transaction with one data phase. Master A has already requested. Master B of higher priority is now requesting. Explain with neat timing diagram, bus arbitration in PCI. **10**
   (b) Explain Bus Access Lathency in PCI. **10**

5. (a) Explain PCI signals :– **10**
   (i) $\overline{\text{FRAME}}$
   (ii) PAR64
   (iii) $\overline{\text{LOCK}}$
   (iv) $\overline{\text{SBO}}$
   (v) $\overline{\text{TRDY}}$
   (b) In PCI, explain interrupt chaining process. **10**

6. (a) Explain following terms of USB bus – **10**
   (i) Host controller and its functions
   (ii) NAK and ACK token
   (iii) Transaction frame.
   (b) Explain following signals in SCSI. **10**
   ATN, MSG, BSY, SEL

7. (a) Explain protocol for data read/write commands in IDE. **10**
   (b) Explain Refleoted wave switching in PCI bus. **5**
   (c) What is sector interleave and its use. **5**

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Basics of VLSI

P3-upq-Feb.-13KL-165 A4 E

Con. 8873–13. **(OLD COURSE)** **GS–4435**

(3 Hours) **[Total Marks : 100**

N.B. :(1) Question No. **1** is **compulsory**.
(2) Attempt any **four** out of remaining **six** questions.
(3) Assume **suitable** data wherever **necessary**.

1. (a) Design a CMOS logic gate for the function :— **5**

$$f = \overline{A + (B + C)(D + E)}$$

(b) Compare ion implantation and diffusion. **5**
(c) Explain the flat band condition. **5**
(d) Explain channel length modulation of MOSFET. **5**

2. (a) Calculate the zero bias threshold voltage for an NMOS silicon gate transistor that has well doping $N_A = 3 \times 10^{17}\ cm^{-3}$, gate doping $N_D = 10^{20}\ cm^{-3}$ gate oxide thickness $t_{ox} = 200°A$ and $Q_{ss} = 2 \times 10^{10}\ cm^{-2}$. **10**
(b) Explain latchup in CMOS and how to prevent it. **10**

3. Draw a circuit diagram, stick diagram and layout. Using lambda based design rule. **20**

4. (a) What is scaling. Explain constant voltage and constant field scaling in detail with their merits and demertis. **10**
(b) Compare resistive, enhancement, depletion load NMOS and CMOS inverter. **10**

5. (a) Explain the complete fabrication process steps for a CMOS inverter using a n-well process (cross sectional view). **10**
(b) Explain CMOS design rule :— **10**
(i) N. P Well (iii) Poly
(ii) Active (iv) Contact.

6. (a) Differentiate butting and buzzied contact. **10**
(b) Discuss the sizing of the various transistor in a four input NAND gate based on the reference inverter. In reference inverter $\frac{W}{L}$ ratio of the depletion load transistor is 4/1 and the (W/L) of the driver transistor is 2/1. Also draw schematic. **10**

7. Write short notes on :— **20**
(a) Hot electron effect
(b) CZ method of water processing
(c) MOS capacitor.

BE-(ETRX) SEM VII (old) 14/5/13 May 2013
J.S.

15 : 1st half.13-shilpa(i)

Con. 8299-13. **(OLD COURSE)** **GS-4333**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume suitable **data** wherever **required**.
(4) Illustrate answer with **sketches** wherever **required**.
(5) **Figures** to the **right** indicate **full** marks.

1. (a) Choose the most suitable temperature transducer for measuring the temperature in each of the following :– **20**
   (i) Rapidly changing temperature
   (ii) Very small temperature changes about 40°C
   (iii) Very high temperature (> 1500°C)
   (iv) Highly accurate temperature measurement
   (v) Wide temperature variations.
   (b) Describe the operation of a Piezo-electric transducer.
   (c) What are the objectives of a DAS ?
   (d) Define the following terms :–(any **two**)
   (i) repeatability
   (ii) rangeability
   (iii) reproducibility
   (iv) sensitivety.

2. (a) List different flow measuring devices, with a neat sketch, explain the operation of a magnetic flowmeter. What are its advantages and limitations ? **10**
   (b) For the first order instrument, find the step response and ramp response. **10**

3. (a) Explain the principle of Hall effect and how it can be used for measuring angular displacement. **10**
   (b) Explain the operation of resistance strain gauges and hence derive the expression for gauge factor. **10**

4. (a) Discuss the Piezo-electric transducer with proper signal conditioning circuits for vibration measurement. **10**
   (b) Explain briefly :— **10**
   (i) phcto conductive cell
   (ii) photo voltaic cell.

5. (a) What is LVDT ? Explain the use of phase sensitive detector for operation of LVDT. **10**
   (b) Give different types of load cell configuration. Hence explain effect of temperature variations for force measurement. **10**

[TURN OVER

6. (a) Describe the Multichannel Analog Multiplexed Data Acquisition System. State its merit and demerits over Digital Multiplexing Data Acquisition System. **10**

   (b) Explain Absorbtion type and Transmission type of Torque measurement. **10**

7. Write short notes on :– **20**

   (a) Virtual Instrumentation

   (b) Optical Pyrometer

   (c) Data logger.

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21/5/2013

B.E (ETRX) Sem VII (Old)

Filter Theory & Application

Con. 7751–13. **(OLD COURSE)** **GS–4213**

(3 Hours) **[Total Marks : 100**

N.B. (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** of the remaining **six** questions.
(3) Assume **suitable** additional data wherever **necessary**.

1. Answer the following :— **20**
   (a) Compare FIR and IIR filters.
   (b) Compare rectangular and Hamming window with respect to main and side lobe characteristics.
   (c) Explain – 'Ideal filter characteristics are not realisable'.
   (d) Sketch the locations of all zeros of a linear phase FIR filter if the zeros are at $0{\cdot}5\ e^{j\,\pi/3}$ and $0{\cdot}2$.

2. (a) The desired response of a low pass filter is – **15**

$$H_Q\left(e^{jw}\right) = e^{-j3w} \qquad |w| \le \frac{3\pi}{4}$$
$$= 0 \qquad \text{otherwise}$$

   (b) Explain the characteristics of different window functions. **5**

3. (a) Prove that $S = \frac{2}{T}\left[\frac{1 - z^{-1}}{1 + z^{-1}}\right]$ and $w = 2\tan^{-1}(\Omega\, T\, /\, 2)$ in Bilinear transformation. **15**

   Also explain mapping between s-plane and z-plane.
   (b) Write a short note on the intutive method of IIR filter design. **5**

4. (a) Design a Butterworth filter using impulse invariance and Bilinear transformation method for the following specifications. Assume T = 1 sec. **15**

$$0{\cdot}8 \le \left|H\left(e^{jw}\right)\right| \le 1 \quad \text{for} \quad 0 \le |w| \le 0{\cdot}2\pi$$
$$\left|H\left(e^{jw}\right)\right| \le 0{\cdot}2 \quad \text{for} \quad 0{\cdot}6\pi \le |w| \le \pi$$

   (b) Prove that zeros in linear phase FIR filter occur at reciprocal location. **5**

5. (a) Determine the coefficient of a linear phase FIR filter of length M ≠ 15 having symmetric unit impulse reponse and frequency satisfying the following condition — **15**

$$H_v\left(\frac{2\pi k}{15}\right) = \begin{cases} 1 & k = 0, 1, 2, 3 \\ 0{\cdot}4 & k = 4 \\ 0 & k = 5, 6, 7 \end{cases}$$

(b) Write a short note on Gibbs phenomenon. **5**

6. (a) Explain digital filter design technique using Kaiser window. **10**

(b) Explain the impulse invariance technique of designing IIR filters. **10**

7. Write short notes on (any **two**) :— **20**

(a) Analog frequency transformation

(b) Frequency warping effect on Bilineaar transformation

(c) Limit cycle oscillation due to quantisation.

BE | ETRX | VII (OLD) 27/5/13
Digital Communication

Con. 9206–13. **(OLD COURSE)** **GS–4633**

(3 Hours) **[Total Marks : 100**

N.B. (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume **suitable** data if **required** but justify the **same**.

1. Answer the following questions (any **four**) :— **20**
   (a) Define random variables and differentiate between discrete and continuous random variables.
   (b) Show that entropy is maximum when all the messages are equiprobable.
   (c) Differentiate between offset and non-offset QPSK
   (d) Show that duobinary signaling suffers from error propogation while precoded duobinary signaling does not.
   (e) What is matched filter ? How it differs from optimum filter.

2. (a) A discrete memoryless channel has six symbol as shown with probabilities : **10**

Message	M_1	M_2	M_3	M_4	M_5	M_6
Probability	0·3	0·25	0·2	0·12	0·08	0·05

Find the codewords, average no. of bits per message, code efficiency, redundancy and variance using Huffman coding.

(b) For a (7, 4) linear block code (hamming code) :— **10**
   (i) Design Generator Matrix
   (ii) Find the code vectors for the message :—
      (1) 0011
      (2) 1010
   (iii) Write the Parity check matrix.
   (iv) Detect and correct the error of any in the following received code word :
      (1) 0111100
      (2) 0001001

3. (a) A convolutional encoder has following impulse response **12**

$G_1 = \{1, 1, 0\}$, $G_2 = \{1, 1, 1\}$, $G_3 = \{1, 0, 1\}$

   (i) Sketch the encoder
   (ii) Find the code word for the message 11001
   (iii) Draw the code tree, state diagram and trallis diagram for the above codeword.

(b) Differentiate between :— **8**
   (i) Source coding and channel coding
   (ii) Systematic and non-sysmatic cyclic code.

4. (a) Draw the block diagram of BPSK modulator and demodulator and describe the following :— **10**
   (i) Distance between two transmitted symbol and effect of noise
   (ii) Power spectral density and hence bandwidth for BPSK.
   (b) Differentiate between :— **10**
   (i) MPSK and MFSK
   (ii) Duobinary encoding and modified duobinary encoding.

5. (a) Why MSK is called shaped QPSK ? Justify with relevant waveform. **10**
   (b) Prove that for the 16-ary QASK digital modulation techniques, the Euclidian distance is given by – **10**

$$d = 2\sqrt{0{\cdot}4\,Eb}$$

6. (a) Draw the block diagram of DS-SSS transmitter and receiver. Obtain the expression for the signal at the output of each block and show that the original sequence can be recovered at the receiver output. **10**
   (b) What are Pseudo-noise sequence in spread spectrum technology ? Why they are used in spred spectrum modulation ? Draw a neat diagram to generate a P-N sequence (assume any No.) **10**

7. Write short notes on the following (any **four**) :— **20**
   (a) ISI and Eye diagram
   (b) Tapped-delay line equalizer
   (c) Nyquist criteria for distributionles baseband signal
   (d) Central limit theorem
   (e) Lempel ziv coding with suitable example.
