

EXTC Old / M & M - II / TE VI / May 2017

16/05/16



Q.P. Code:13089

(3 Hours)

[Total Marks : 100]

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

(2) Solve any four questions from the remaining six questions.

(3) Figures to the right indicate full marks.

(4) Assume suitable data where necessary.

1. (a) Explain stack operations in PIC 18F microcontroller. 5
- (b) Explain function of BIU in 8086. 5
- (c) Explain Flag register of 8086. 5
- (d) Explain significance of \overline{LOCK} in 8086. 5
2. (a) Explain the following instructions of PIC 18F microcontroller. 10
(i) CLRWDI (ii) BTG PORT C, 4, 0 (iii) ANDLW 0x5F (iv) TBLWT (v) MULWF 0x27, 0
- (b) Draw and explain interfacing of 8086 with 8255. 10
3. (a) With the help of flowchart/algorithm write assembly language program for 8086 to exchange contents of two data block of ten 8 bit numbers.
- (b) Explain the instruction format of PIC 18F microcontroller. 10
4. (a) Explain interrupt structure of 8086. 10
- (b) Explain addressing modes of PIC 18F microcontroller. 10
5. (a) Explain interfacing of 8254 with 8086 in minimum mode. 10
- (b) Design 8086 microprocessor based system using minimum mode with following specifications 10
(i) 8086 microprocessor working at 5 MHz.
(ii) 16 KB EPROM using 8 K x 8 devices.
(iii) 32 KB SRAM using 16 K x 8 devices.
Clearly show memory map with address ranges.

PTO

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6. (a) Explain XLAT instruction of 8086 with example.
(b) Interface two common cathode seven segment display to PIC 18F microcontroller using PORT B and PORT C. Explain interfacing with the help of neat block diagram and suitable diagram.
7. Write note on any four of the following
(a) PIC 18F Pipelining.
(b) Comparative study of salient features of 8086 and 80386.
(c) Bus controller 8288.
(d) PIC 18F STATUS register.
(e) Memory segmentation in 8086.





16/05/17

Q.P.Code: 013273

(3 Hours)

[Total Marks: 80]

N.B.

- 1] Question no.1 is compulsory
- 2] Attempt any three questions out of remaining five questions
- 3] Assumptions made should be clearly stated
- 4] Illustrate answers with sketches wherever required

Q.1

- Attempt any four
- a Prove that entropy of extremely unlikely messages is zero. 5
 - b Compare offset QPSK and non-offset QPSK. 5
 - c State two criteria which a spread-spectrum communication system must satisfy. 5
Justify that the spread-spectrum signals are transparent to the interfering signals, and vice-versa.
 - d Explain the Coherent and non-coherent digital modulation techniques. 5
 - e Prove that syndrome depends on error patterns and not on transmitted code word. 5

Q.2

- a Consider the five source symbols of a discrete memoryless source and their 10 respective probabilities as below.

S_1	S_2	S_3	S_4	S_5
$P(s_i)$	0.4	0.2	0.2	0.1

- i) Create a Huffman Tree for Huffman source coding technique to find the codeword and length of codewords for each source symbol.
 - ii) Determine the average codeword length of the specified discrete memoryless source.
 - iii) Comment on the results obtained.
- b Describe in convolution code, Time domain approach, and Transform-domain approach to determine encoder output. 10

Q.3

- a Justify that the probability of error in matched filter does not depend on the shape of input signal. Derive the relevant expression. 10
- b Explain the working of M-ary PSK Transmitter and receiver and plot spread spectrum and calculate the bandwidth. 10

Q.4

- a Describe coherent detection method of binary FSK signals. Also draw power spectra for BPSK modulated signal. 10
- b In a digital communication system, the bit rate of a bipolar NRZ data sequence is 1 Mbps and carrier frequency of transmission is 100MHz. Determine the symbol rate of transmission and the bandwidth requirement of the communications channel for
 - i) 8-ary PSK system
 - ii) 16-ary PSK system.

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TURN OVER



- Q.5
- a Design a syndrome calculator for a (7, 4) Hamming code, generated by the generator polynomial $g(x)=1+X^2+X^3$, if the transmitted code word $C=(0111001)$ and received word $r=(0110001)$. 10
- b A (7, 4) cyclic code is described by a generator polynomial $g(x) = x^3 + x + 1$ 10
- i) Find out the generator matrix
 - ii) Parity checks matrix.
 - iii) Draw the syndromecalculator and explain how received message is corrected?

- Q.6 Attempt the following (any two).
- a Write short note on Intersymbol interference (ISI) and Eye diagram. 10
- b Explain with the help of block diagrams and waveforms, the following techniques of spread spectrum communication. (a) Direct sequence (b) Frequency hopping. 10
- c What are different decoding methods of convolutional codes? Explain any one in detail. 10



(3 hours)

[Total Marks: 80]

- N.B: 1) Question number 1 is compulsory
 2) Solve any three questions out of the remaining five questions
 3) In all four questions to be attempted.
 4) Figures to the right indicate full marks.

- Q.1 (a) Derive relationship between DFT and DTFT. (05)
 (b) Compare: Impulse invariant technique and bilinear transformation technique. (05)
 (c) Define phase delay and group Delay. (05)
 (d) Explain interpolation process with frequency spectrum. (05)
- Q2) (a) Develop Composite radix DITFFT flow graph for $N=6=2 \times 3$ (10)
 (b) Analog filter Transfer function is $H(s) = \frac{4}{(s+1)(s^2+4s+5)}$ obtain equivalent digital filter transfer function $H(Z)$ using impulse invariant technique by taking $T=0.5$ sec (10)
- Q.3 (a) State two important properties of DFT which are used to derive FFT. How Computational Complexity of DITFFT algorithm is determined from flow graph. Derive necessary formulas. (10)
 (b) $y(n) = 2x(n) + \frac{4}{5}x(n-1) + \frac{3}{2}x(n-2) + \frac{2}{3}x(n-3)$ (10)
 Determine lattice realization.
- Q.4 (a) Using frequency sampling method, design FIR band pass filter for following specifications
 Sampling frequency $=8000\text{Hz}$
 Cut Off frequency $=f_{c_2}=3000\text{Hz}$
 Cut Off frequency $=f_{c_1}=1000\text{Hz}$
 Determine filter coefficients for $N=7$ (10)
- (b) Write short note on: Dual tone multi frequency detection (06)
 (c) What is multi rate DSP? State its applications. (04)
- Q(5) (a) Design a Butterworth digital IIR filter using BLT by taking $T = 0.1$ sec to satisfy following specifications (10)
- $$0.6 \leq |H(e^{j\omega})| \leq 1.0 \quad 0 \leq \omega \leq 0.35\pi$$
- $$|H(e^{j\omega})| \leq 0.1 \quad 0.7\pi \leq \omega \leq \pi$$

Turn Over

(b) $x(n) = \{2, 3, 4, 5\}$ and $y(n) = \{5, 2, 3, 4\}$

(10)

- (i) Find circular convolution using time domain method
- (ii) Find circular convolution using frequency domain method
- (iii) Compute linear convolution. Comment on your results.

Q6) (a) The transfer function for discrete time causal system is given by

(10)

$$H(z) = \frac{1 - z^{-1}}{1 - 0.2z^{-1} - 0.15z^{-2}}$$

- (i) Find difference equation
- (ii) Draw Direct Form-I and Direct form-II realization structure
- (iii) Draw cascade and parallel realization

(b) Explain the effects of coefficients quantization in FIR filters

(05)

(c) State Parseval's theorem. Verify it for $x(n) = \{1, 2, 3, 4\}$

(05)



Q.1 is compulsory.

Attempt any four questions from the remaining six questions.

- Q.1 (a) State Shannon-Hartley theorem and determine maximum channel capacity. (5)
 (b) Draw and explain the working of QPSK transmitter. (5)
 (c) Discuss the concept of syndrome decoding for cyclic codes. (5)
 (d) Discuss the meaning of "matched" for a Matched filter. (5)
- Q.2 (a) Design a cyclic encoder for (8, 5) cyclic code with $G(x) = x^3 + x + 1$. Use this encoder to find the codeword for message 11011 in systematic form. (10)
 (b) Draw the signal space representation of non-orthogonal BFSK system and thus calculate the Euclidean distance between the two symbols. (10)
- Q.3 (a) Consider code rate $1/2$ convolution encoder with $g^{(1)} = (100)$, $g^{(2)} = (101)$. Draw the code tree diagram, state diagram and trellis diagram for this encoder. (10)
 (b) A binary baseband detection system uses the input signal given by

$$s(t) = A, T \leq t \leq 2T, \text{ and } 0, \text{ elsewhere.}$$
 Determine the output of matched filter with this input signal. (10)
- Q.4 (a) Draw and explain transmitter and receiver of MSK modulation system. (10)
 (b) Derive transfer function and impulse response of duobinary encoder with precoder. (10)
- Q.5 (a) The parity check bits of an (8, 4) linear block code are $c_5 = \text{xor}(d_1, d_2, d_4)$, $c_6 = \text{xor}(d_1, d_2, d_3)$, $c_7 = \text{xor}(d_3, d_4, d_5)$, and $c_8 = \text{xor}(d_2, d_3, d_4)$. (i) Determine G and H matrices. (ii) Find the error detecting and correcting capabilities of this code. (10)
 (b) A discrete memoryless source has three symbols with probabilities $p(x_1) = 0.4$, $p(x_2) = 0.4$, $p(x_3) = 0.2$. Calculate the code efficiency for 2nd order extended Huffman code for this source. (10)
- Q.6 (a) Discuss the working of Viterbi decoding of convolution codes. Illustrate the meaning of "survivor paths" with an example. (10)
 (b) Design a syndrome calculator for (7, 4) systematic cyclic code with $G(x) = x^3 + x + 1$. Using this design, calculate the syndrome for $R = 1001101$. (10)
- Q.7 (a) Compare BPSK, QPSK, 16-PSK, Orthogonal BFSK and MSK on the basis of Euclidean distance as well as bandwidth requirements. (10)
 (b) Discuss the concept of eye pattern. (5)
 (c) For linear block codes, prove that if syndrome $S = 0$, it implies that the received codeword is same as transmitted codeword, i.e. $R = C$. (5)



N.B. :

- (a) Question No.1 is compulsory.
- (b) Total 4 questions need to be solved.
- (c) Attempt any three questions from remaining five questions.
- (d) Assume suitable data wherever necessary, justify the same.

- | | | |
|----|--|----|
| 1a | Which is better, ADSL or cable? Justify your answer. | |
| 1b | Explain the persistent strategies of ADSL. | 10 |
| 1c | Explain the fields that are related to fragmentation and reassembly of an IP datagram. | 10 |
| 1d | Discuss Quality of Service (QoS) in terms of flow characteristics. | 10 |
| 2a | Explain the concept of sending an Email using an application layer protocol. | 10 |
| 2b | Explain with diagram the connection establishment and connection termination in TCP using three-way handshaking. | 10 |
| 3a | Explain how RTP achieves time synchronization. | 10 |
| 3b | With an example explain the concept of building a routing table in link state routing. | 10 |
| 4a | What is Peer to Peer (P2P) file sharing? Differentiate between the centralized and decentralized P2P. | 10 |
| 4b | Explain various networking devices. | 10 |
| 5a | Draw the blocks of IPsec. Explain each block. | 10 |
| 5b | Explain in detail OSI 11 Wireless LAN. | 10 |
| 6 | Write a short note on | 10 |
| | (a) Flow control using HF | |
| | (b) WPA | |
| | (c) MPLS | |
| | (d) DNS | |

EXTC / VI | CBSGS | ~~CBS~~ / TE | 2106117



T3126 / T0893 TELEVISION ENGINEERING

Q.P. Code : 11990

[Time: 3 Hours]

[Marks: 80]

- N.B:
1. Please check whether you have got the right question paper.
 2. Questions number 1 is compulsory.
 3. Solve any three questions from the remaining
 3. Illustrate your answer with neat sketches

- Q.1 A Write characteristics of D2 MAC. 4
 B How is charge image created in image orthicon? 4
 C Briefly explain NTSC coder? 4
 D What is the use of front porch and back porch in the composite video signal? 4
 E What is the need of MUSE system? 4
- Q.2 A Why are color difference signals used in colors transmission? Why (G-Y) is not transmitted in color TV. Elaborate? 10
 B Explain working of vidicon camera tube? 10
- Q.3 A A draw and explain working principle of LCD display. Compare and contrast LCD and LED televisions? 10
 B Explain the concept of frequency interleaving. What is the need of interlaced scanning? 10
- Q.4 A Discuss composite video signal with respect to blanking level, pedestal height, active period and black and white level? 10
 B What is the need of multiplexed analog component? Explain MAC signal? 10
- Q.5 A In relation to digital TV discuss? 10
 1) Pixel array
 2) Viewing angle and distance
 3) Digitization
 4) Frame rate and refresh rate
- Q.5 B What is need of chroma sub sampling? Explain types of chroma sub sampling? 10
- Q.6 Write short note on 10
 1. Direct to home television 7
 2. Plasma television 7
 3. Competibility and reverse compatibility? 6

EXTC / OLD / To Sem 8 / TV / 02/05/18

13116/11000 TEL: 02025500000 FAX: 02025500000

(3 hours)

QP CODE: 387034

Total Marks: 100

NOTE:

- (1) Question No 1 is compulsory
- (2) Answer any four out of remaining six questions
- (3) Draw the neat diagrams wherever necessary



Que1 Answer the following-

- a) Explain in brief positive and negative modulation. Justify the choice of modulation for TV transmission. (10M)
- b) Why (G-Y) is not transmitted in colour television system? (10M)
- c) Describe different streaming media protocols. (10M)
- d) Explain compatibility considerations in TV system. (10M)

Que2 a) Draw and explain working of Image Orthicon camera tube explain its advantages. (10M)

b) Compare DeltaGun PFL & Trinitron picture tubes. (10M)

Que3 a) Explain composite video signal with neat diagram. (10M)

b) Explain with neat diagram i) Interlace scanning ii) frequency interleaving. (10M)

Que4 a) Explain chromaticity diagram & define the following terms
i) Hue ii) Saturation iii) Tint. (10M)

b) Explain the various steps involved for generation of chroma signal from R,G,B signal. (10M)

Que5 a) Why Vestigial side band used for picture transmission in TV? Explain in brief VSB correction. (10M)

b) Draw neat diagram and explain working of Digital TV receiver. (10M)

Que6 a) Draw neat block diagram of PAL Encoder and explain in brief phase error cancellation. (10M)

b) Compare NTSC, PAL & SECAM systems in detail. (10M)

Que 7 Write short notes on (any two) (10M)

a) EIA pattern

b) Degaussing in TV receiver

c) Explain CATV & MATV

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Case Details

Date: 15/08/2024

Time: 10:30 AM

Page No. 01

- 1. The complainant has reported that...
- 2. The complainant has reported that...
- 3. The complainant has reported that...
- 4. The complainant has reported that...
- 5. The complainant has reported that...
- 6. The complainant has reported that...
- 7. The complainant has reported that...
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- 11. The complainant has reported that...
- 12. The complainant has reported that...
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- 16. The complainant has reported that...
- 17. The complainant has reported that...
- 18. The complainant has reported that...
- 19. The complainant has reported that...
- 20. The complainant has reported that...

15/08/2024





Q.P.Code:16055

Time: 3 Hours

Marks: 80

Please check whether you have got the right question paper.

- N.B. :
1. Question No. ONE is compulsory
 2. Solve any THREE out of remaining questions
 3. Assume suitable data if required

- Q1. Solve the following 20 Marks
- A. Show the current drawn by CMOS inverter on VTC and justify that CMOS inverter draws maximum current during switching.
 - B. Compare all types of MOSFET based inverters. Clearly draw their circuits and also mention their advantages and limitation/drawbacks.
 - C. Two lines on an interconnect level are separated a spacing of $S=0.60 \mu\text{m}$. Each individual line has $w=0.30 \mu\text{m}$, $T_{ox}=1.0 \mu\text{m}$ and $t=1 \mu\text{m}$. Calculate the coupling capacitance per unit length C_c . Also find the coupling capacitance if the interaction length is $25 \mu\text{m}$.
 - D. In short, explain what is pass transistor logic? With suitable example explain when you will prefer pass transistor logic and when transmission gate.

- Q2. A. Calculate t_{fall} using average current method for CMOS inverter with following parameters: 05 Marks
- Power supply voltage $V_{DD}=3.2 \text{ V}$
 Output load capacitance = 0.1 pF
 $\mu_n C_{ox} = 20 \mu\text{A/V}^2$
 $(W/L)_n = 20$
 $V_{Tn} = 1.0 \text{ V}$



- B. For the function $Z = (A + B)(E + F)(H + I)$
- (i) Domino CMOS circuit
 - (ii) Draw an equivalent circuit for domino circuit by using equivalent transistor sizes with $W/L = 30/2$ (both for NMOS and PMOS) 05 Marks

- C. Design CMOS inverter such that the switching threshold is $V_{th} = 1.2 \text{ V}$, with the following device parameters:
- NMOS: $V_{Tn} = 0.6 \text{ V}$ $\mu_n C_{ox} = 60 \mu\text{A/V}^2$
 PMOS: $V_{Tp} = -0.8 \text{ V}$ $\mu_p C_{ox} = 20 \mu\text{A/V}^2$
 Assume $V_{DD} = 2.4 \text{ V}$ and $\lambda = 0$ 10 Marks



Q.P. Code

- Q3. A. Design the circuit and draw layout for the function $Y = (D + E + F)(B + C + A)$ using CMOS logic. Also find equivalent CMOS inverter circuit for simultaneous switching of all inputs assuming that $(W/L)_p=30$ for all PMOS transistors and $(W/L)_n=10$ for all NMOS transistors. 10 Marks
- B. What are the problems of Domino logic? Also suggest remedy for these problems. 10 Marks
- Q4. A. With neat diagrams explain the read and write operation of 3T1D1RAM cell. 10 Marks
- B. Explain in detail design strategy of 6T1SRAM Cell. Also draw the layout for 6T1SRAM cell. 06 Marks
- C. Draw MOSFET based Master Slave JK Flip Flop. 04 Marks
- Q5. A. Construct the complementary static CMOS full adder. Now propose another full adder which will take less number of transistors as compared to complementary static CMOS full adder. 10 Marks
- B. Draw and explain 4 X 4 multiplier array. 06 Marks
- C. Justify that even if LEVEL 1 MOSFET model already exists there is necessity of LEVEL 2 MOSFET Model. 04 Marks
- Q6. A. With suitable diagrams explain clock stabilization in VLSI Chip. 05 Marks
- B. What is the need of input and output ports in CMOS circuits? Explain with neat schematic bidirectional IO port. 05 Marks
- C. Explain different components of leakage power in CMOS. 05 Marks
- D. Explain DIBL and velocity saturation in short channel device. 05 Marks