T.E / SEM VI (CBSGS) EXTC NOV '16

DIGITAL COMMUNICATION

QP Code : 588301

(3 Hours) **[Total Marks : 80**

N.B.: (1) Question **No 1** is **compulsory.**
(2) Attempt any **three** questions out of remaining **five**.
(3) All questions earry **equal marks.**
(4) Assume Suitable data, if required and state it clearly.

1. Attempt **any Four** :-
   (a) Compare systematic and nonsystematic codes. **5**
   (b) How is spread spectram signal different from normal signal? **5**
   (c) Derive the expression for entropy? When is entropy maximum? **5**
   (d) Explain QPSK is better than PSK? **5**
   (e) Write short note on Optimal filter. **5**

2. (a) A discrete memory less source has an alphabet of five symbol with their probabilities as shown in **10**

Symbol	m_1	m_2	m_3	m_4	m_5
Probability	0.4	0.19	0.16	0.15	0.10

Construct a shanon Fano code for the source and calculate code efficiency, redundancy of the code. Repeat same for the Huffman source coding technique.

   (b) Explain the meaning of equalizer. How is equalization achieved? With the help of neat block diagram explain tapped delay line equalizer. **10**

3. (a) State and explain maximum likelihood decision rule. Explain the function of correlator receiver. **10**
   (b) State and explain the condition for orthogonality of the BFSK signal determine its spectrum and hence bandwidth requirement for transmission of signal. **10**

4. (a) Draw the signal space diagram of 16-QASK and calculate the Euclidean and compare with 16-PSK. **10**

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(b) A generator matrix of (6,3) linear block code is given by **10**

$$G = \begin{bmatrix} 1 & 0 & 0 & 1 & 1 & 1 \\ 0 & 1 & 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 & 1 \end{bmatrix}$$

Determine

1. All the code vectors.
2. "d_{min}" for the above code.
3. Error detection and correction capability.
4. If the received sequence is 101101, determine the message bit sequence.

5. (a) Sketch the encoder and syndrome calculator for the generator polynomial $g(x) = 1 + X^2 + X^3$ and obtain the syndrome for the received codeword 1001011. **10**

(b) Generator vectors for a rate1/3 convolution encoder are : **10**

$g_1 = (101)$, $g_2 = (100)$, $g_3 = (111)$.

Draw Encoder diagram, trellis diagram, using trellis find code vector if message vector is (101100).

6. (a) Draw the block diagram for FH-SS system and explain the working. Differentiate between slow frequency hopping and fast frequency hopping. **10**

(b) Draw the block diagram of QPSK transmitter and receiver and sketch the waveform. **10**

T.E./SEM VI (CBSGS) EXTC NOV '16

DISCRETE TIME SIGNAL PROCESSING

Q.P. Code : 588402

(3 Hours) Total Marks : 80

N. B. : (1) Q.1 is compulsory.

(2) Solve any three questions from remaining 6 questions

(3) Assume suitable data if it is required.

Q.1 (a) Explain phase delay and group delay [20]
(b) What are the advantages of digital filter over analog filter?
(c) State and prove frequency shifting property of DFT
(d) Compare: FIR filter and IIR filter.

Q.2.(a)(i) x(n)={ 1 , 2, 3 ,4} find DFT X(k) [10]

(ii) Using results obtained in part (i) and otherwise find DFT of following sequences

a(n)={ 4,1,2,3} b(n)={2,3,4,1} c(n)={3,4,1,2} d(n)={4,6,4,6}

(b)A digital filter is described by the following differential equation [10]

y(n) =0.9y(n-1)+bx(n)

(i)Determine b such that $|H(0)| = 1$

(ii)Determine the frequency at which $|H(w)|=\frac{1}{\sqrt{2}}$

(iii) Identify the filter type based on the passband.

Q3 (a) If x(n)={ 1 0 2 0 3 0 4 0}, Find X(K) using DIFFFT .Compare computational complexity of above algorithm with DFT. [10]

(b)Explain effect of aliasing in Impulse Invariant Technique

Using this method, determine H(Z) if $H(s) = \frac{3}{(s+2)(s+3)}$ if T =0.1 sec [10]

Q.4 (a) Design a Linear Phase FIR Low Pass filter of Length 7 and cut off frequency 1 rad/sec using Hamming window. [10]

(b) if $x(n) = \{1, 2, 3, 2\}$ and $h(n) = \{5, 6\ 7\ 8\}$ [10]

a) Find circular convolution using time domain method.

b) Find circular convolution using DFT / IDFT method.

c) Find linear convolution using circular convolution.

[TURN OVER]

Q.5(a) Design a digital Butterworth filter for following specifications using Bilinear Transformation Technique [10]

Attenuation in Pass band =1.93 dB, Pass band Edge frequency =0.2π
Attenuation in Stop band =13.97dB Stop band Edge frequency =0.6π

(b) With a suitable block diagram describe sub-band coding of speech signals. [10]

Q.6(a) Determine FIR lattice coefficient of system with transfer function [10]

$$H(Z) = 1+\frac{13}{24}Z^{-1}+\frac{5}{8}Z^{-2}+\frac{1}{3}Z^{-3}$$

(b) Write a note on Frequency Sampling realization of FIR Filter [10]

E/ EXTC / Sem-VI (CBSGS) / Computer Comm. & Telecom Networks / Nov-16

Q.P. Code : 588501

(3 Hours) **[Total Marks : 80**

N.B. : (1) Question **No.1** is **compulsory**.
(2) Solve **any Three** out of remaining questions.
(3) Assume suitable **data** wherever **required**.
(4) **Answers** to the questions should be **grouped** and **written** together.

1. (a) List and describe in brief network connection topologies. **5**
(b) Differentiate the host to host delivery provided by data link layer and network layer. **5**
(c) What is socket address? Explain with example. **5**
(d) Compare between circuit switching and packet switching. **5**

2. (a) Explain DNS protocol with query resolution. **10**
(b) Classify unicast routing protocol. Explain exterior routing protocol in brief. **10**

3. (a) Compare between Ethernet LAN and IEEE 802.11 WLAN. **5**
(b) What are DSL and HFC? Describe in brief. **5**
(c) What is peer-to-peer communication? Describe decentralized peer-to-peer sharing. **10**

4. (a) Draw a neat diagram of TCP Header. **5**
(b) Explain CSMA/CD technique with exponential back-off algorithm. **5**
(c) Describe in details the physical transmission media for computer communication networks. **10**

5. (a) Compare between Distance Vector algorithm and Link state routing algorithm. **10**
(b) Draw a neat diagram of IPv4 Header. Explain each field. **10**

6. Write short notes on **(any Two)** : **20**
(a) Networking Devices
(b) ATM
(c) IPv6

T.E./ Sem VI (CBSGS)/ EXTC Nov/Dec '16

Television Engg

Q.P. Code : 588602

(3 Hours) **[Total Marks : 80**

N.B. : 1. Question no.1 is compulsory.
2. Answer any three question out of remaining questions.
3. Assume suitable data if required.

1 a) An odd number of lines are chosen in television system for scanning. Justify 5

b) What is compatibility in TV transmission? What are the requirements to be met to make the colour system fully compatible? 5

c) Compare Plasma, LED and LCD displays. 5

d) Explain in brief Direct-to-home TV (DTH). 5

2 a) Explain with the help of suitable sketch, how is video signal developed in a vidicon camera tube? How is different from other camera tubes and what are its special applications? 10

b) Draw the block diagram of PAL TV receiver and explain the working and functions of each block. 10

3 a) What is the difference between component video and composite video? Give the main features of CCIR Rec.601 for digital video standards 10

b) Describe new TV standards and compatibility adopted for HDTV. Explain MUSE system and its advantages. 10

4 a) Sketch composite video signal waveform for at least three successive line and indicate: 5

i. Extreme white level
ii. Blanking level
iii. Pedestal height
iv. Sync. pulse level

b) Only (R-Y) and (B-Y) colour difference signals along with luminance signal is chosen for transmission. Justify the statement. Also explain why it is necessary to weight down the chrominance signal. 10

c) What are the technical advantages of using digital technology in television systems? 5

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5. a) What is the need of MAC encoding? Explain the general format of MAC signals for transmitting colour TV signals. 10

b) Explain the following terms of Digital video. 10

i. Digitization

ii. Viewing distance and angle

iii. Aspect ratio

6. a) Explain Interlace Scanning? Calculate the percentage of interlace error when the second field is delayed by 16 microseconds. Retrace time may be assumed to be negligible. 10

b) Write a note on Wide Dimension High Definition Television and its standards. 10

T.E./EXTC/ SEM VI (CBSGS) NOV/DEC'16

OPERATING SYSTEMS

QP Code : 588700

(3 Hours) **[Total Marks : 80**

N.B. : (1) Question **No.1** is **compulsory**.
(2) Attempt **any three** questions out of remaining **five** questions.
(3) Assume suitable data whenever required but justify the same.
(4) Assumption made should be clearly stated.

1. (a) What is an operating system? Explain the different functions of OS. **5**
(b) What is a file directory? Describe methods of organizing directories in an OS. **5**
(c) What are the characteristics of a Real Time OS? **5**
(d) What is system call? Explain any five system calls. **5**

2. (a) Define the meaning of a race condition, use an execution sequence to illustrate your answer. **10**
(b) Explain clearly how UNIX performs file management using I-nodes. **10**

3. (a) Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130 starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all a pending requests, for each of the following disk scheduling algorithms? **10**
(i) FCFS (ii) SSTF (iii) SCAN (iv) LOOK
(b) Explain the different allocation method for file. **10**

4. (a) Consider the following process **10**

Process	Arrival Time	Service Time
P1	0	8
P2	1	4
P3	2	9
P4	3	5

Solve the above given problem with shortest remaining time first by drawing gantt chart and also calculate the average waiting time, turn around time, and throughput.
(b) Explain RAID with different levels. **10**

5. (a) Explain the working of EDF and RMA real time scheduling algorithms. **10**
(b) Describe process management in Linux. **10**

6. (a) What is deadlock? Explain deadlock prevention and avoidance. **10**
(b) What is Semaphore? Give an implementation of bounded buffer producer consumer problem using semaphore. **10**

T.E. / Sem VI (CBSGS) NOV / DEC '16

VLSI DESIGN

Q.P. Code : 588804

Time: 3 Hrs **Marks: 80**

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

Q1. Solve any **Four** of the following **20 Marks**

A. Draw layout for 2 input CMOS NAND gate.

B. How to distribute a clock properly in VLSI chip?

C. Draw layout for minimum size 6T SRAM cell.

D. Explain the issues associated with pass transistor logic with suitable example.

E. Explain constant voltage scaling?

Q2. A. Explain the fabrication process flow for NMOS with proper device cross section and layout. **10 Marks**

B. Explain pseudo NMOS logic with suitable example. **05 Marks**

C. Show realization of MOSFET based one Bit Shift Register,. **05 Marks**

Q3. A. Design the circuit and draw layout for the function $Y = \overline{(D + E + A)(B + C)}$ 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 principle of working of NOR flash. **10 Marks**

B. Draw and explain Barrel shifter. **06 Marks**

C. Draw schematic and layout for 4:2 decoder. **04 Marks**

Q5. A. Explain ripple carry adder in detail. **10 Marks**

B. Explain how to ensure faithful write operation in case of 6T SRAM Cell. **06 Marks**

C. Compare LEVEL 1 and LEVEL 2 MOSFET model. **04 Marks**

Q6. A. With suitable diagrams explain on chip clock generation circuit. **05 Marks**

B. Explain a typical power distribution scheme followed in VLSI chip. **05 Marks**

C. Describe the dynamic power dissipation in CMOS. **05 Marks**

D. Explain Latch-up in CMOS. **05 Marks**
