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   5
        word.

Q.2

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

S_i	S_1	S_2	S_3	S_4	S_5
P(si)	0.4	0.2	0.2	0.1	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   10
        approach to determine encoder output.

Q.3

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

Q.4

    a   Describe coherent detection method of binary FSK signals. Also draw power   10
        spectra for BFSK modulated signal.
    b   In a digital communication system, the bit rate of a bipolar NRZ data sequence is   10
        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.

TURN OVER

8198A654033A5DDD10138F11D56F1F92

Q.5

a   Design a syndrome calculator for a (7, 4) Hamming code, generated by the generator   10
polynomial $g(x)=1+X^2+X^3$, if the transmitted code word C=(0111001) and received
word r = (0110001).

b   A (7, 4) cyclic code is described by a generator polynomial   10

$$g(x) = x^3 + x + 1$$

  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   10
techniques of spread spectrum communication. (a) Direct sequence (b)
Frequency hopping.

c   What are different decoding methods of convolutional codes? Explain any one in   10
detail.

(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 ×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 =8000Hz
   Cut Off frequency =f_{c_2}=3000Hz
   Cut Off frequency =f_{c_1}=1000Hz
   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 = 0.1sec to   (10)
   satisfy following specifications

     $0.6 \le | H(e^{jw})| \le 1.0$ $0 \le w \le 0.35\pi$

     $| H(e^{jw})| \le 0.1$ $0.7\pi \le w \le \pi$

Turn Over

A4F3662AC57F7D38EAD99E583995A3A6

(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)

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

   (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 Parserval's theorem. Verify it for x (n) = {1, 2, 3, 4} (05)

T3126 / T0892   COMPUTER COMMUNICATION AND TELECOM NETWORKS

Q. P. Code : 13294

(3 Hours)   (Total Marks: 80

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.**

1.a	Which is better, ADSL or cable? Justify your answer.	[5]
1.b	Explain the persistent strategies of CSMA.	[5]
1.c	Explain the fields that are related to Fragmentation and Reassembly of an IPv4 datagram.	[5]
1.d	Discuss Quality of Service (QoS) in terms of Flow characteristics.	[5]
2.a	Explain the concept of sending an E-mail using an appropriate Application layer protocol.	[10]
2.b	Explain with diagram the connection establishment and connection termination in TCP using Three- Way Handshaking.	[10]
3.a	Explain how BGP achieves Inter-Autonomous System Routing.	[10]
3.b	With an example explain the concept of building a routing table in Link state Routing.	[10]
4.a	What is Peer to Peer(P2P) File sharing. Differentiate between the centalized and decentralized P2P.	[10]
4.b	Explian various networking devices.	[10]
5.a	Draw the header of IPv6. Explain each field.	[10]
5.b	Explain in detail 802.11 Wireless LAN.	[10]
6	Write a short notes on :	[20]

    (a)   Flow control using TCP
    (b)   Wi Max
    (c)   MPLS
    (d)   DNS

_____

Q.P. Code :11990

[Time: 3 Hours]   [Marks:80]

Please check whether you have got the right question paper.

N.B: 1.   Questions number 1 is compulsory.
             2.   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.   10
        Elaborate?
     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   10
        white level?
     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
      1 Direct to home television   7
      2 Plasma television   7
      3 Compatibility and reverse compatibility?   6

T3126 / T0894   OPERATING SYSTEMS

Q.P. Code :13893

[Time: Three Hours]   [Marks:80]

Please check whether you have got the right question paper.

N.B: 1.   Question.No.1 is compulsory.
           2.   Attempt any 3 questions from the remaining 5 questions.
           3.   Draw neat diagrams wherever necessary.

Q 1	a)	What is operating system? Discuss the role of an OS as a resource manager.	5
	b)	Differentiate between deadlock avoidance and deadlock prevention.	5
	c)	What are the advantages of Linux and Unix over windows?	5
	d)	Explain the performance of demand paging.	5
Q 2	a)	Explain clearly, how Unix performs file management using I-nodes.	10
	b)	What is process? Explain the life cycle of a process using process state transition diagram.	10
Q 3	a)	Explain clearly, paging and segmentation based memory management techniques.	10
	b)	Explain the working of Buddy algorithm in Linux memory management.	10
Q 4	a)	What is semaphore? Give an implementation of bounded buffer producer consumer problem using semaphore.	10
	b)	Explain the different methods of organizing directories in an operating system.	10
Q 5	a)	What is kernel of an operating system? What are the different types of kernels?	10
	b)	Explain the working of EDF and RMA real time scheduling algorithms.	10
Q 6		Write a details note on following	
	a)	Disks Arm Scheduling Algorithms.	10
	b)	Logical and physical address space.	10

(3 Hours) | Total Marks : 80

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

1.　Solve any five :- 　　　　　　　　　　　　　　　　　　　　　　　　　　　20
　　　 (a)　Draw layout of 2 input CMOS NOR gate using lambda (λ) rules.
　　　 (b)　Implement Master Slave D Flip Flop using C²MOS logic style.
　　　 (c)　Explain various sources of power dissipation in CMOS Inverter.
　　　 (d)　Implement NOR based 2:4 decoder.
　　　 (e)　State various short channel effects and explain one of them.
　　　 (f)　Draw static CMOS NAND and NOR gates. Size all transistors in
　　　　　　NAND and NOR gate to provide worst case equal rise and fall delay
　　　　　　for both gates. Assume mobility of electron is two times higer than
　　　　　　that of holes. Magnitude of threshold voltage for all transistor is
　　　　　　same.

2.　(a)　Draw six transistor CMOS SRAM cell. Describe various constraints that　10
　　　　　should be imposed on the devices for guaranteeing safe read and write
　　　　　operation. Derive the equation that would help to size the transistors and
　　　　　also based on derived equations, discuss qualitatively relative sizing of
　　　　　transisters in the cell.

　　　(b)　Implement $Y = \overline{AB + C(D + E)}$ using　　　　　　　　　　　10
　　　　　　 (i)　Static CMOS logic.
　　　　　　 (ii)　Dynamic logic with pull up network.
　　　　　　 (iii)　Dynamic logic with pull down network.
　　　　　　 (iv)　Pesudo NMOS logic.

3.　(a)　With the help of neat cross sections and appropriate masks, give the process　10
　　　　　flow of N-well CMOS technology.
　　　(b)　For CMOS Inverter with following parameters.　　　　　　　　　　10

$$V_{TO,n} = 0.6 \text{ V} \qquad \mu_n C_{ox} = 60 \mu A/V^2, \left(\frac{W}{L}\right)_n = 8$$

$$V_{TO,p} = -0.7 \text{ V} \qquad \mu_p C_{ox} = 20 \mu A/V^2, \left(\frac{W}{L}\right)_p = 12$$

　　　　 Calculate noise margins and the switching threshold of the inverter. The
　　　　 power supply voltage $V_{DD} = 3.3$ V.

JP-Con. 12467-15. 　　　　　　　　　　　　　　　　　　　　　　　[TURN OVER

4. (a) Design clocked CMOS JK latch to implement the truth table shown below.   10

Clk	J	K	Q_{n+1}
1	0	0	Q_n
1	0	1	0
1	1	0	1
1	1	1	$\overline{Q}_n$ (toggle)

(b) Explain 4 × 4 bit array multiplier with the help of necessary hardware for the generation and addition of partial product.   10

5. (a) In two input CMOS NAND gate , $\mu_n C_{ox} = 20\mu A/V^2$, $\mu_p C_{ox} = 10\mu A/V^2$, and all   10

PMOS have $\left(\dfrac{W}{L}\right)_n = 20$, $V_{TO,n} = 1$ V and $V_{TO,p} = -1$ V. If one of the input is

held permenantly at V_{DD} and other is switched from zero volts to V_{DD} with zero rise time for a duration grater than fall delay of NAND gate and then switched back to zero volts with zero fail time, then calculate t_{PHL} and t_{PLH}. Assume $V_{DD} = 5V$ and total load capacitance which is independent of MOSFET sizes is equal to 2PF.

(b) With the help of suitable diagrams explain how clock is generated and stabilized in VLSI chip.   5

(c) Explain with help of neat diagrams importance of power distribution network in VLSI chip.   5

6. Write short notes on any four :-   20
   (a) Flash memory
   b) Carry look ahead adder
   (c) ESD protection circuit
   (d) Barrel Shifter
   (e) Interconnect scalling.

Course: T.E.(SEM VI)(CBSGS)(E&TC)(prog 585 TO 598)

Q.P Code: 5141

Correction:

Q.no.(5)(a) (check following image)

Query Update time: 09/06/2015 03:25 PM

Note: Take printouts and distribute them to concerned students