

M.Tech. II-Semester *Regular Examinations, November 2012*  
*Coding Theory and Techniques*  
(DECS)

Max. Marks: 60

Time: 03 Hours

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Answer any five questions

All Questions carry equal marks (12 Marks each)

1. a. Explain the terms 'Mutual Information' and 'Entropy'. And give their significance 6M
- b. State and prove Source Coding theorem. 6M
2. a. Construct the Huffman code for the following symbols with associated probabilities 6M  
and also calculate the coding efficiency.

Symbol	A	B	C	D	E	F	G
Probability	0.20	0.16	0.14	0.08	0.22	0.07	0.13

- b. Explain the LZ encoding algorithm with an example 6M
3. a. For a (7, 4) linear block code whose generator matrix is shown below. 7M

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

- (i) Obtain the code word for the message signals 1 0 1 1 and 1 0 0 1
- (ii) Calculate the syndrome of the above two code words.
- b. Explain briefly about the error correcting and error detecting capabilities of linear block codes. 5M
4. Based on the Mac Williams identity, the weight enumerated  $B(z)$  of the dual code  $C_D$  is expressed in terms of the weighted enumerator  $A(z)$  of the code  $C$  by  $B(z) = 2^{-K}(1+z)^n A\left(\frac{1-z}{1+z}\right)$ . Derive  $A(z)$  in terms of  $B(z)$  12M
5. a. Explain the syndrome computation and error detection of cyclic codes with neat schematic diagram. 7M
- b. Write short note on 'Error – Trapping Decoding'. 5M
6. a. Consider the non – systematic feed – forward encoder with 12M

$$g^{(0)} = (1 \ 1 \ 0),$$

$$g^{(1)} = (1 \ 0 \ 1),$$

$$g^{(2)} = (1 \ 1 \ 1).$$

- a. Draw the encoder block diagram
- b. Find the time – domain generator matrix  $G$
- c. Find the code word  $v$  corresponding to the information  $u = (1 \ 1 \ 1 \ 0 \ 1)$
7. a. Explain the Fano sequential decoding algorithm with the help of flow chart 7M
- b. Give the applications of Viterbi algorithm. 5M
8. a. Explain about decoding of BCH codes 6M
- b. List out and elaborate the basic properties of Galois Fields 6M

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**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET  
(AUTONOMOUS)**

**M.Tech. II-Semester Regular Examinations, November 2012**

**Detection and Estimation of Signals**

**( DECS )**

**Max. Marks: 60**

**Time: 03 Hours**

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**Answer any five questions**

**All Questions carry equal marks (12 Marks each)**

1. a. Explain the Properties of Fourier Transforms 6M
- b. Find the transfer function  $H(\omega)$ , if an input  $X_n = \begin{cases} \left(\frac{1}{2}\right)^{-n}, n \leq 0 \\ 0, n > 0 \end{cases}$  6M  

$$\text{Produces an output whose transfer function is } Y(\omega) = \frac{2\cos\omega}{2 - \cos\omega - j\sin\omega} \text{ and hence compute } h_0, h_1, h_2, h_3.$$
2. a. Explain the minimum probability of error criterion in detail. 6M
- b. Using Neyman-pearson criterion, show that the decision procedure for declaring a signal of Amplitude of 'A' present in a Gaussian noise background is given by 6M  

$$x_1 > d = \left(\frac{A}{2}\right) + \left(\frac{\sigma_n^2}{A}\right) \ln K \text{ for one sample.}$$
3. a. Obtain a physically matched filter given  $s(t) = \begin{cases} Be^{bt}, t < 0 \\ 0, t > 0 \end{cases}$  6M  
is a signal corrupted by additive white noise.
- b. Write a note on Generalized matched filter. 6M
4. a. Explain about Bayesian approach for detection of signals? 6M
- b. Write a brief note on Generalized likelihood Ratio test? 6M
5. Explain the following
  - a. Estimation concepts & criteria 6M
  - b. Wiener filter for estimation 6M
6. List and explain the various properties of estimators 12M
7. Explain the Linear prediction with an example in detail 12M
8. a. Explain the Kalman filtering procedure for recursive estimation of signal 6M
- b. Explain the Steepest decent algorithm in detail. 6M

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**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET  
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**M.Tech. II-Semester Regular Examinations, November 2012**

**DSP Processors and Architectures**

**( Common to DECS, ES & VLSI Sys D )**

**Max. Marks: 60**

**Time: 03 Hours**

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**Answer any five questions**

**All Questions carry equal marks (12 Marks each)**

1. a. Explain with a block diagram a basic DSP system. What are the advantages and disadvantages of programmable DSP processor? 6M
- b. For the FIR Filter 6M  

$$Y(n) = ((x(n) + x(n-1) + x(n-2))/3)$$

Determine the system function, magnitude response function and phase response function.
2. a. Explain A/D Conversion errors in DSP systems. 6M
- b. Calculate the dynamic range and precision of each of the following number representation formats. 6M
  - i) 24-bit, single-precision, fixed-point format
  - ii) 48-bit, double precision, fixed-point format
  - iii) a floating point format with a 16-bit mantissa and an 8-bit exponent.
3. a. Design an address generation unit for programmable DSP architecture. 6M
- b. Explain the implementation of system level parallelism and pipelining using two MAC units. 6M
4. a. Briefly explain the pipeline programming models in a DSP. 6M
- b. What is an interrupt? Explain the various interrupts in a DSP. 6M
5. a. Explain Data addressing modes of TMS 320C54XX processor. 6M
- b. Explain Interrupts TMS 320C54XX processors. 6M
6. a. Implement the necessary Algorithm for PID controller using DSP processor. 6M
- b. Explain the implementation of interpolation filter on a DSP. 6M
7. a. Implement an FFT algorithm for a bit Reversal Index algorithm. 6M
- b. Explain about overflow and scaling. 6M
8. a. Explain the interfacing of memory to a DSP. 6M
- b. Explain the following I/O peripherals with reference to interfacing 6M
  - (i) interrupts & I/O
  - (ii) McBSP

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**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET  
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**M.Tech. II-Semester *Regular Examinations, November 2012*  
*High Speed Networks*  
( DECS )**

**Max. Marks: 60****Time: 03 Hours**

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**Answer any five full questions****All Questions carry equal marks (12 Marks each)**

1. a. Define "Quality of Service". Explain on what factors quality of service depends. 6M  
b. Mention and explain various network mechanisms. 6M
2. a. Explain about three ISDN standard channel types in detail. 6M  
b. What is the significance of functional groupings (user access) of ISDN? 6M
3. Explain the functions of various layers of ATM reference model in detail 12M
4. a. Draw the flowchart for call establishment using Virtual Paths. 6M  
b. What are the applications of Virtual Channels and Connections? 6M
5. What is the relation between Banyan Network and Crossbar switch? Explain about Banyan switch 12M
6. What is Ben's network? How do you implement bens network. Explain with example. 12M
7. a. What is the difference between UNI and PNNI signaling? 6M  
b. Explain ABR Traffic management. 6M
8. Write short notes on the following 12M
  - a) TCP/IP
  - b) QOS in IP Networks

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**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET  
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**M.Tech. II-Semester Regular Examinations, November 2012**

**Image and Video Processing**

**( DECS)**

**Max. Marks: 60**

**Time: 03 Hours**

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**Answer any five questions**

**All Questions carry equal marks (12 Marks each)**

1. a. Explain relations between the pixels 6M
  - i. Connectivity
  - ii. Neighbors
  - iii. Distancemesure
- b. Explain the Haar Transform and obtain the Haar matrix for  $N=8$ . 6M
2. a. Discuss the following spatial filtering techniques. 6M
  - i. Low pass filtering
  - ii. High boost filtering
- b. Explain why the discrete histogram equalization technique will not, in general, yield a flat histogram 6M
3. a. What is degradation? Explain different Point Spreading Functions(PSF)used in image degradation modeling 6M
- b. Briefly explain the approach of wiener filtering method used for image restoration. 6M
4. a. Explain how to detect edges in image. 6M
- b. Discuss about the region growing based segmentation. 6M
- 5 Explain the following:
  - a. Watershed segmentation 6M
  - b. Gradient filter technique 6M
6. a. With the help of block diagram explain about lossless and lossy compression models. 6M
- b. Explain about image compression standards 6M
7. Discuss in detail about various methods of 2-D motion estimation techniques in video processing. 12M
8. a. Explain in detail about video filtering. 6M
- b. Compare wave form based coding and block based transform coding techniques. 6M

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**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET  
(AUTONOMOUS)****M.Tech. II-Semester Regular Examinations, November 2012*****Microcomputer System Design  
( DECS )*****Time: 03 Hours****Max. Marks: 60**

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**Answer any five questions****All Questions carry equal marks (12 Marks each)**

1. a. Explain the concept of segmentation and what are its advantages? 06M  
b. How does the pipelining in 8086  $\mu$ p increases its throughput? Explain 06M
2. Explain the internal architecture of 80286  $\mu$ p with neat diagram. 12M
3. a. Explain the programming model of 80386  $\mu$ p. 08M  
b. Explain the difference between segmentation and paging. 04M
4. a. What do you mean by paging? Explain the paging mechanism in Pentium  $\mu$ p. 08M  
b. Briefly explain the new instructions added to the Pentium instruction set. 04M
5. a. Explain the internal architecture of Pentium 4 processor. 08M  
b. Write a short notes on Branch prediction logic 04M
6. a. Explain various ways of giving priority to an interrupt system. 06M  
b. How do you transfer bulk data? Explain? 06M
7. a. Write a short note on semaphore operation. 06M  
b. Explain virtual memory concept of 80286  $\mu$ p. 06M
8. Explain the internal structure of the 80X87 arithmetic coprocessor. 12M

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