Hall Ticket Number :										

Code: 4PA321

R-14

M.Tech. II Semester Regular & Supplementary Examinations June 2017

Coding Theory and Techniques

(Digital Electronics and Communication Systems)

Max. Marks: 60 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60 Marks)

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UNIT–I

1. a) A discrete memory less source has five symbols x1,x2,x3,x4,x5, with probability of occurrence of each symbol given by p (x1)=0.4p (x2)=0.19, p (x3)=0.16, p (x4)=0.15,p (x5)=0.1
   (i) Construct a Shannon fan of code & calculate the efficiency of the code. 3M
   (ii) Construct a huffman code & compare the results. 5M

   b) Define mutual information and state and prove any two of its properties. 4M

OR

2. a) Define entropy for a discrete memory less source and when is the entropy maximum. 3M

   b) If H (X,Y) denote joint entropy, H (X) &H (Y) are marginal entropic so of source & destination, H (x/y) &H (y/x) denote conditional entropies then show that H (X,Y)= H (X) + H (y/x) 5M

   c) show that the entropy of a discrete memory less source is maximum when all the symbols are equally probable. 4M

UNIT–II

3. a) The parity check bits of a (8,4) block code are generated by C_5=d1+d2+d4, C_6=d1+d2+d3, C_7=d1+d3+d4 , C_8=d2+d3+d4, where d1, d2, d3, d4 are the message bits.
   (i) Find the generator and parity check matrices for this code.
   (ii) Show that this code can detect three errors per codeword. 8M

   b) Explain about hamming codes. 4M

OR

4. a) Explain about golay codes in detail. 6M

   b) Define minimum distance of a block code & prove the two theorems. 6M

UNIT–III

5. a) Explain about algebraic structure of cyclic codes. 4M

   b) A (7,4) cyclic code is generated by $g(x)=1+x+x^3$
   i. Obtain all the 16 code words using shift register encoder.
   ii. Obtain the 16 code words using parity polynomial. 8M

OR

6. a) Explain about the general cyclic code decoder, where the received code words is shifted in to the syndrome register from the left end. 6M

   b) A (7,4) cyclic code is generated by g (x) =$1+x+x^3$ obtain the seven syndrome vectors for the seven single error patterns. 6M

UNIT–IV

7. Consider the (3,1,2) convolution code where g^1=(1,1,0) & g^2=(1,0 1)
   (a) Draw the encoder block diagram. 4M
   (b) Draw the state diagram. 4M
   (c) Draw the trellis diagram. 4M

OR

8. a) Describe the viterbi algorithm for decoding convolution codes. 7M
   b) Explain the stack algorithm for decoding convolution codes. 5M

UNIT–V

9. a) State the necessary conditions for a set G to be considered as a group when a binary operation * is defined on it. 3M
   b) Define a field F , state the necessary conditions for a set F to be satisfied to consider as a field with respect to two binary operators +&* . 3M
   c) Define primitive polynomial, construct galois field GF (2^4) if the primitive polynomial is p (x)=1+x+x^4. 6M

OR

10. a) Define BCH codes, given a BCH code over galois field GF (2^m) ,m≥3 ,n=2^m-1, define the following parameters with necessary equations. Block length, errors in a block, number of parity check bits, minimum distance, primitive polynomial &generator polynomial. 8M
    b) State the advantages of BCH codes. 4M

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Hall Ticket Number :										

R-14

Code: 4PA324

M.Tech. II Semester Regular & Supplementary Examinations June 2017

Detection and Estimation of Signals

(Digital Electronics and Communication Systems)

Max. Marks: 60 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60 Marks)

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UNIT–I

1. a) Determine and sketch the magnitude & phase response of $y(n) = \frac{1}{2}[x(n) + x(n+2)]$ 6M

   b) What is Impulse Response of the system & Explain the properties of Convolution? 6M

OR

2. a) Explains about Energy & power signals in detail with an example 6M

   b) High light the importance of Properties of Fourier Discrete Transforms& Derive the Differentiation & Integration Properties 6M

UNIT–II

3. a) Derive an expression for the Minimum error probability? 6M

   b) Explain about Minmax Criterion & its importance 6M

OR

4. a) Explain Minimum Probability of Error Criterion 6M

   A) Explain Hypothesis testing by multiple Observations 6M

UNIT–III

5. a) Explain in detail about Matched Filter with known signals & noise 6M

   b) Explain about Whitening Filter 6M

OR

6. a) Explain the Adhoc Formulation (Filtering of signals of Noise) 6M

   b) Explain the Detection of Known Amplitude Variations 6M

UNIT–IV

7. a) Explain about Simple Hypothesis & its types? 6M

   b) Explain the Importance of Unknown A prior Information 6M

OR

8. a) Explain about Composite Hypothesis Testing? 6M

   b) Explain about the Multiple Measurements 6M

UNIT–V

9. a) Explain a Simple Estimation Model With an Example 6M

   b) Explain about Non Random Estimate(Interval Estimate) 6M

OR

10. a) Explain about Steepest Descent Algorithm with block diagram? 6M

    b) Define Prediction? Explain about Prediction error Process? 6M

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Hall Ticket Number :										

R-14

Code: 4PB324

M.Tech. II Semester Regular & Supplementary Examinations June 2017

DSP Processors and Architectures

(Common to DECS, ES & VLSISD)

Max. Marks: 60 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60 Marks)

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UNIT–I

1. a) Explain the Digital Signal Processing system with the help of a block diagram. Also neatly sketch the typical signals in a DSP scheme. 5M

   b) Describe the basic feature that should be provided in the DSP architecture to be used to implement the Nth order FIR filter $y(n)=\sum_{i=0}^{N-1} h(i)x(n-i)$; n=0,1,2,… Where x(n) denotes the input sample ,y(n) the output sample and h(i) denotes the ith filter co-efficient. 7M

OR

2. a) Write and explain the fixed-point format for signals and co-efficient in DSP system. Find the range of numbers that can be represented in a fixed-point format using 16 bits if the number is treated as a signed integer and signed fraction. 5M

   b) Briefly explain the A/D conversion errors. 7M

UNIT–II

3. a) Implement a 3-bit shift right, barrel shifter. Tabulate the outputs fof different bit shifts. 8M

   b) Explain the different frequently used techniques to prevent overflow and underflow conditions occurring in MAC unit. 4M

OR

4. a) Explain with block diagram the implementation of 8 tap FIR filter,(i) pipelined using 8 MAC units and (ii) parallel using 2 MAC units. 8M

   b) Identify the Addressing modes of the operands in each of the following instructions and their operation. (i) ADD #1234h ,(ii) ADD B 4M

UNIT–III

5. a) Explain any three data addressing modes of TMS320C54xx. Give one example for each. 8M

   b) With a neat sketch, describe the Host port interface signal. 4M

OR

6. a) Assume that the contents of AR3 to be 400h, what will be its content after each of the following TMS320C54xx addressing mode is used. Assume that the contents of AR0=40h. (i) *AR3+ 0; (ii) *AR3+; (iii) *AR3 + 0B; 8M

   b) Describe the operation of the following instructions of TMS320C54XX processor. (i) MPY *AR2-,*AR4 + 0,B ; (ii) SSBX SXM ; (iii)RPT #k 4M

UNIT–IV

7. a) What values are represented by the 16 bit fixed point number N=2000h in the Q0,Q7 and Q15 notations. 8M

   b) Briefly explain the IIR filter. With the help of block diagram, explain second order IIR filter. 4M

OR

8. a) Explain how the bit-reversed index generation can be done in 8 point FFT. Also write a TMS320C54xx program for 8 point DIT FFT bit reversed index generation. 8M

   b) Explain, how scaling prevents overflow conditions in the butterfly computation. 4M

UNIT–V

9. a) What are interrupts? How interrupts are handled by the C54xx DSP processor. 8M

   b) Explain an interface between ban A/D converter and the TMS320C54xx processor in the programmed I/O mode. 4M

OR

10. a) Explain PCM3002 CODEC, with the help of a block diagram. 9M

    b) Draw the I/O interface timing diagram for the read-write-read sequence of operation. 3M

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Hall Ticket Number :										

R-14

Code: 4PA322

M.Tech. II Semester Regular & Supplementary Examinations June 2017

High Speed Networks

(D E C S)

Max. Marks: 60 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60 Marks)

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UNIT–I

1. a) Define "Quality of Service". Explain on what factors quality of service depends. 6M

   b) Mention and explain various network mechanisms. 6M

OR

2. a) Why is there a need for B-ISDN? Explain. 6M

   b) Explain about three ISDN standard channel types in detail. 6M

UNIT–II

3. a) Write about virtual channels and virtual paths in ATM networks. 6M

   b) Discuss how traffic engineering is done by ATM networks. 6M

OR

4. a) Explain about "ATM adaptation layer". 6M

   b) Discuss the different methods of error detection in each of the Application adaptive layer. 6M

UNIT–III

5. a) What is blocking in Banyan Networks? Explain how blocking can be avoided in Batcher- Banyan Network. 6M

   b) Explain the operation of a cross bar switch. Design a (4,4,4) symmetric three stage clos network. 6M

OR

6. a) Distinguish between Banyan and Benes networks. 6M

   b) Explain folding algorithm with a suitable example. 6M

UNIT–IV

7. a) Distinguish between UNI and PNNI signaling. 6M

   b) Explain PNNI routing mechanism with a suitable example. 6M

OR

8. a) Explain ABR Traffic management. 6M

   b) Draw and explain about IPV4 header format. 6M

UNIT–V

9. a) Compare TCP and UDP protocols. 6M

   b) Discuss and compare various TCP congestion control mechanisms. 6M

OR

10. Write short notes on

    a. TCP/IP 6M

    b. QOS in IP Networks 6M

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Hall Ticket Number :										

R-14

Code: 4PA325

M.Tech. II Semester Regular & Supplementary Examinations June 2017

Image and Video Processing

(D E C S)

Max. Marks: 60 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60 Marks)

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UNIT–I

1. a) Distinguish between gray scale image, and color image. Give suitable example to each type of images. 6M

   b) What is meant by image sampling? How can you judge the number of samples required for good approximation of an image? 6M

OR

2. a) Obtain the Hadamard transform matrix for N=8. 6M

   b) Explain the role of Discrete Cosine transform in image processing. 6M

UNIT–II

3. a) Explain about Histogram specification with necessary derivations. 6M

   b) How the “salt and pepper” noise look like? How can it be removed? 6M

OR

4. a) Discuss the image smoothing filter with its model in the spatial domain. 6M

   b) Explain about Laplacian of a Gaussian (LoG) Detector. 6M

UNIT–III

5. a) What are circulant and block circulant matrices? What is the effect of diagonalization on the degradation model? 6M

   b) Define Image restoration. Derive the degradation model for discrete functions. 6M

OR

6. a) Explain the method of inverse filtering for image restoration. 6M

   b) Explain about algebraic approach to image restoration. 6M

UNIT–IV

7. a) Explain how subimage selection and bit allocation effects the compression and quality of an image. 6M

   b) Explain the schematics of image compression standard JPEG. 6M

OR

8. a) Explain with an example how derivative operators are useful for edge detection. 6M

   b) Explain the concept of region split and merge algorithm for segmentation. 6M

UNIT–V

9. a) Distinguish between analog video and digital video. 6M

   b) Distinguish between pixel based motion estimation and Mesh based motion estimation Techniques. 6M

OR

10. a) Briefly Explain about Three-Dimensional Motion models. 6M

    b) Discuss in detail about any four methods of 2-D motion estimation techniques in video processing. 6M

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Hall Ticket Number :										

Code: 4PA323

R-14

M.Tech. II Semester Regular & Supplementary Examinations June 2017

Micro Computer System Design

(Digital Electronics and Communication Systems)

Max. Marks: 60 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60 Marks)

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UNIT–I

1. a) Draw and discuss the internal block diagram of 8086. 8M
   b) How does 8086 differentiate between an operand and instruction data? 4M

OR

2. a) Draw and discuss the machine control word of 80286. 4M
   b) Explain the following:
      i) Task Privilege ii) Descriptor Privilege iii) Selector Privilege. 8M

UNIT–II

3. a) Draw and discuss the Flag register of 80386 in detail. 6M
   b) Enlist the four major architectural advancement in 80486 over 80386 and explain any two of them. 6M

OR

4. a) Explain the use of each of the following registers of 80386
      i) Segment Descriptor Registers
      ii) Control Registers
      iii) Debug and Test Registers
      iv) System Address Registers 8M
   b) Enlist the salient features of 80486. 4M

UNIT–III

5. a) Differentiate between Pentium and Pentium pro-processor w.r.t generation, overclocking feature, core pipeline stages, no.of transistors, address bits main memory size L2 cache, SMP support. 8M
   b) What are the advantages of Hyper thread Technology. 4M

OR

6. a) Explain dynamic branch prediction logic of Pentium processor. 6M
   b) Explain with block diagram how Super Scalar operation is carried out in Pentium processor. 6M

UNIT–IV

7. a) Write short notes on following:
      i) Fundamentals I/O considerations.
      ii) Programmed I/O. 6M
   b) Briefly explain the Virtual Memory concept of 80286. 6M

OR

8. a) Write short notes on the following :
      i) Interrupt driven I/O.
      ii) Block transfer and DMA. 6M
   b) Briefly explain the Semaphore operations. 6M

UNIT–V

9. a) Draw and explain the internal structure of 8087. 6M
   b) Explain the data transfer instructions of 8087. 6M

OR

10. a) Draw and discuss the interfacing between 8086and 8087. 8M
    b) How does the CPU differentiate the 8087 instructions from its own instructions? 4M

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