Code: 9A04601

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

DIGITAL COMMUNICATIONS

(Electronics & Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) What is Sampling theorem and prove it for band pass signals?

(b) A waveform $x(t) = 10\cos(1000t + \frac{\pi}{3}) + 20\cos(2000t + \frac{\pi}{6})$ is to be uniformly sampled for digital transmission. (i) What is the maximum allowable time interval between sample values that will ensure perfect signal reproduction?
ii) If we want to reproduce 1 hour of this wave form, how many sample values need to be sorted?

2 (a) Explain Hierarchy levels used in multiplexing.

(b) Explain about North American Hierarchy. (or) Explain about AT&T Hierarchy and table it bit rates and capacities.

3 (a) State and prove properties of matched filter.

(b) Show that the probability of bit error of a matched filter receiver is given by

$$P_e = \frac{1}{2} erfc \sqrt{\frac{E_b}{N_0}}$$

4 (a) Discuss base band transmission of M-ary data.

(b) An audio signal of bandwidth 4 kHz is sampled at a rate 25% above the Nyquist rate and quantized. The quantization error is not to exceed 0.1% of the signal peak amplitude. The resulting quantized samples are now coded and transmitted by 4 - ary pulses.
(i) Determine the minimum number of 4-ary pulses required to encode each sample.
(ii)Determine the minimum transmission bandwidth required to transmit this data with zero ISI.
(iii) If 4-ary pulses satisfying Nyquist's criterion with 25% roll-off are used to transmit this data. Determine the transmission bandwidth.

5 Explain about forward error correction systems with comparison.

6 Find the efficiency of transmission using Shannon-Fano coding and Huffman coding for the following message sequence [X] = [A B C D E F G H] with probabilities
[P] = [0.50, 0.15, 0.15, 0.08, 0.08, 0.02, 0.01, 0.01]

7 Derive a transfer function of the optimum filter and give the block diagram of correlation receiver with detailed explanation.

8 Compare digital modulation schemes with their space/constellation diagrams.

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Code: 9A04601

III B. Tech II Semester (R09) Regular Examinations, April/May 2012
DIGITAL COMMUNICATIONS
(Electronics & Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Derive an expression for output signal to quantization noise ratio in a commercial PCM system.
(b) A certain 8 bit uniform quantization PCM system can accommodate a signal ranging from -1V to +1V. The RMS value of the signal is 0.5V. Calculate the signal to quantization noise ratio and expresses it in dB.

2 (a) Draw the block diagram of delta modulation system and explain its working.
(b) Derive an expression for quantization noise in delta modulation.

3 (a) What are the essential aspects when designing transmit and receive filters?
(b) What is a raised-cosine pulse? Describe with the help of diagram.

4 (a) What is matched filter? Derive an expression for matched filter.
(b) Give the properties of matched filter.
(c) Show that the probability of bit error of a matched filter receiver is given by

$$P_e = \frac{1}{2} erfc \sqrt{\frac{E_b}{N_0}}$$

5 Write the [H] matrix for the (15, 11) cyclic code using $g(X) = 1+X+X^2+X^3+X^4$. Calculate the code polynomial for $m(X) = 1+X^3+X^7+X^{10}$. Construct the decoder for the code.

6 (a) Derive the condition for encoding the stationary source.
(b) Calculate the coding efficiency of the following codes and construct the decision tree.

Symbol	Probability	Code1	Code2
X_1	1/2	0	00
X_2	1/4	10	01
X_3	1/8	110	10
X_4	1/8	111	11

7 (a) Explain about The Gram-Schmidt process in band pass digital transmission.
(b) Explain in detail about Band pass binary data transmission system.

8 Draw the block diagram of QPSK modulator and demodulator and explain each block in detail.

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Code: 9A04601

3

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

DIGITAL COMMUNICATIONS

(Electronics & Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 How will you differentiate binary FSK and MFSK, explain with block diagrams?

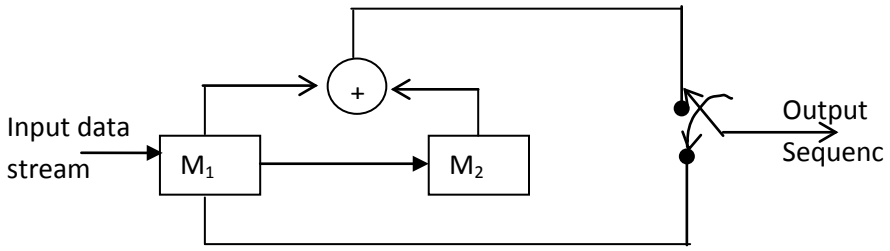
2 (a) Briefly explain the noise present in PCM systems.
(b) A modulating signal is given by x (t) = A Sin (β t). Find the Maximum value of A for no slope over distortion. Assume step size δ=2 mV and a sampling rate of f_s = 10 KHz.

3 (a) Explain the generation and reception of DPSK signals with a neat block diagram.
(b) Derive an expression for method filter with neat block diagram.

4 (a) Draw the block diagram of delta modulation system and explain its working.
(b) A decimal number N was transmitted using seven bit even parity Hamming code. After transmission, it was received as 1101101. Is there any error introduced during transmission. What is the value of N?

5 (a) Derive an expression for coding efficiency.
(b) Derive an expression for channel capacity in terms of signal power, noise power and band width of the channel.

6 Construct state diagram, Trellis Code tree for the Convolution encode shown in figure below, find the coded sequence for the input sequence 1 1 0 0. If the received sequence has an error in the 4.th bit. How Vitterbe algorithm is used to correct the errors.



7 (a) With the help of a block diagram explain baseband binary data transmission system?
(b) Binary data is transmitted at the rate of 112kbps using a baseband binary PAM system designed to have a raised cosine spectrum. What is the transmission bandwidth required if the roll off factor ρ = 0.2, 0.45?

8 (a) What is correlative coding? Explain it in detail.
(b) For input binary data 1011101 obtain the output of duo binary encoder and also the output of decoder.

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Code: 9A04601

4

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

DIGITAL COMMUNICATIONS

(Electronics & Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) What are optimal filters? Derive the transfer function of optimum filter.
(b) What is the difference between base band transmission and band pass transmission? Distinguish both features.

2 (a) Distinguish between delta modulation and adaptive delta modulation.
(b) In a single integration DM system, the voice signal is sampled at a rate of 32 kHz, similar to PCM. The maximum signal amplitude is normalized as A_{max}=1.
(i) Determine the minimum value of the step size to avoid slope overload.
(ii) Determine the granular noise power N_o if the voice signal bandwidth is 1.7 kHz.
(iii) Assuming that the voice signal is sinusoidal, determine S_o and the SNR.

3 (a) The term matched filter is often used synonymously with correlator. Describe how that is possible when their mathematical operations are different.
(b) A binary PAM wave is to be transmitted over a baseband channel with an absolute maximum bandwidth of 75 kHz. The bit duration is 10 μs. Find the raised cosine spectrums that satisfy these requirements.

4 (a) What is meant by quantization error? How to reduce it?
(b) What is the disadvantage of uniform quantization over the non-uniform quantization?

5 Design a syndrome calculator for a (7, 4) cyclic Hamming code generated by the polynomial g (x) = x^3+x+1. Calculate the syndrome for the received code vector 100101.

6 (a) Three BSC's each with error probability p_e=0.1 are cascaded as shown below and p (0) =1/4, p (1) = 3/4. Calculate H(Y), H (U), I(X, Z) and I (X, U).
(b) A BSC has the error probability p=0.2 and the input to the channel consists of 4 quiprobable messages x_1 =000, x_2 =001, x_3 =011, x_4 =111, calculate:
(i) p (0) and p (1) at the input (ii) Efficiency of code (iii) Channel capacity.

7 (a) What is matched filter? Give its properties.
(b) A binary data is transmitted over a microwave link at the rate of 10^6 bits/sec. and the psd of the noise at the receiver input is 10^{-10} watts/Hz. Find the average carrier power required to maintain an average probability of error $p_e \leq 110^{-4}$ for coherent binary PSK.

8 (a) Give the comparison of M-ary digital modulation techniques.
(b) Derive an expression for probability of error for an M-ary PAM system (M=4).

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Code: 9A04602

1

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

MICROPROCESSORS & MICROCONTROLLERS

(Common to EEE, ECE, CSE, EIE & E. Con. E)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Briefly explain the internal architecture of MCS-96.
(b) Discuss about the process memory map of MCS-96.

2 (a) What are the advantages of memory segmentation in 8086 microprocessor?
(b) Discuss in brief about assembler directives.

3 (a) Write an ALP in 8086 to find the largest and smallest of a set of 8-bit numbers.
(b) Write an ALP in 8086 to add two ASCII numbers.

4 (a) Draw the block diagram of 8237 & explain its interfacing to 8086 microprocessor with a neat sketch.
(b) Briefly explain the maximum mode configuration of 8086.

5 Sketch and explain the interface of PPI 8255 to the 8086 microprocessor in minimum mode. Interface four 7 segment LEDs to display as a BCD counter.

6 (a) A terminal is transmitting asynchronous serial data at 1200 bd. What is the bit time? Assuming 8 data bits, a parity bit and 1 stop bit how long does it take to transmit one character.
(b) Draw necessary circuit to interface 8251 to an 8086 based system with an address 0C0H. Write the sequence of instructions to initialize 8251 for synchronous transmission. (Assume the necessary data).

7 (a) Draw the block diagram for multiple 8259A based interrupt system.
(b) Explain about cascading of 8259s and its functioning.

8 (a) What is microcontroller? List the features of 8051 microcontroller. Name the five interrupt sources of 8051.
(b) Write an assembly language program in 8051 to find the GCD of two numbers.

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Code: 9A04602

2

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

MICROPROCESSORS & MICROCONTROLLERS

(Common to EEE, ECE, CSE, EIE & E. Con. E)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Explain the architecture of 8086 microprocessor.
(b) Explain the segmentation in 8086 microprocessor. What are the different registers used for this purpose?

2 (a) Write an ALP to generate the FIBONOCI series.
(b) Write an ALP in 8086 to find 1's complement of a 16 bit hexadecimal number.

3 Explain 8257 DMA interface to 8086 micro processor & what are the registers available in 8257? What are their functions?

4 (a) Explain the functional diagram of 8279 keyboard and display controller.
(b) Discuss about DOS and BIOS interrupts.

5 (a) Explain IOCO and IOSO register for timer 1 in 80196.
(b) What are the interrupt sources for synchronous serial transmission and reception in 80196? What are the identification flags and local enable bits for these sources?

6 Distinguish between Asynchronous and Synchronous data transfer schemes & explain block diagram IC 8251. Explain the logic of 8251 program.

7 (a) With neat diagrams explain the five modes of operation of 8253 in detail.
(b) Draw the block diagram of 8253 and explain about each block in detail.

8 (a) What is assembly language program? What is the function of SWAP?
(b) List out the steps involved in programming the 8051 to transfer data serially.

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Code: 9A04602

3

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

MICROPROCESSORS & MICROCONTROLLERS

(Common to EEE, ECE, CSE, EIE & E. Con. E)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1		Explain the instruction set of 8051 microcontroller. Write a program in 8051 to perform multiplication of two numbers using 8051.
2		Explain about addressing modes and instruction set of MCS-96 family.
3	(a)	Write in detail about the addressing modes of 8086 microprocessor.
	(b)	What are various types of procedures? Give examples.
4	(a)	Write a program to initialize 8251 in synchronous mode with even parity, single SYNCH character, 7 bit data character. Then receive FFH bytes of data from a remote terminal and store it in the memory at address 5000 H: 2000 H.
	(b)	Why are the two ground pins on an RS-232C connector not just jumpered together?
5	(a)	Explain need and importance of DMA.
	(b)	Discuss about Static RAM & EPROM with reference to 8086.
6	(a)	Sketch the interfacing of PPI 8255 to the microprocessor.
	(b)	Interface four 7 segment LEDs to display as a BCD counter.
7	(a)	It is necessary to serve 18 interrupt requests using 8259's. The address map for the 8259's is given from 0A00H to 0A0FH. Show the complete interface with 8086 system bus. These 18 interrupts are to be requested from interrupt type 040H on words, with edge trigged mode and auto end of interrupt. Give the initialization sequence for all 8259's.
	(b)	Explain the operating modes of 8259.
8	(a)	Write an ALP in 8086 to add five 8 bit numbers and the result is 16 bit.
	(b)	Write an ALP in 8086 to add two 8 bit decimal numbers.

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Code: 9A04602

4

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

MICROPROCESSORS & MICROCONTROLLERS

(Common to EEE, ECE, CSE, EIE & E. Con. E)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Explain the advantages of using the USART chips in microprocessor based systems.
(b) Discuss how 8251 is used for serial communication of data.

2 (a) Explain the flag register of 8086.
(b) Explain the concept of memory segmentation.

3 (a) Write about interrupt sequence in an 8086 system.
(b) Explain about command words of 8259.

4 (a) Write a recursive routine to evaluate the following polynomial Y = A0+A1X+A2X2+A3 X3 +.....+ANXN The coefficients A0,A1,A2....AN are to be successive words in memory and all parameter addresses are to be passed via the stack.
(b) Write a FAR procedure SER WORD that searches a word array for a given word and sets the value of a word parameter to the index of the element in the array if a match is found; otherwise, it puts a -1 in the index word parameter. The parameters are to be passed to the procedure via a parameter address table. Give a sequence for calling SER WORD to search ARRAY 1 of length LENGTH 1 for variable 'ID' and put the index in INDEX 1.

5 What is the difference between minimum and maximum modes of 8086 and also explain how 8086 microprocessor can be configured in minimum and maximum modes of operations?

6 (a) Explain in brief about programming timer interrupts in 8051.
(b) Discuss the bit format of IP register of 8051.

7 (a) Explain the advantages of using the keyboard and display controller chips in microprocessor based system.
(b) Write a program using RST 5.5 interrupt to get an input from keyboard and display it on the display system.

8 (a) Explain the historical perspective in development of MCS - 96 family.
(b) Explain the register to register architecture concept of MCS – 96 family.

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Code: 9A04603

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

DIGITAL SIGNAL PROCESSING

(Common to CSE, EIE, E. Con. E, ECE & ECC)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Discuss the characterization of IIR filter.
(b) Using backward difference method obtain H (z) for following H (s) = 1/(s + 3).

2 (a) Explain the FIR filter design using windowing technique.
(b) Compare FIR and IIR filters.

3 Implement a two stage decimator for the following specifications. Sampling rate of the input signal = 15,000 Hz.
M=50.
Pass band = 0 to 40 Hz.
Transition band = 40 to 50 Hz.
Pass band ripple = 0.01.
Stop band ripple = 0.002.

4 (a) How window length is selected in STFT?
(b) Discuss about spectral analysis of sinusoidal signals.

5 Check the following systems described with difference equations for linearity, shift invariance, memory and causality: (i) y (n) + y (n+1) = n x (n).
(ii) y (n) = x (n) + x (n-1) + x (n-2).

6 For the given periodic sequence, find Fourier series coefficients and corresponding magnitude an phase of coefficients.

$x_p(n) = 1$ for n= 0 to 4
$= 0$ otherwise

Period of the given sequence i.e. N=10. Also sketch sequence, magnitude and phase spectra of coefficients.

7 (a) Compare DIT-FFT and DIF-FFT algorithms.
(b) Find DFT of sequence using DIT – FFT, the sequence is x (n) = {1, 1, 1, 1, 1, 1, 1, 1}.

8 (a) Discuss the realization of FIR filter structures.
(b) Realize FIR filter with system function in cascade form $H(z) = 1 + (5/2)\, z^{-1} + 2z^{-2} + 2z^{-3}$.

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Code: 9A04603

2

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

DIGITAL SIGNAL PROCESSING

(Common to CSE, EIE, E. Con. E,ECE & ECC)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Describe the digital signal processing system.

(b) Sketch the following signals and its even and odd parts:

$x(n) = 8(0.5)^n u(n)$.

2 State and prove circular convolution property of DFT.

3 (a) Compute the 4-point DFT of the sequence x (n) = (1, 0, 1, 0) using DIF-FFT radix – 2 algorithm. Compare the answer with conventional approach.

(b) Find the x (n) for X (k) found in part (a) by two different methods.

4 Determine z-transforms of the following finite duration signals. Also find out ROC:

(i) $x_1(n) = \{1, 2, 5, 7, 0, 1\}$

(ii) $x_2(n) = \{1, 2, 5, 7, 0, 1\}$
$\uparrow$

(iii) $x_3(n) = \delta(n-k)$ $k>0$

5 Describe Butterworth approximation of obtaining IIR filter transfer function for given frequency response.

6 (a) Discuss about characteristics linear phase FIR filters.

(b) What are the effects of windowing?

7 Compare the single stage and three stage realization of decimator with the following specifications.

Sampling rate of a signal has to be reduced from 10 KHz to 500 Hz. The decimation filter H (z) has the pass band edge of 150 Hz, stop band edge of 180 Hz, pass band ripple of 0.002 and stop band ripple of 0.001

8 (a) Discuss the few applications digital signal processing.

(b) Discuss about frequency response of typical band limited channel.

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Code: 9A04603

3

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

DIGITAL SIGNAL PROCESSING

(Common to CSE, EIE, E. Con. E, ECE & ECC)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Explain the features of Chebyshev approximation.
(b) Discuss the location of poles for Chebyshev filter.

2 (a) Compare features of different windowing functions.
(b) Justify that FIR filter is linear phase filter.

3 (a) Discuss the need for signal compression.
(b) Explain the concept of dual tone multi frequency signal detection.

4 The spectrum of a signal x (n) is symmetrical triangular pulse with amplitude of '2' and frequency boundaries are -0.25 to 0.25. Sketch the spectrum and sketch spectrums of
(i) The zero interpolated signal y (n) = x (n/3).
(ii) The decimated signal d (n) = x (3n).
(iii) The signal g(n) that equals to x (n) for even n, and zero for odd n.

5 Describe all the characteristics of systems in detail.

6 Find the DFT of the sample data sequence x (n) = {1, 1, 2, 2, 3, 3} and determine the corresponding amplitude and phase spectrum.

7 Discuss in detail the concept of decimation in time FFT. Also sketch the necessary flow graph for N=8.

8 (a) Explain the advantages and disadvantages of direct form-II realization over direct form-I.
(b) Realize following system with difference equation in cascade form:
$y(n) = (3/4)\, y(n-1) - (1/8)\, y(n-2) + x(n) + (1/3)x(n-1)$

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Code: 9A04603

4

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

DIGITAL SIGNAL PROCESSING

(Common to CSE, EIE, E. Con. E, ECE & ECC)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 Check the following systems for linearity:
(i) $y(n) = 3^n x(n)$
(ii) $y(n) = e^{in} x(n)$
(iii) $y(n) = e^{x(n)}$
(iv) $y(n) = \cos(0.5 \acute{n}) x(n)$

2 Consider the following specifications for a band pass filter:

$$|H_d(e^{j\omega})| \le 0.01 \qquad 0 \le |\omega| \le 0.2\pi$$

$$0.92 \le |H_d(e^{j\omega})| \le 1.02 \qquad 0.3\pi \le |\omega| \le 0.7\pi$$

$$|H_d(e^{j\omega})| \le 0.02 \qquad 0.8\pi \le |\omega| \le \pi$$

Design a linear phase FIR filter to meet these specifications using Hamming window.

3 Discuss all types of symmetric properties of DFT.

4 Draw the flow graph for 16-point radix–2 decimation in frequency FFT algorithm and explain it briefly. Also label the multipliers appropriately.

5 If the system function of a causal filter is $H(z) = 1/(1 + 1.1z^{-1} + 0.9z^{-2} + 1.4z^{-3} + 0.5z^{-4})$. Realize the filter and investigate the filter stability.

6 Describe the IIR filter design approximation using Impulse Invariant method. Also sketch the s – plane to z – plane mapping. State its merits and demerits.

7 Explain the concepts of decimation and interpolation with the help of waveform illustrations.

8 Write short notes on the following:
(i) Coding redundancy.
(ii) Single echo filter.
(iii) STFT.

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Code: 9A04604

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

ELECTRONIC MEASUREMENTS & INSTRUMENTATION

(Electronics & Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Define sensitivity. Express sensitivity mathematically. What is deflection factor?
(b) A particular ammeter requires a change of 1 A in its coil in order to produce a change in deflection of the pointer by 3 mm. Determine its sensitivity and deflection factor.

2 (a) What is the necessity of using a marker generator?
(b) State the application of a sweep generator.

3 (a) How can you show mathematically that any complex waveform is made up of a fundamental and its harmonies?
(b) What is the function of a wave analyzer?

4 (a) What is a CRO? What is the use of CRO in the development of electronic circuits the systems?
(b) Explain how a two dimensional display is produced in a CRO.

5 Describe components of a digital-data-acquisition system.

6 (a) Explain, with the help of a block diagram the various parts of a digital multimeter.
(b) Explain the ohmmeter part of a digital multimeter. Describe how R×1, R×10, R×100 ranges are obtained in this instrument.

7 (a) Explain the operation of a potentiometric transducer.
(b) Define a transducer. List the applications.
(c) What are the functions of a transducer?

8 (a) Draw the circuit for Schering bridge and derive the expression for unknown capacitance Cx.
(b) In the case of a Schering Bridge, arm Ac has R =4.7 k. Arm CD has unknown elements. Arm BD has C = 0.1 MF Arm AB = 4.7 K is shunt with 1 MF. Determine values of components are the arm CD.

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Code: 9A04604

2

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

ELECTRONIC MEASUREMENTS & INSTRUMENTATION

(Electronics & Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Draw the trigger pulse circuit and explain.
(b) What is driven sweep and single sweep?

2 (a) What is the frequency range in which the wave analyzers are used? Explain.
(b) Describe the term real time analyzers.

3 (a) Draw the characteristics of a general pulse and explain the terminologies.
(b) List the specifications of the pulse generator.

4 (a) Explain the fundamental principle on which dc meter is constructed.
(b) How a basic meter movement can be used to measure:
i) DC current.
(ii) DC voltage.
(iii) Resistance.
(c) A 1 mA meter movement with an internal resistance of 100 Ω is to be converted into a 0-100 mA ammeter. Calculate the value of shunt resistance required.

5 (a) Which type of bridge circuit is used to determine the dissipated factor of a capacitor? Draw the circuit and derive the expression for the unknown elements.
(b) Draw the Andersons bridge circuit and derive the expression for the unknown elements.

6 (a) Write short note on any one of the bellow-type gauge for measurement of absolute pressure.
(b) What are the differences between active and passive transducers?

7 (a) What are the advantages of dual trace over dual beam CROs for multiple trace?
(b) What precautions must be taken when using a sampling oscilloscope?

8 Describe the signals of RS-232 and comment on full duplex, half duplex and simplex communication.

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Code: 9A04604

3

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

ELECTRONIC MEASUREMENTS & INSTRUMENTATION

(Electronics & Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Define retardation lag and time delay.
(b) What the help of a graph define dynamic error?
(c) An ammeter reads 4.3 A and the true value of the current is 4.5 A. Determine the absolute error and relative percentage error.

2 (a) Explain the necessity of signal generators. What are the requirements of a signal generator?
(b) List down the requirements of laboratory type signal generator.

3 (a) What is distortion? What does a distortion analyzer measure?
(b) Explain how wave analyzer can be turned to a particular frequency within the audible frequency range.

4 (a) Why delay time is used in vertical section of an oscilloscope?
(b) Draw the trigger pulse circuit and explain.

5 Give the constructional features of strip chart recorders. State its various applications.

6 (a) What are the advantages of dual beam for multiple trace oscilloscopes?
(b) How is the vertical axis of an oscilloscope deflected? How does this differ from horizontal axis?

7 Define quality factor. Derive the expression of quality factor in Hay's bridge which is used for the measurement of unknown inductance.

8 What do you understand by PH? What is the necessity of using a thermo compensator for PH measurements?

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Code: 9A04604

4

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

ELECTRONIC MEASUREMENTS & INSTRUMENTATION

(Electronics & Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Discuss about the important CRT features.
(b) The amplitude read on CRO set at 1 v/div is 1.5 cm on the vertical axis. Find the value of amplitude in volts.

2 (a) What is meant by distortion factor?
(b) Explain how these distortion factors can be measured.

3 (a) What are the methods of creating arbitrary waveforms?
(b) What are the parameters of arbitrary waveform generator?

4 (a) Differentiate static and dynamic characteristics.
(b) Define calibration. What are the different steps involved in calibration procedure. What is meant by calibration record?

5 (a) How do you use q-meter for measurement of low impedance and high impedance components?
(b) Explain how a Maxwell bridge can be used for measuring an unknown inductance.

6 Explain briefly about thermistor. A thermistor has β = 3140 k & the resistance at 270 c is 1050 Ω. The thermistor is used for temperature measurement and the resistance measured is as 2330 Ω. Find the measured temperature.

7 (a) Discuss the advantages and disadvantages of analog and digital type of oscilloscope.
(b) Describe an overview of applications of a CRO.

8 Write short notes on :
i) Simplex, half duplex, full duplex.
ii) Serial and parallel communication.
iii) Asynchronous and synchronous communication.

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Code: 9A04605

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

VLSI DESIGN

(Common to Electronics & Communication Engineering, Electronics & Instrumentation Engineering & Electronics & Control Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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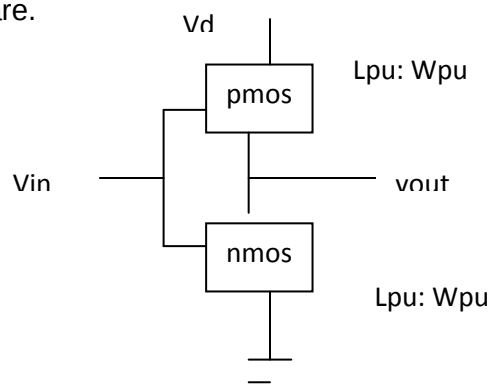
1 (a) Explain clearly about Moore's law.
(b) What is the need of VLSI circuits?
(c) Draw typical VLSI design flow in Y chart representation and explain.

2 Compare the relative merits of three different forms of pull up for an inverter circuits. What is the best choice for realization in (a) nMOS technology (b) CMOS technology?

3 Calculate ON resistance from Vdd to GND for the given inverter circuit shown in figure below. If p channel sheet resistance is 2 X 10^4 ohm per-square and n channel sheet resistance is 10^4 ohm per-square.



4 What is the purpose of design rule? What is the purpose of stick diagram? What are the different approaches for describing the design rule? List some important CAD toolsets. Give three approaches for making contacts between poly silicon and diffusion in NMOS circuit.

5 (a) Write about switch logic.
(b) Implement 4:1 multiplexer using switch logic and compare it with gate logic implementation.

6 (a) Explain about the designing of a chip with sea of gates (SOG).
(b) Write about FPGA.

7 What is the need for testing? Discuss in detail about testing at various levels of chip fabrication?

8 Explain the following:
(i) Circuit extraction (ii) Layout extraction (iii) Layout synthesis (iv) Back annotation
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2

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

VLSI DESIGN

(Common to Electronics & Communication Engineering, Electronics & Instrumentation Engineering & Electronics & Control Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 Explain about: (a) ASIC (b) FPGA
(c) CMOS technology (d) Bi CMOS technology.

2 Calculate the threshold voltage of a transistor at zero source/substrate bias. Transistor has the following parameters.
$x_{ox}=200^{o}A;Є_{ox}=3.5*10\text{-}13;øs=0.6V;Q_f=1.6*10^{-8};Є_{si}=1*10^{-12}$;
$N_A=10^{15}cm^{-3}$; $N_{ap}=10^{19}cm^{-3}$; $N_{II}=1*10^{12}$.

3 Explain about the constraints in choice of layers.

4 Sketch the stick diagram and lay out for a CMOS gate computing $y=(A+B+C+D)^{/}*D$.

5 Write about design for testability. And hence discuss in detail about the need for it in VLSI.

6 (a) 'Implement an 8-bit comparator using 4-bit comparators' and other interfacing requirements.
(b) With the help of logic diagram explain the working of 4-bit comparator.

7 (a) What is meant by logic optimization?
(b) Write about technology dependent and technology independent logic optimization.

8 With the help of neat diagrams showing the structure of Antifuse and Vialink explain the working principle of both as programmable interconnect elements.

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3

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

VLSI DESIGN

(Common to Electronics & Communication Engineering, Electronics & Instrumentation Engineering & Electronics & Control Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1		Mention different non ideal I-V effects and clearly explain about them.
2		Estimate the total delay when a larger load capacitance is driven by a large inverter gate N which is driven by a small gate N-1 and so on.
3		With neat sketches explain oxidation process in IC fabrication.
4	(a)	What are design rules? Why is metal-metal spacing larger than poly-poly spacing?
	(b)	What is stick diagram? Draw the stick diagram and layout for a CMOS inverter.
5	(a)	Explain about IDDQ (VDD Supply Current Quiescent) testing for bridging faults.
	(b)	Explain how a Pseudo random sequence generator and a signature analyzer is used to test an 8-input combinational circuit.
6	(a)	Implement a full adder circuit using transmission gates.
	(b)	Construct an 8-bit carry select adder using adders and multiplexers.
7	(a)	What are design capture and design verification tools?
	(b)	With the help of an example using VHDL as both design capture and design verification tool explain the difference between them.
8		Summarize the advantages and disadvantages of various design options used to implement a CMOS system design. Give an example for each.

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4

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

VLSI DESIGN

(Common to Electronics & Communication Engineering, Electronics & Instrumentation Engineering & Electronics & Control Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 What are programmable gate arrays? With an architectural diagram explain the working of gate arrays in the process of implementing a function/system.

2 What is meant by simulation? Explain in detail about switch level and circuit level simulation.

3 (a) With respect to struck at fault model explain about fault collapsing.
(b) For a full adder circuit implemented with XOR and AND gates generate the test vectors for SA0 faults on all primary inputs.

4 (a) With the help of a diagram explain the working of serial/parallel multiplier.
(b) Enumerate the working of a ROM implemented using pseudo NMOS NOR array.

5 (a) What are the advantages of CMOS technology?
(b) Draw the flow chart for VLSI design flow and explain clearly about each step.

6 Explain clearly about different operating regions in nmos transistor with neat diagrams.

7 What is the problem of driving large capacitance load? Explain a method to drive such load.

8 Explain clearly about the limitations of scaling.

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Code: 9A04606

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

MICROWAVE ENGINEERING

(Electronics & Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) Discuss the concept of attenuation in waveguides.
(b) Derive the relation from fundamentals:

$$\lambda = \frac{\lambda_g \lambda_c}{\sqrt{\lambda_g^2 + \lambda_c^2}}$$

2 (a) Explain the differences between strip line and micro strip line.
(b) Draw the circular resonator cavity diagram and derive equation for resonator cavity.

3 (a) Draw a typical magic Tee junction and explain its operation to obtain sum and difference signals.
(b) Differentiate between isolators and circulators.

4 Show that the scattering matrix for entirely symmetrical (120^0) series T junction is given by

$$[s] = \frac{1}{3}\begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$$

5 Define velocity modulation process. Derive the expression of beam-coupling coefficient. Draw the graph of beam-coupling coefficient versus gap transit angle.

6 Derive the expressions for power output and efficiency of TRAPATT diode. Mention its applications and performance characteristics.

7 (a) List various methods of beam focusing in TWT'S. Explain.
(b) Compare & contrast TWT & Klystron amplifier.

8 (a) What are the main and common microwave test and measurement equipment for the measurement of different parameters of microwave devices?
(b) Describe a method to measure unknown microwave frequency with the necessary setup.

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Code: 9A04606

2

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

MICROWAVE ENGINEERING

(Electronics & Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) How do you measure microwave power using a Bolometer?
(b) Distinguish among the three power measurement methods including the errors and limitations.

2 (a) Draw the schematic diagram of an n-type GaAs diode and explain its operation.
(b) Derive the criterion for classifying the modes of operation for Gunn effect diodes

3 (a) Explain how the oscillations are sustained in cavity magnetron with suitable sketches assuming that the π-mode oscillations already exist.
(b) Explain how the same effect is obtained without strapping.

4 (a) What are the various UHF limitations of vacuum tubes which limit their use at high frequencies? Describe each of these in detail and suggest remedial measures.
(b) Discuss about the parameters on which bunching depend on.

5 (a) Find expressions for the electric surface current density on the wall of a rectangular wave guide for a TE10 mode.
(b) A rectangular wave guide of cross section 5 cm × 2 cm is used to propagate TM11 mode at 9 GHz. Determine the cut off wave length and wave impedance.

6 An air filled waveguide with a cross section 2X1 cm transports energy in the TE_{10} mode at the rate of 0.5 HP. The impressed frequency is 30GHz. What is the peak value of electric field occurring in the waveguide?

7 (a) Describe the working of Probe Coupleing and how the position of probe is dependent on Coupling.
(b) Draw the diagram of H-Plane Tee and explain the working.

8 Show that the scattering matrix for an ideal y circulator is given by:

$$[s] = \begin{bmatrix} 0 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$$

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3

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

MICROWAVE ENGINEERING

(Electronics & Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Derive expression for cut off frequency in rectangular waveguide for TM_{11}mode.
(b) An air filled waveguide has a=3 cm, b=1.5cm. Determine whether TM_{11} mode propagates in it. If it propagates what is the phase velocity.

2 What is discontinuity in a waveguide? Explain different types of windows and their equivalent circuits.

3 (a) Discuss the microstrip strip line propagation constant and characteristic impedance characteristics.
(b) For a microstrip line calculate the characteristic impedance if ϵ_r =5.23, strip width w = 10 mils, strip thickness (t) = 2.8 mils and height (h) = 7 mils.

4 What ate Ferrites? Prove that for a ferrite, the permeability matrix is given by:

$$[\mu] = \begin{bmatrix} \mu & -jk & 0 \\ jk & \mu & 0 \\ 0 & 0 & \mu_0 \end{bmatrix}$$

5 (a) Write short notes on “Two Cavity Klystron Oscillator”.
(b) Derive the expression for trans-admittance of Reflex Klystron Oscillator and explain the condition of oscillation from admittance spiral.

6 (a) Write short notes on “Helix Traveling Wave Tube”.
(b) An O type TWT operates at 2 GHz. The slow wave structure has a pitch angle of 4.40 and attenuation constant of 2 Np/m. Determine the propagation constant of the traveling wave in the tube.

7 Explain how Manley-Rowe power relations are useful in the prediction of power gain possibility in a parametric amplifier.

8 Describe the different blocks of microwave bench setup used in microwave measurements and explain their features.

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4

III B. Tech II Semester (R09) Regular Examinations, April/May 2012

MICROWAVE ENGINEERING

(Electronics & Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) What is the relation between λ_g, λ_0, λ_c in a waveguide? Derive it.
(b) Draw the magnetic and electric field configurations for TE_{20}, TM_{20} in rectangular waveguide.

2 (a) What is coupling coefficient of a cavity? Explain critical coupling, over coupling and under coupling.
(b) A rectangular waveguide has dimensions a = 4 cm, b = 3 cm and d = 10 cm. Determine resonant frequency.

3 (a) Draw different type's corners and give the design procedure criterion.
(b) Explain the construction and working of waveguide phase shifters.

4 Show that the scattering matrix for series T-junction matched at arm 3 is given by:

$$[s] = \frac{1}{2}\begin{bmatrix} 1 & 1 & \sqrt{2} \\ 2 & 1 & -\sqrt{2} \\ \sqrt{2} & -\sqrt{2} & 0 \end{bmatrix}$$

5 (a) Give the performance specification of Reflex klystron.
(b) Define and explain current modulation with neat diagrams and required expressions.

6 (a) What is a w-β diagram? How is it significant for slow wave structures?
(b) Explain the possibility of oscillations in a TWT amplifier. How are they prevented?
(c) List out the gain relations of a TWT amplifier and comment on its bandwidth.

7 (a) Give the classification of solid state microwave devices along with examples?
(b) An n-type GaAs Gunn diode has following parameters:
Electron drift velocity: v_d = 2.5 × 105 m/s.
Negative electron mobility: μ_n = 0.015 m^2/ v. s.
Relative dielectric constant: €$_r$ = 13.1.
Determine the criterion for classifying the modes of operation.

8 Discuss about the important considerations when making attenuation measurement.

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