Sixth Semester B.E. Degree Examination, December 2011
Digital Communication

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1 a. Explain the natural sampling, with relevant waveforms. Give all the time-domain and frequency domain equations. **(08 Marks)**

   b. Show that the shifted Sinc functions $sinc(2f_m t – n)$; used in the reconstruction of sampled signal are mutually orthogonal. **(06 Marks)**

   c. Consider the signal $x(t) = 5 \cos(2000\pi t) + 10 \cos(6000\pi t)$.
     i)   What is the Nyquist rate and Nyquist interval?
     ii)   Assume that, if we sample the signal using sampling frequency $f_s = 5000$ Hz, what is the resulting discrete-time signal?
     iii)   Draw the spectrum of the sampled signal when $f_s = 5000$Hz. **(06 Marks)**

2 a. What are the advantages of digital representation of analog signals? **(04 Marks)**

   b. What is the need for non-uniform quantization? Explain the μ-law compounding. **(09 Marks)**

   c. Derive an expression for the SNR of a PCM system. **(07 Marks)**

3 a. With block diagrams, explain the adaptive delta modulation system. **(07 Marks)**

   b. Determine the PSD of polar quaternary format of NRZ type based on natural code. Assume statistically independent and equally likely message bits. **(07 Marks)**

   c. Consider a speech signal with maximum frequency of 3.4 kHz and maximum amplitude of 1V. This speech signal is applied to a delta modulator whose bit rate is 20 kbps. Discuss the choice of appropriate step size for the modulator. **(06 Marks)**

4 a. Explain the basic elements of a baseband binary PAM system. **(08 Marks)**

   b. The binary data 001101001 are applied to the input of a duobinary system.
     i) Construct the duobinary coder output and corresponding receiver output, without a precoder.
     ii) Suppose that due to error during transmission, the level at the receiver input produced by the second digit is reduced to zero. Construct the new receiver output. **(08 Marks)**

   c. Write a note on eye-pattern. **(04 Marks)**

PART – B

5 a. With block diagrams, explain the QPSK transmitter and receiver. **(08 Marks)**

   b. Explain the coherent binary FSK system, with the help of a signal space diagram. Indicate the decision boundary. **(06 Marks)**

   c. A binary sequence 101101 is transmitted over a communication channel, using the differential phase-shift keying (DPSK). The channel introduces a phase shift of 180°.
     i) Sketch the transmitted signal, using an initial bit of '0'.
     ii) Assume that the channel is noise free, show that the DPSK detector in the receiver produces the original binary sequence despite 180° phase reversal in the channel. **(06 Marks)**

6 a. i) Using the Gram-Schmidt orthogonalization procedure, find a set of orthonormal basis functions to represent the three signals $s_1(t)$, $s_2(t)$ and $s_3(t)$ as shown in Fig.Q6(a).

   ii) Express each of these signals in terms of the set of basis functions found in part (i).
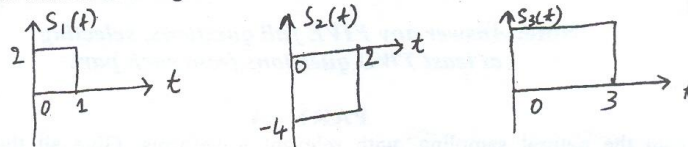
Fig.Q6(a)   (12 Marks)

   b. Show that for a noisy input, the mean value of the jth correlator output x_j depends only on s_{ij} and all the correlators output x_j, $j = 1, 2, \ldots\ldots N$, have a various equal to the PSD No/2 of the additive noise process w(t).   (08 Marks)

7 a. List the properties of a matched filter receiver.   (08 Marks)
   b. Explain the non-coherent quadrature receiver, using correlators.   (06 Marks)
   c. Explain the maximum likelihood detector.   (06 Marks)

8 a. Explain the slow frequency hopping spread spectrum system.   (10 Marks)
   b. Define the processing gain and jamming margin.   (04 Marks)
   c. Consider the PN sequence 000100110101111. Demonstrate the properties of the PN sequence.   (06 Marks)

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Sixth Semester B.E. Degree Examination, December 2011
Microprocessors

Time: 3 hrs.   Max. Marks:100

*Note: Answer any FIVE full questions, selecting
at least TWO questions from each part.*

PART – A

1   a.   With a neat sketch, explain the CPU architecture of 8086.   **(10 Marks)**
    b.   Explain with example, the different addressing modes of the 8086 microprocessor. **(10 Marks)**

2   a.   What is the segment override prefix? Explain with examples.   **(05 Marks)**
    b.   What do the following instructions do?
      i) ROR   ii) RCR   iii) SHR   iv) STD   v) JE   **(05 Marks)**
    c.   Explain the following:
      i) WAIT   ii) HLT   iii) NOP   iv) LOCK   v) ESC   **(10 Marks)**

3   a.   Write a display macro, using for statement that is used to display 'VTU' on the screen.
                                                           (05 Marks)
    b.   Write the DOS function CALL numbers, to achieve the following:
      i)   Reading a key with an echo.   ii) Reading a key without an echo.
      iii) Reading an entire line with echo.   iv) To display an ASCII character.
      v)   To display a string of characters.   **(05 Marks)**
    c.   Write a 8086 program to enter a string and display the reversed string on the screen.
                                                            (10 Marks)

4   a.   Explain the software interrupt operation of 8086.   **(05 Marks)**
    b.   Explain the functions of atleast five dedicated interrupts in 8086.   **(10 Marks)**
    c.   Which are the two hardware interrupt inputs of the 8086 microprocessor? Write the interrupt priority of 8086.   **(05 Marks)**

PART – B

5   a.   Explain the interfacing of a 4×4 keyboard to the 8086 microprocessor.   **(10 Marks)**
    b.   Explain the interfacing of a stepper motor to a microcomputer.   **(10 Marks)**

6   a.   Write a program to find the area of a circle, with the arithmetic co-processor.   **(08 Marks)**
    b.   Differentiate between the following instructions :
      i)   Forward and reverse division   ii)   FADD and FADDP
      iii) FINIT and FNINIT   iv) FTST and FXAM   **(12 Marks)**

7   a.   Bring out the differences between minimum mode and maximum mode operation of 8086.
                                                            (04 Marks)
    b.   Explain the read cycle timing diagram for minimum mode.   **(08 Marks)**
    c.   Write a note on the peripheral component interconnect (PCI) bus.   **(08 Marks)**

8   a.   Write a short note on Pentium processor.   **(08 Marks)**
    b.   Describe the features of   i) 80386 and 80486   ii) Memory system of 80386.   **(12 Marks)**

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Sixth Semester B.E. Degree Examination, December 2011
Analog Mixed Mode VLSI Design

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting*
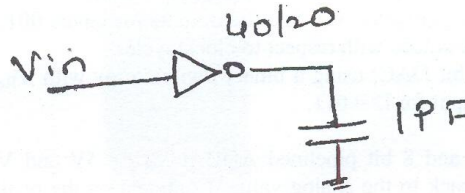*at least TWO questions from each part.*

PART – A

1 a. Define DNL, INL, offset error, gain error.   **(04 Marks)**
   b. Explain the issues involved in mixed signal layout.   **(10 Marks)**
   c. Explain the working of a simple sample and hold circuit with the help of a circuit diagram. Explain the typical errors associated with the S/H circuit.   **(06 Marks)**

2 a. With a neat block diagram, explain the working of a 3 bit pipelined DAC. List the advantages of the pipelined DAC over cyclic DAC.   **(07 Marks)**
   b. For a 3 bit pipelined DAC, find the outputs for inputs 001, 110 and 101 V_{Ref} = 5V. List the intermediate values with respect to clock cycles.   **(08 Marks)**
   c. Design a 3 bit DAC, using a binary switch array with V_{Ref} = 5V, power dissipation 5mW. Find the output for D = 011.   **(05 Marks)**

3 a. For a 4 bit and 8 bit pipelined ADC if V_{Ref} = 5V and V_{in} = 2V, find the digital output. Convert it back to the analog value. Comment on the result regarding the resolution of the converter.   **(08 Marks)**
   b. How would the design of the resistor string change for a 3 bit flash ADC, for the quantization error to be centered about '0' LSB?   **(02 Marks)**
   c. With a neat block diagram, explain the working of a dual slope integrating ADC. **(10 Marks)**

4 a. For a successive approximation ADC if V_{in} = 2.49V, what will be the output? If the comparator makes a mistake in the MSB, what will be the final output? V_{Ref}= 5V N = 4.   **(06 Marks)**
   b. For an 8 bit dual slope ADC with V_{Ref} =5V and clock frequency 1MHz, what is the minimum and maximum conversion time? If V_{in} = 2.5V, what will be total conversion time?   **(04 Marks)**
   c. Explain the working of a comparator, with a block diagram.   **(10 Marks)**

PART – B

5 a. Explain SNR, spurious free dynamic range, ENOB, SNDR.   **(08 Marks)**
   b. Develop an expression for ENOB in terms of the SNR measured, if the input sinewave has a peak to peak amplitude of 40% of V_{Ref+}- V_{Ref-}.   **(04 Marks)**
   c. Bring out the principle of interpolation and decimation.   **(08 Marks)**

6   a.   With a neat block diagram, explain the accumulator and dump circuit. Plot the general frequency response of an averaging filter.   **(10 Marks)**

  b.   Sketch the block level circuit diagram of a fs/4 digital resonator after deriving the transfer function.   **(05 Marks)**

  c.   Discuss the advantages and disadvantages of cascading averaging circuits to increase filter attenuation.   **(05 Marks)**

7   a.   Describe the CMOS process flow with neat sketches.   **(10 Marks)**

  b.   Explain how MOSFET behaves as a capacitor. Also explain the floating MOS capacitor.   **(06 Marks)**

  c.   Explain the simple delay element, using the pass transistors and CMOS inverters.   **(04 Marks)**

8   a.   Draw the arrangement for a 4 bit pipelined adder and full adder bit implemented, using the dynamic logic.   **(08 Marks)**

  b.   Explain the limitation of inverter at the output of op-amp with the help of its transfer curve. How is it overcome?   **(06 Marks)**

  c.   Estimate the high to low and low to high delays in   **(06 Marks)**

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Sixth Semester B.E. Degree Examination, December 2011
Antenna and Propagation

Time: 3 hrs.   Max. Marks:100

*Note: **Answer any FIVE full questions, selecting
at least TWO questions from each part.***

PART – A

1 a. Explain the following terms with proper expressions: i) Directivity   ii) Field pattern
    iii) Half power beam width.   **(09 Marks)**

    b. Show that maximum effective aperture of a $\frac{\lambda}{2}$ dipole is $0.13\,\lambda^2$.   **(06 Marks)**

    c. A radio link has a 15 W transmitter connected to an antenna of $2.5\ m^2$ effective aperture at
5 GHz. The receiving antenna has an effective aperture of $0.5\ m^2$ and is located at a 15 km
line of sight distance from the transmitting antenna. Assume lossless antennas. Find the
power delivered to the receiver.   **(05 Marks)**

2 a. Derive the expression for total field, in case of two isotropic point sources with the same
amplitude and equal phase. Plot the field pattern for two isotropic sources spaced $\frac{\lambda}{2}$ apart.
                                                     (10 Marks)

    b. For a square having radiation intensity $u = u_m \sin^2\phi \sin^3\phi$, given $0 \le \theta \le \pi$ and $0 \le \phi \le \pi$.
Find the directivity by i) Exact method   ii) Approximate method   **(10 Marks)**

3 a. Explain the principle of pattern multiplication.   **(05 Marks)**

    b. A linear array consists of 4 isotropic point sources. The distance between the adjacent
elements is $\frac{\lambda}{2}$. The power is applied with equal magnitudes and a phase difference –dr.
Obtain the field pattern and find BWFN (Beam Width First Null) and HPBW.   **(10 Marks)**

    c. State and prove the power theorem.   **(05 Marks)**

4 a. Show that the radiation resistance of $\frac{\lambda}{2}$ is 73 ohms.   **(06 Marks)**

    b. Derive the expressions for the field components of a short dipole, starting with the
expression of electric potential and vector magnetic potential. Also determine the far-field
component.   **(14 Marks)**

PART – B

5 a. Explain Babinet's principle with illustrations. Discuss features of complementary antenna.
                                                     (10 Marks)

    b. Write short notes on: i) Horn antenna   ii) Loop antenna.   **(10 Marks)**

6 a. Explain the features of an helical antenna. Explain the practical design considerations of the
helical antenna.   **(10 Marks)**

    b. Write short notes on a log periodic antenna.   **(06 Marks)**

    c. A 64 m diameter dish antenna, operating at a frequency of 1.43 GHz is fed by a non-
directional antenna. Calculate its i) HPBW   ii) BWFN.   **(04 Marks)**

7 a. In tropospheric propagation, show that radius of curvature of path is a function of the rate of
change of dielectric constant, with height and also explain the duct propagation of wave.
                                                     (10 Marks)

    b. Derive the expression for resultant field strength at a point due to space wave propagation.
                                                     (10 Marks)

8 a. Define the following terms as related to ionospheric propagation:
    i) MUF   ii) Critical frequency   iii) Virtual height   **(06 Marks)**

    b. Derive the expression for conductivity, relative permittivity and refractive index as a
function of electron density and angular frequency.   **(08 Marks)**

    c. Explain skip distance and derive the expression for skip distance for flat earth surface.
                                                     (06 Marks)

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Sixth Semester B.E. Degree Examination, December 2011
Information Theory and Coding

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1 a. The international morse code uses a sequence of dots and dashes to transmit letters of English alphabets. The dash is represented by a current pulse that has a duration of 3 units and the dot has a duration of 1 unit. The probability of occurrence of dash is 1/3 of the probability of occurrence of a dot.
   i)   Calculate the information content of a dot and a dash.
   ii) Calculate the average information in the dot dash code.
   iii) Assume that the dot lasts 1 msec which is the same interval as the pause between symbols. Find the average rate of information transmission.   **(08 Marks)**

   b. For the source model shown in Fig.Q1(b), find the source entropy and the average information content per symbol in messages containing one, two and three symbols.

Fig.Q1(b)   **(12 Marks)**

2 a. For the binary symmetric channel shown in Fig.Q2(a), find the rate of information transmission over the channel when p = 0.9, 0.8 and 0.6, given that the symbols rate is 1000/sec.   **(06 Marks)**

$P[x = 0] = 1/2$
$P[x = 1] = 1/2$

Fig.Q2(a)

   b. A source emits an independent sequence of symbols A, B, C, D and E with the probabilities 1/4, 1/8, 1/8, 3/16 and 5/16 respectively. Find the Shannon code and efficiency.   **(08 Marks)**

   c. A binary source emits an independent sequence of 0's and 1's, with probabilities p and 1 – p. Prove that the entropy is maximum at p = ½. Plot the entropy.   **(06 Marks)**

3 a. Explain the prefix coding and decision tree with examples.   **(08 Marks)**

   b. A discrete memoryless source has an alphabet of five symbols, with their probabilities as given below.

Symbol	S_0	S_1	S_2	S_3	S_4
Probability	0.55	0.15	0.15	0.10	0.05

Compute two different Huffman codes for this source. For each of the two codes, find
i) The average code word length   ii) The variance of the average code word length over the ensemble of source symbols.   **(12 Marks)**

4 a. Derive an equation for the capacity 'C' of a channel of Bandwidth B Hz effected by additive white Gaussian noise of power spectral density of $N_0/2$. (10 Marks)

 b. An analog signal has a 4 kHz bandwidth and is sampled at 2.5 times the Nyquist rate and each sample is quantized into one of 256 equally likely levels.
   i) What is the information rate of the source?
   ii) Can the output of this source be transmitted without errors over a Gaussian channel with a Bandwidth of 50 kHz and S/N of 20 db?
   iii) What will be the bandwidth requirements of an analog channel for transmitting the output of the source without errors, if the S/N ratio is 10 db? (10 Marks)

PART – B

5 a. Write a note on encoding and decoding of linear block code. (06 Marks)

 b. The parity clock bits of a (8, 4) block code are generated by
   $$C_5 = d_1 + d_2 + d_4 \qquad C_6 = d_1 + d_2 + d_3 \qquad C_7 = d_1 + d_3 + d_4 \qquad C_8 = d_2 + d_3 + d_4$$
   where d_1 , d_2 , d_3 and d_4 are message bits.
   i) Find the generator matrix ad parity check matrix.
   ii) Find the minimum weight of this code.
   iii) Show through an example that this code can detect and correct errors. (08 Marks)

 c. Design a single error correcting code with a message block size of 8-bits. (06 Marks)

6 a. The generator polynomial of a (7, 4) cyclic code is $g(x) = 1 + x + x^3$.
   i) Find the codewords for messages 1010, 1110, 1100, 1111.
   ii) Find the codewords for i) using the systematic form. (08 Marks)

 b. Discuss the features of encoder and decoder, used for cyclic codes, with examples. (12 Marks)

7 Write short notes on any four:
   i) RS codes ii) BCH codes iii) Golay codes
   iv) Shortened cyclic codes v) Burst error correcting codes. (20 Marks)

8 Consider a (3, 1, 2) convolutional code with
   $$g^{(1)} = 110 ; \qquad g^{(2)} = 101 ; \qquad g^{(3)} = 111$$
   i) Draw the encoder block diagram
   ii) Find the generator matrix
   iii) Find the codeward corresponding to the information sequence 11101, using the time domain and transform domain approach. (20 Marks)

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Sixth Semester B.E. Degree Examination, December 2011
Programming in C++

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1 a. List all the features of object oriented programming (OOP) technique. Briefly explain any two of them.   **(07 Marks)**

   b. Mention the application areas of OOP and give examples of OOP languages.   **(04 Marks)**

   c. Explain the following, with examples:
       i) Enumerated datatype   ii) Manipulators   iii) Reference variables.   **(09 Marks)**

2 a. Write a C++ program to find the volume of a sphere and display the result. In this context, explain i) cin   ii) cout   iii) #include   iv) namespace   **(08 Marks)**

   b. Write the definition and give example for each:
       i) Identifiers   ii) Qualifiers   iii) Modifiers   iv) Constant.   **(06 Marks)**

   c. Discuss the precedence and associativity of the operators, with classification. With a programming example, show how to use the 'dot'(.) operator to access structure members.
                                                                                   (06 Marks)

3 a. With flowchart and pseudocode, explain the following:
       i) if   ii) if – else   iii) while   **(09 Marks)**

   b. Write a C++ program to generate the prime numbers between 50 and 500. Display the result using 'setw'.   **(05 Marks)**

   c. Write a C++ program to accept a string from the keyboard, count the different vowels and display each count separately. Use the 'switch' statement.   **(06 Marks)**

4 a. With a programming example, explain the 'call-by-value' and 'call-by-reference' parameter passing methods to a function.   **(08 Marks)**

   b. What is 'inline' function? Explain with syntax and example. What are its limitations?
                                                                                   (06 Marks)

   c. State the requirements for 'function overloading' in C++. Write a C++ program to illustrate this concept, using a function addition( ).   **(06 Marks)**

PART – B

5 a. What are the exceptions? Explain the THROW and TRY exception handling mechanisms, in C++.   **(10 Marks)**

   b. Create a class called EMPLOYEE. The data members are: employee name, employee id and salary per month. 10% bonus will be added at the end of the year. Write member functions to read the details, compute gross salary per annum and display the details. In the main( ) program, make this record for 3 employees. In this context, explain the concept of classes, objects, private and public.   **(10 Marks)**

1 of 2

6 a. With a programming example, explain the concept of 'friend' function and 'friend' class.
   (10 Marks)

   b. What are the constructors? With a programming example, explain the parameterized constructor and copy constructor. **(10 Marks)**

7 a. What is the operator overloading? Write the syntax and name the operators in C++ that cannot be overloaded. **(04 Marks)**

   b. Write a C++ program to illustrate overloading the binary '+' operator to concatenate two strings S_1 = "VTU" and S_2 = "KARNATAKA". Display the concatenated string and two original strings. Use string class and necessary member functions. **(08 Marks)**

   c. What is dynamic memory management? Discuss the use of 'new' and 'delete' operators with a programming example. **(08 Marks)**

8 a. What is the advantage of inheritance? Briefly describe the different classifications, with diagrams. **(06 Marks)**

   b. Create a class called STUDENT, with data members student id, age and fees paid. Using inheritance, create the classes UGSTUDENT and PGSTUDENT with data members as semester and average marks. Write a main( ) program to create two objects of each derived class. Use member functions to read and display the details. **(08 Marks)**

   c. Illustrate with a programming example, how to access base class members in derived class, using the single level inheritance, with public derivation of base class. **(06 Marks)**

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Sixth Semester B.E. Degree Examination, December 2011

Satellite Communication

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting
at least TWO questions from each part.*

PART – A

1 a. What is satellite communication? List the applications and some of the service provided by satellites. **(06 Marks)**

    b. Explain how a satellite continues to be in orbit and derive expressions for :
      i) Satellite velocity   ii) Orbital period. **(08 Marks)**

    c. Define and explain elevation and Azimuth angles of a ground station antenna for communication with an orbiting satellite. **(06 Marks)**

2 a. State Kepler's three laws of planetary motion with the help of appropriate diagrams and give necessary equations. **(08 Marks)**

    b. The orbit for an earth orbiting satellite has an electricity of 0.15 and semi major axis of 9000 kms. Determine : i) Periodic time,   ii) Apogee height,   iii) Perigee height. Given $h = 3.986 \times 10^5$ km^3/s^2. Assume a mean value of 6371 kms for earth's radious. **(06 Marks)**

    c. With the help of a neat sketch, explain : **(06 Marks)**
      i) Inclination   ii) Right ascension of exceeding node   iii) Argument of perigee.

3 a. List out the major subsystems required on satellite. **(04 Marks)**

    b. Briefly describe the three axes method of satellite stabilization. Define the terms roll, pitch and yaw. **(10 Marks)**

    c. State the types of satellite antenna normally used to produce radiation pattern. How spot beams are are produced? **(06 Marks)**

4 a. Derive the satellite link formula. Express the formula in decibels also. **(08 Marks)**

    b. A satellite downlink at 12 GHz operates with a transmit power of 6 watts and an antenna gain of 48.2 dB. Calculate EIRP in dBW. **(04 Marks)**

    c. Show that the rain attenuation in dB is given by $A_p = \alpha R_p^b L_s r_p$ with usual notations. **(08 Marks)**

PART – B

5 a. With the help of a block diagram, explain the arrangement for Master antenna TV system. **(03 Marks)**

    b. Compare CATV and MATV system. **(07 Marks)**

    c. With the aid of a block diagram, describe the functioning transmit-receive earth station. **(10 Marks)**

6 a. Explain the concepts of TDMA and FDMA using appropriate figures. Discuss the relative advantage and disadvantage of each. **(10 Marks)**

    b. Describe briefly the modes of interference that can occur in a satellite communication system. Distinguish between satellite and terrestrial modes of interference. **(10 Marks)**

7 a. Explain : i) Bit rate for digital TV   ii) Radar satellite **(10 Marks)**

    b. Explain in detail GPS along with a block diagram of GPS receiver. **(10 Marks)**

8   Write short notes on : a) Pre assigned TDMA   b) Home satellite TV
                          c) Geo stationary orbit   d) Irridium   **(20 Marks)**

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Sixth Semester B.E. Degree Examination, December 2011
Digital System Design Using VHDL

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1 a. Draw the block diagram and logic circuit of a 2:4 decoder. Write the VHDL code using the case statement. **(10 Marks)**
   b. Write the VHDL code for full adder using logic equations. Draw the logic circuitry and T.T. **(10 Marks)**

2 a. Explain the operation of the basic ROM structure. **(10 Marks)**
   b. An N – bit bidirectional shift register has N parallel data inputs, N outputs, a left serial input (LSI), a right serial input (RSI), a clock input and the following control signals :
   Load : Load parallel data into reg(load overrides shift)
   Rsh : Shift the register right (LSI goes into left end)
   Lsh : Shift the register left (RSI goes into right end)
   If the register is implemented using PAL 22V10 what is the maximum value of N? **(10 Marks)**

3 a. With the state graph of binary multiplier control, write the behavioral model for a 4×4 binary multiplier. **(10 Marks)**
   b. Draw the block schematic of a signed divider (32 bits by 16 bits) with the associated control circuits. Supply the steps of procedure to carry out the division. Draw the state graph for the control circuit. **(10 Marks)**

4 a. Construct an SM chart equivalent to the following state table. Test only one variable in each decision box. Try to minimize the number of decision boxes.

Present state	Next state				o/p $z_1 z_2$			
$x_1 x_2 =$	00	01	10	11	$x_1 x_2 =$ 00	01	10	11
S_0	S_3	S_2	S_1	S_0	00	10	11	01
S_1	S_0	S_1	S_2	S_3	10	10	11	11
S_2	S_3	S_0	S_1	S_1	00	10	11	01
S_3	S_2	S_2	S_1	S_0	00	00	01	01

(10 Marks)
   b. Write VHDL description of the state machine, based on SM chart of Q.No.4(a). **(10 Marks)**

PART – B

5 a. With the help of block diagram, explain the CLB of xilinx 3000 series logic cells in FPGA. **(10 Marks)**
   b. Draw the block diagram of AHera 7000 series CPLD and explain in brief. **(10 Marks)**

6 a. Trace the flow chart for floating point multiplication and explain its operation. **(10 Marks)**
   b. How the bus structure helps in loading the registers? Explain with a neat sketch. **(10 Marks)**

7 a. Using sample waveforms, explain transport and inertial delays in VHDL. **(10 Marks)**
   b. Develop VHDL code for synthesis of a case statement and explain optimization. **(10 Marks)**

8 a. Develop the VHDL model for the memory that does not take time limit into consideration. **(10 Marks)**
   b. Draw the SM chart for simplified 486 bus interface. **(10 Marks)**

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Sixth Semester B.E. Degree Examination, December 2011
Satellite Communication

Time: 3 hrs.   Max. Marks:100

**Note: *Answer any FIVE full questions, selecting
at least TWO questions from each part.***

PART – A

1 a. Mention at least ten salient features of ground wave propagation.   (10 Marks)
   b. Define the wave tilt of ground wave. List the important features of wave tilt.   (10 Marks)

2 a. List and explain the characteristic parameters of ionospheric propagation.   (15 Marks)
   b. Discuss the effect of earth's magnetic field.   (05 Marks)

3 a. State the three laws of Kepler and highlight their significance.   (12 Marks)
   b. What is the importance of local mean solar time and sun synchronicity? Explain.   (08 Marks)

4 a. Mention and explain the three factors that determine the look angles for geostationary orbit.
                                                                                          (07 Marks)
   b. With the figures, explain the phenomenon of earth eclipse of a satellite.   (13 Marks)

PART – B

5 a. Make comparison of the physical cause and importance of the different propagation
       impairments.   (07 Marks)
   b. Starting from the definition of EIRP, derive an expression for the power received as
       $[P_R] = [EIRP] + [G_R] – [FSL]$, taking free–space loss (FSL) into account.   (13 Marks)

6 a. Draw the block diagram and explain the satellite control system, with the tracking, telemetry
       and command.   (10 Marks)
   b. Sketch the power transfer characteristics and phase characteristics of a TWT. Explain their
       significance.   (10 Marks)

7 a. Write and explain any one arrangement diagram for a master antenna T.V. (MATV) system.
                                                                                          (10 Marks)
   b. Draw a detected block diagram of a transmit–receive earth station and explain.   (10 Marks)

8 a. Explain the INTELSAT SCPC channeling scheme for a 36MHz transponder and discuss the
       use of the SCPC system, for thin route message traffic.   (10 Marks)
   b. Draw the block diagrams for on board signal processing for FDMA/TDM operation
       including conventional approach and group signal processing. Explain.   (10 Marks)

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Sixth Semester B.E. Degree Examination, December 2011
Transmission Lines and Antennas

Time: 3 hrs.   Max. Marks:100

Note:1. *Answer any FIVE full questions, selecting*
at least TWO questions from each part.
2. Smith chart usage is permitted.

PART – A

1 a. What are the components of low pass filter constant K type? Deduce the expression to design such a filter by the knowledge of characteristic resistance and the cut-off frequency. Use T section as the basis of analysis. **(10 Marks)**

   b. Impedance measurements made on a 0.25 km field quad cable at 1600 Hz under open and short circuit conditions gave the following results: $\tau_{OC} = 2460 \lfloor -86.3°\Omega$, $\tau_{SC} = 21.5 \lfloor 14°\Omega$. Calculate τ_0 , α and β and the line parameters R, L, G and C per unit length of line.

   (10 Marks)

2 a. Show that the input impedance of OC and SC loss-less transmission lines are purely reactive. Sketch the reactance curves and explain. **(10 Marks)**

   b. A loss-less transmission line with characteristic impedance 50 Ω terminated in a load $50 + J50\Omega$. Using the smith chart find the following: i) VSWR   ii) the magnitude and angle for reflection coefficient   iii) load admittance   iv) the reflection coefficient at a distance $\frac{\lambda}{4}$ from the load. **(10 Marks)**

3 a. Explain the following terms as related to antenna system:
   i) Radiation intensity   ii) Directivity   iii) Beam area   iv) Beam efficiency
   (10 Marks)

   b. Explain Friss transmission formula. Find the maximum power received at a distance of 0.75 km over a free space 110 MHz circuit consisting of a 30 dB gain and receiving antenna with a 25 dB gain. The power input to the transmitting antenna is 120 watts. **(10 Marks)**

4   Write short notes on:
   a. T and π equivalent to lines. **(07 Marks)**
   b. Antenna field zones. **(07 Marks)**
   c. Insertion loss. **(06 Marks)**

PART – B

5 a. State and explain power pattern theorem. **(04 Marks)**
   b. Explain field and phase pattern. **(06 Marks)**
   c. If radiation intensity $U = U_m \sin^2 \theta \sin^3 \phi$, $(0 \le \theta \le \pi, \ 0 \le \phi \le \pi)$. Find i) Exact directivity ii) Approximate directivity. **(10 Marks)**

6 a. Derive the expression for radiation resistance of short dipole with uniform current. **(10 Marks)**
   b. Obtain the Far fields of a thin linear antenna. **(10 Marks)**

7 a. Obtain the field components of a small loop antenna. **(10 Marks)**
   b. Explain Babinet's principle by considering an example. **(10 Marks)**

8   Write short notes on the following:
   a. Plasma antenna.
   b. Ultra wide band antenna.
   c. Embedded antenna.
   d. Log periodic antennas. **(20 Marks)**

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