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10EC/TE61

**Sixth Semester B.E. Degree Examination, June/July 2017**  
**Digital Communication**

Time: 3 hrs.

Max. Marks: 100

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

**PART – A**

- 1 a. What are the merits and demerits of digital communication? (06 Marks)
- b. Find the Nyquist rate for the signal  $g(t) = \cos^2 400\pi t \cos 1000\pi t$ . Plot the spectrum of the signal for  $n = 0, 1$  considering the sampling rate of 1400. (08 Marks)
- c. Derive the time domain and frequency domain expressions for natural samples. Draw the spectrum of sampled signal. (06 Marks)
- 2 a. What is TDM? Draw the block diagram of TDM and explain its working with waveform. (08 Marks)
- b. Derive the signal to quantization noise ratio expression for PCM system. Considering midtread uniform quantization, show that  $(SNR)_{QdB} = 6n - 7.2$ . (08 Marks)
- c. A telephone signal with cutoff frequency of 4kHz is digitized into 8 bit PCM, sampled at Nyquist rate. Calculate transmission BW and  $SNR_Q$ . Assume mid raiser quantization with normalized signal power. (04 Marks)
- 3 a. With neat block diagram, explain the working of DPCM transmitter and receiver. (08 Marks)
- b. For the binary data 10110010, give the following binary data formats:
  - i) Polar format (NRZ)
  - ii) Bipolar format (NRZ)
  - iii) Manchester format
  - iv) Differential encoding (04 Marks)
- c. Derive the power spectral density expression for NRZ bipolar format and draw the PSD curve. (08 Marks)
- 4 a. Define ISI and explain how it arises. (06 Marks)
- b. The binary data 011100101 is applied to the input of a modified duobinary system. Construct the modified duobinary coder output and corresponding receiver output without a precoder. (10 Marks)
- c. What do you mean by equalization? Give the structure of tapped delay line filter and briefly explain how it acts as equalizer. (04 Marks)

**PART – B**

- 5 a. Derive the expression for probability of bit error considering coherent binary frequency shift keying (FSK) signal. (12 Marks)
- b. What is the difference between BPSK and DPSK? Given the binary data 10010011 draw BPSK and DPSK waveforms. (08 Marks)
- 6 a. What is Gram Schmidt orthogonalization procedure? Explain briefly. (06 Marks)
- b. Show that it is possible to construct a set of N orthonormal basis functions from linearly independent signals. (08 Marks)
- c. What is signal space diagram? Obtain the signal space diagram of QPSK by indicating the signals and basic functions. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
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- 7 a. What is maximum likelihood detector? Explain how the decision is made in detecting the signal in ML detector. (06 Marks)
- b. State the properties of matched filter and prove any two properties. (09 Marks)
- c. Explain in brief about correlation receiver. (05 Marks)
- 8 a. What are the advantages of spread spectrum communication? Mention types of SSS. (05 Marks)
- b. Test all three properties of ML sequence after generating PN sequence for a 3 stage feedback shift register. (Assume 100 as initial state) (10 Marks)
- c. Define processing gain and jamming margin. What is the relationship between them? (05 Marks)

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10EC/TE62

**Sixth Semester B.E. Degree Examination, June/July 2017**  
**Microprocessors**

Time: 3 hrs.

Max. Marks:100

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

**PART – A**

- 1
  - a. Explain the architecture of 8086 microprocessor with a neat block diagram. (10 Marks)
  - b. Explain about Instruction execution time dependency parameters. (05 Marks)
  - c. Determine the physical address resulting from the following instructions :
    - i) MOV DL, [BP + SI]      ii) MOV DI, [BX + 100H]
    - iii) MOV [BP + DI + 5], AH    iv) MOV AL, [5036H]
 BP = 7000H , SI = 0350H , SS = 8000H  
 BX = 4FFFH , DS = 2000H AND DI = 6A00H. (05 Marks)
- 2
  - a. Explain the following instruction function with an example :
    - i) DAA    ii) IDIV    iii) AAM    iv) XLAT. (04 Marks)
  - b. Opcode for ADD instruction is 000000DW. Determine the machine language code for the following : i) ADD CL, BH    ii) ADD 4523 [BX + DI], DX. (06 Marks)
  - c. What are Assembler directives? Explain the significance of the following :
    - i) EQU    ii) ALIGN    iii) DT    iv) ASSUME    v) MACRO. (10 Marks)
- 3
  - a. Using table translation instruction write a program to find equivalent seven segment code for the given BCD digit. (06 Marks)
  - b. Explain the following string instructions with examples :
    - i) MOVSB    ii) CMPSB    iii) SCASB    iv) Repeat prefix (REP). (08 Marks)
  - c. Write a program to check the given string is Palindrome or not and display the suitable message. (06 Marks)
- 4
  - a. Draw the interrupt vector table and write the sequence of operation that are performed when an interrupt is recognized. (10 Marks)
  - b. Define the following interrupts :
    - i) Type 0    ii) Type 1    iii) Type 3    iv) Type 4 (04 Marks)
  - c. Write a macro to read a character without echo and read a string of characters from the keyboard. (06 Marks)

**PART – B**

- 5
  - a. Explain about mXn matrix key board interface diagram along with program and flow chart. (10 Marks)
  - b. Define Stepper motor. Explain the interfacing of a stepper motor to 8086 microprocessor with necessary circuit diagram. Write an ALP to rotate the stepper motor clockwise by n steps and anti clock wise by m steps. (10 Marks)
- 6
  - a. With a neat diagram, explain the architecture of 8087 coprocessor. (10 Marks)
  - b. Write 8087 ALP to compute the area of the circle. (05 Marks)
  - c. Convert  $(1259.125)_{10}$  in short real, long real and temporary real formats. (05 Marks)
- 7
  - a. With a neat block diagram, explain the maximum mode operation of 8086. (10 Marks)
  - b. Write short note on : i) PCI    and ii) USB. (10 Marks)
- 8
  - a. Briefly explain about 80386 special registers. (10 Marks)
  - b. Explain the memory system of 80386 with diagram. (04 Marks)
  - c. Write the salient features of 80486. (06 Marks)

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**Sixth Semester B.E. Degree Examination, June/July 2017**  
**Microelectronic Circuits**

Time: 3 hrs.

Max. Marks:100

**Note: Answer Three questions from Part A and Two from Part B.**

**PART – A**

- 1 a. Draw the  $i_D$ - $V_{DS}$  characteristics of an enhancement MOSFET. Indicate all regions of operation and explain it. (07 Marks)
- b. For the circuit shown in Fig. Q1 (b), derive the expression of voltage gain, overall voltage gain, input impedance and output impedance. (10 Marks)

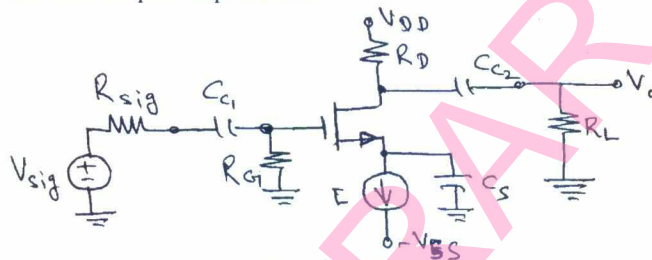


Fig. Q1 (b)

- c. An nMOS transistor has  $V_{t0} = 0.8$  V,  $2\phi_f = 0.7$  V and  $\gamma = 0.4$   $V^{1/2}$ . Find  $V_t$  when  $V_{SB} = 3$  V (03 Marks)
- 2 a. The high frequency response of an amplifier is characterized by the transfer function,  

$$F_H(s) = \frac{1 - \frac{s}{10^5}}{\left(1 + \frac{s}{10^4}\right)\left(1 + \frac{s}{4 \times 10^5}\right)}$$
. Determine the 3-dB frequency. (04 Marks)
- b. Explain the operation of a current mirror using MOSFET. (08 Marks)
- c. Draw the circuit diagram to generate a number of constant currents of various magnitudes using BJT and explain it. (08 Marks)
- 3 a. Draw the circuit of a common gate amplifier with active load and explain it. (07 Marks)
- b. What is a cascade amplifier? Mention the advantages of it. (04 Marks)
- c. Consider a common gate amplifier specified as follows:  $\frac{W}{L} = \frac{7.2 \mu\text{m}}{0.36 \mu\text{m}}$ ,  
 $\mu_n C_{OX} = 387 \mu\text{A}/\text{V}^2$ ,  $\gamma_0 = 18 \text{K}\Omega$ ,  $I_D = 100 \mu\text{A}$ ,  $g_m = 1.25 \text{mA}/\text{V}$ ,  $\psi = 0.2$ ,  $R_S = 10 \text{K}\Omega$ ,  
 $R_L = 100 \text{K}\Omega$ ,  $C_{gs} = 20 \text{fF}$ ,  $C_{gd} = 5 \text{fF}$  and  $C_L = 0$ . Find  $A_{VO}$ ,  $R_{in}$ ,  $R_{out}$ ,  $G_V$ ,  $G_{is}$  and  $G_i$ . (09 Marks)
- 4 a. Explain the operation of a MOS cascade amplifier. (06 Marks)
- b. What is the need for transistor pairings? Draw all transistor pairings and mention advantages of each. (08 Marks)
- c. Derive the expression of CMRR of a MOS differential amplifier for the two different cases. (06 Marks)

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**PART – B**

- 5 a. Explain the operation of a active loaded MOS differential pair. (08 Marks)  
 b. Why differential amplifiers are well suited for IC fabrication? (04 Marks)  
 c. With neat circuit diagram, explain the operation of two-stage CMOS op-amp circuit. (08 Marks)
- 6 a. With a mathematical analysis, explain the effect of negative feedback on gain desensitivity and bandwidth extension. (08 Marks)  
 b. Draw the structure of a series-shunt feedback amplifier and derive the expression of input and output impedance with feedback. (08 Marks)  
 c. Draw the Root locus diagram for an amplifier with three poles and explain it. (04 Marks)
- 7 a. For the circuit shown in Fig. Q7 (a), determine the values of  $V_i$ ,  $i_1$ ,  $i_2$ ,  $V_o$  and  $i_L$ . Also determine the voltage gain  $\frac{V_o}{V_i}$ , current gain  $\frac{i_L}{i_1}$  and Power gain  $\frac{P_o}{P_i}$ . (07 Marks)

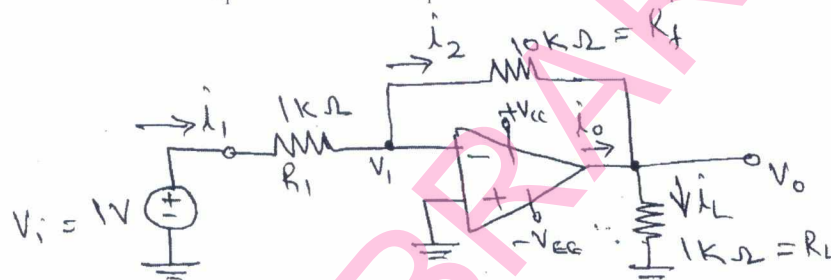


Fig. Q7 (a)

- b. Derive the output voltage expression of a logarithmic amplifier with temperature compensation. (09 Marks)  
 c. With the help of waveform, explain the effect of slew rate limiting on output sinusoidal waveform. (04 Marks)
- 8 a. Define the following performance parameter of a logic circuit family and also draw the propagation delay and switching times waveform of the logic inverter.  
 (i) Noise margin  
 (ii) Propagation delay.  
 (iii) Robustness.  
 (iv) Delay-power product. (10 Marks)
- b. Implement the following expressions using AOI gates and also write logic equivalent circuit:  
 (i)  $F = (A + B)(C + D)$   
 (ii)  $F = XY + \bar{Z}$  (10 Marks)

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10EC64

Sixth Semester B.E. Degree Examination, June/July 2017

**Antenna and Propagation**

Time: 3 hrs.

Max. Marks:100

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

**PART – A**

- 1 a. Define the term directivity and effective aperture of an antenna. Derive the relation for D in terms of  $A_e$ . (08 Marks)
- b. Define the following parameters of antenna:
  - i) Beam area
  - ii) Radiation pattern (08 Marks)
- c. An antenna has a field pattern given by  $E(\theta) = \cos\theta \cos 2\theta$  for  $0 \leq \theta \leq 90^\circ$ . Find:
  - i) The half-power beam width
  - ii) The beam width between first nulls. (04 Marks)
- 2 a. State and prove the power theorem and explain its application to an isotropic source. (04 Marks)
- b. The radiation intensity of an antenna is given by  $U = U_m \sin^2 \theta$  for  $0 \leq \theta \leq \pi/2$  and  $0 \leq \phi \leq 2\pi$ . Find the directivity. (04 Marks)
- c. Explain field and phase pattern. (05 Marks)
- d. Derive an expression for total field in case of two isotropic points with same amplitude and phase. Plot the relative field pattern when these two isotropic sources are spaced  $\lambda/2$  apart. (07 Marks)
- 3 a. Derive the expression for the radiation resistance of short dipole. (08 Marks)
- b. Show that the radiation resistance of a linear  $\lambda/2$  antenna with sinusoidal current distribution is equal to  $73\Omega$ . (08 Marks)
- c. For a short dipole  $\lambda/15$  long, find the efficiency, radiation resistance if loss resistance is  $1\Omega$ . Find also the effective aperture. (04 Marks)
- 4 a. Derive Far field expressions for small loop antenna. (08 Marks)
- b. State and explain Babinet's principle. (06 Marks)
- c. Write notes on patch antenna with applications. (06 Marks)

**PART – B**

- 5 a. Explain the Yagi-Uda array antenna. (08 Marks)
- b. Explain the working of log periodic antenna. (08 Marks)
- c. A 16-turn helical beam antenna has a circumference of  $\lambda$  and turn spacing of  $\lambda/4$ . What is (i) HPBW, (ii) Axial ratio, (iii) Gain? (04 Marks)
- 6 Write short notes on:
  - a. Sleeve antenna (05 Marks)
  - b. Antennas for ground penetrating radars (GPR) (05 Marks)
  - c. Ultra wide band antennas (05 Marks)
  - d. Plasma antenna (05 Marks)

- 7 a. Find the approximate formula for the field strength in VHF propagation and explain how it varies sinusoidally. (10 Marks)
- b. Explain about the diffraction with two basic models. (06 Marks)
- c. A VHF communication is to be established at 90 MHz, with the transmitter power of 35 watts. Calculate the LOS communication distance, if the heights of transmitter and receiver antennas are 40 m and 25 m respectively. (04 Marks)
- 8 a. Derive the expression for refractive index of an ionospheric layer. (10 Marks)
- b. Explain the effects of earth's magnetic field. (06 Marks)
- c. A HF radio link is established for a range of 2000 km. If the reflection region of the ionosphere is at a height of 200 km and has a critical frequency of 6 MHz. Calculate MUF. (04 Marks)

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10EC65

**Sixth Semester B.E. Degree Examination, June/July 2017**  
**Operating System**

Time: 3 hrs.

Max. Marks: 100

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

**PART – A**

- 1 a. Explain the batch processing system with advantages and disadvantages. (10 Marks)  
b. Explain the goals and functions of operating system. (10 Marks)
- 2 a. Explain the differences between monolithic and layered based design. (10 Marks)  
b. Explain micro kernel based operating system. (10 Marks)
- 3 a. Explain programmers view and operating system view of processes. (10 Marks)  
b. Explain the difference between the threads and processes. (10 Marks)
- 4 a. Explain the difference between contiguous and non contiguous memory allocation. (10 Marks)  
b. Explain kernel memory allocation. (10 Marks)

**PART – B**

- 5 a. Explain virtual memory using paging. (10 Marks)  
b. Explain page replacement policies. (10 Marks)
- 6 a. Explain over view of input/output organization. (10 Marks)  
b. Explain allocation of disk place. (10 Marks)
- 7 a. Describe the real time scheduling. (10 Marks)  
b. Explain process scheduling in UNIX. (10 Marks)
- 8 a. Explain message passing with example. (10 Marks)  
b. Describe various interprocess communication schemes with UNIX example. (10 Marks)

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10EC662

Sixth Semester B.E. Degree Examination, June/July 2017

**Satellite Communication**

Time: 3 hrs.

Max. Marks:100

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

**PART – A**

- 1 a. Explain the services provided by a satellite. (06 Marks)
- b. State and explain Kepler's three laws of planetary motion and give necessary equations. (08 Marks)
- c. Define the terms:
  - i) Retrograde orbit and prograde orbit
  - ii) Mean anomaly and true anomaly
  - iii) Ascending and descending node. (06 Marks)
- 2 a. Calculate the semimajor axis for the satellite parameter  $NN = 14.23304826 \text{ day}^{-1}$  and explain the phenomenon Earth eclipse of satellite. Assume  $\mu = 3.986005 \times 10^{14} \text{ m}^3/\text{s}^2$ . (08 Marks)
- b. Calculate the apogee and perigee heights for the orbital parameters  $e = 0.0011501$  and  $a = 7192.335 \text{ km}$ . Assume a mean earth radius of 6371 km. (03 Marks)
- c. Define Sidereal day and Solar day. (02 Marks)
- d. A geostationary satellite is located at  $90^\circ \text{W}$ . Calculate the azimuth angle for an earth station antenna at latitude  $35^\circ \text{N}$  and longitude  $100^\circ \text{W}$ . Also find the range and antenna elevation angle. Assume radius of orbit  $a_{450} = 42164 \text{ km}$  and the average radius of earth  $R = 6371 \text{ km}$ . (07 Marks)
- 3 a. A QPSK signal is transmitted by a satellite. Raised-Cosine filtering is used, for which the roll off factor is 0.2 and BER of  $10^{-5}$  with  $[E_b/N_0] = 9.6 \text{ dB}$  is required. For the satellite downlink, the losses amount to 200 dB the receiving earth station G/T ratio is  $32 \text{ dBK}^{-1}$ , and the transponder bandwidth is 36 MHz. Calculate: i) the bit rate which can be accommodated, and ii) the EIRP required. Assume  $K = -228.6$  with losses 200 in dB. (06 Marks)
- b. Explain carrier to noise ratio of a satellite link. (07 Marks)
- c. Show that the rain attenuation in decibels is given by  $A_p = aR_p^b L_s r_p$  dB. (07 Marks)
- 4 a. Explain momentum wheel stabilization of satellite. (06 Marks)
- b. Explain how station keeping is done in satellites. (06 Marks)
- c. What is transponder of satellite and with a neat diagram, explain wideband receiver of satellite transponder. (08 Marks)

**PART – B**

- 5 a. With the help of a block diagram, explain transmit-receive earth station. (08 Marks)
- b. Describe briefly the modes of interference that can occur in a satellite communication system. (06 Marks)
- c. What is master antenna TV system? With the help of a diagram, describe an arrangement for MATV system. (06 Marks)

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- 6 a. A 14 GHz uplink operates with transmission losses and margins totaling 212 dB and a satellite  $(G/T) = 10$  dB/K. The required uplink  $[E_b/N_0]$  is 12 dB.
- i) Assuming FDMA operation and an earth station uplink antenna gain of 46 dB, calculate the earth station transmitter power needed for transmission of a T1 baseband signal.
  - ii) If the down link transmission rate is fixed at 74 dBb/s, calculate the uplink power increase required for TDMA operation. For T1 bit rate is 1.544 Mb/s or  $[R_b] = 62$  dBb/s,  $K = -228.6$ . (06 Marks)
- b. Explain the following methods in demand-assigned FDMA:
- i) Polling method (04 Marks)
  - ii) Centrally controlled random access. (10 Marks)
- c. Explain on-board signal processing for FDMA/TDM operation. (10 Marks)
- 7 a. Calculate the bit rate that can be carried in the 24 MHz channel using QPSK, allowing a roll off factor of 0.2. (04 Marks)
- b. With respect to direct broadcast satellite service, explain the following:
- i) Orbital spacing
  - ii) Power rating of transponder
  - iii) Frequencies and polarization (08 Marks)
- c. Explain the following:
- i) Transponder capacity (08 Marks)
  - ii) Bit rate for digital TV
- 8 a. Explain a very small aperture terminal system. (08 Marks)
- b. Write short note on:
- i) Radarsat
  - ii) Global positioning system (12 Marks)

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10EC665

## Sixth Semester B.E. Degree Examination, June/July 2017

### Programming in C++

Time: 3 hrs.

Max. Marks:100

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

#### PART – A

- 1 a. What is preprocessor directive? Explain available preprocessor directives in C++ with necessary example. (08 Marks)
- b. What are the advantages of dynamic allocation of arrays? Explain dynamic allocation operators with example. (06 Marks)
- c. Define object oriented design. Explain, what are the basic features of object oriented design. (06 Marks)
- 2 a. Explain following operations:
 

i) Constant	ii) Reference type	iii) Enumeration
iv) Namespace	v) Typedef	vi) Conditional operator

 (12 Marks)
- b. Justify with program how two strings initialized, concatenated, and find the length of the concatenated string. (04 Marks)
- c. Explain vector initialization operations. (04 Marks)
- 3 a. Explain basic bitwise operators of C++ with each example. (06 Marks)
- b. Explain execution operation of continue, break and goto statements. (06 Marks)
- c. Write a C++ program to sort the array of 'n' numbers in ascending order. (08 Marks)
- 4 a. With a programming example, explain the 'call-by-value' and 'call-by-reference' parameter passing methods to a function, define function prototype. (08 Marks)
- b. Write a C++ program to pass array of 10 integer numbers to the user defined function, to find the largest of the array and return to the calling program, and display the largest value in main(). (06 Marks)
- c. Define inline function. With example, explain inline function. What are its limitations? (06 Marks)

#### PART – B

- 5 a. Define exception. What are the advantages of exception? Explain try, catch, throw exception handling mechanism. (08 Marks)
- b. Explain C++ exception features available, catch all, terminate, unexpected. (12 Marks)
- 6 a. Create a class with STUDENT, declare data members as: student name, USN, department, semester, six subject marks. Declare member functions to read( ) and display( ). Calculate the percentage of a student using percent( ). According to percentage assign class to a student using result( ), with following condition, if percentage is
  - i) Above 70% - FCD
  - ii) Between 60% to 69% - FC
  - iii) Between 50% to 59% - SC
  - iv) Below 50% - FAIL
 in main program. Make this record for 10 students. (12 Marks)
- b. Explain with example function overloading for constructor operation. (08 Marks)

- 7 a. What is operator overloading? Give general syntax of operator overloading. (04 Marks)  
b. In C++, justify with programming example how prefix and postfix increment operator overloading distinguished. (06 Marks)  
c. Write a C++ program to illustrate how the binary '+' operator overloaded for addition of two complex numbers using friend function operator overloading. (10 Marks)
- 8 a. Define virtual member. Explain virtual function access with derived class. (06 Marks)  
b. Explain multiple inheritance with constructor and destructor operation executed with example. (06 Marks)  
c. Explain with example private, public, protected base class inheritance operation for at least one level. (08 Marks)

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10ML61

**Sixth Semester B.E. Degree Examination, June/July 2017**  
**Data Communication**

Time: 3 hrs.

Max. Marks: 100

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

**PART – A**

- 1 a. Explain the frequency domain characterization of a communication channel, in detail. (08 Marks)  
b. List the basic properties of digital transmission system. (04 Marks)  
c. Explain digital transmission of analog signal by taking a uniform quantizer and also explain quantization error. (08 Marks)
- 2 a. With a neat block diagram representation explain the quadrature amplitude modulation and demodulation. (10 Marks)  
b. Explain the properties and applications of the following transmission media :  
i) Twisted pair  
ii) Optical fiber. (10 Marks)
- 3 a. Explain the frequency division multiplexing, with a neat diagram. List its different applications. (10 Marks)  
b. Explain space division switching. (cross bar switch and multistage switch). (10 Marks)
- 4 a. With a neat representation explain the three phases of a telephone connection. (07 Marks)  
b. Write a short note on internet protocol(IP). (05 Marks)  
c. List the essential elements of a network architecture. (08 Marks)

**PART – B**

- 5 a. With a neat sketch, explain the seven layered OSI reference model. (10 Marks)  
b. Draw and explain TCP/IP network architecture. (10 Marks)
- 6 a. Explain the service model with neat diagram. (10 Marks)  
b. With neat representations explain the stop-and-wait ARQ protocol. (10 Marks)
- 7 a. With a neat phase diagram, discuss a typical scenario of PPP. (10 Marks)  
b. Explain data link services with PDU's and SDU's. (10 Marks)
- 8 a. What is ALOHA? Explain the slotted ALOHA. (07 Marks)  
b. Explain the following controlled access methods :  
i) Reservation system  
ii) Polling  
iii) Token passing rings. (09 Marks)  
c. Write a note on time division multiple access (TDMA) channelization scheme. (04 Marks)

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10ML62

**Sixth Semester B.E. Degree Examination, June/July 2017**  
**Medical Physics**

Time: 3 hrs.

Max. Marks: 100

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

**PART - A**

- 1 a. Differentiate the temperature scales used for measuring temperature and write a brief note on thermography. (12 Marks)  
b. Discuss the safety aspects with cryosurgery. (08 Marks)
- 2 a. With a neat sketch and relevant equations determine heat losses from the body. (12 Marks)  
b. Illustrate measurement of pressure in the urinary bladder and skeleton. (08 Marks)
- 3 a. Analyse the pressure – airflow relationship between lungs. (10 Marks)  
b. List out the physics of some common lung diseases. (10 Marks)
- 4 a. With a neat sketch analyse carbon-dioxide and oxygen exchange in the capillary system. (08 Marks)  
b. Differentiate between the two types of blood flow. (08 Marks)  
c. Elaborate about transmural pressure. (04 Marks)

**PART - B**

- 5 a. Describe the brain electrical potentials arising from the brain. (10 Marks)  
b. Summarize the effects of high frequency electricity in medicine. (10 Marks)
- 6 a. Explain the principle and working of the stethoscope. (10 Marks)  
b. Explain the process of speech production with relevant figure. (10 Marks)
- 7 a. Describe the following :  
i) Outer ear  
ii) Inner ear. (10 Marks)  
b. Summarize the applications of LASERS in medicine. (10 Marks)
- 8 a. Elaborate about the diffraction effects on the eye. (10 Marks)  
b. Draw the cross section of eye and explain the focusing elements of eye. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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10ML63

**Sixth Semester B.E. Degree Examination, June/July 2017**  
**Biomedical Equipments**

Time: 3 hrs.

Max. Marks:100

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

**PART – A**

- 1 a. With a neat block diagram, highlight the components and the functional aspects of a spectrophotometer. (12 Marks)  
b. Elaborate on the types of Ion – Selection Electrodes used in Electrolyte Analyzers. (08 Marks)
- 2 a. With the aid of a block diagram, explain the construction and working of a complete blood gas analyzers. (12 Marks)  
b. Enumerate the types of blood cells along with their number of cells (in  $\text{mm}^3$ ) and the Mean cell volume ( $\mu\text{m}^3$ ) in the human blood. (08 Marks)
- 3 a. Highlight the transducers used in Audiometry. (08 Marks)  
b. With a neat block diagram, describe the functioning of an Evoked Response Audiometry System. (12 Marks)
- 4 a. Describe the working principle of Surgical Diathermy machine. Justify the same, with a figure as well. (10 Marks)  
b. Highlight the risks associated with Electro surgery. (10 Marks)

**PART – B**

- 5 a. With the aid of a schematic diagram, highlight the working principle of Microwave Diathermy. (10 Marks)  
b. Describe any two applications of Electrical Stimulation in pain relief applications. (10 Marks)
- 6 a. Elaborate on the functions of the human kidney as well as structure of the Nephron. (10 Marks)  
b. With the aid of an appropriate flow diagram, highlight the working of a wearable artificial kidney. (10 Marks)
- 7 a. Explain in detail, the prominent features of the Extra – Corporeal shock ware device. (10 Marks)  
b. With a neat block diagram, describe the construction and working of an anesthesia machine. (10 Marks)
- 8 a. With the aid of a functional diagram, illustrate the working of a positive pressure ventilator. (10 Marks)  
b. Provide a detailed classification of ventilators. Also mention the basis for the classification. (10 Marks)

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10ML64

**Sixth Semester B.E. Degree Examination, June/July 2017**  
**Lasers and Fiber Optics in Medicine**

Time: 3 hrs.

Max. Marks: 100

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

**PART – A**

- 1 a. Explain the operation of a Laser. (10 Marks)  
b. Give comparison of a Laser and on ordinary light source. Explain properties of the Laser light. (10 Marks)
- 2 a. Explain what happens when Laser light interacts with biological tissues. (10 Marks)  
b. Discuss the absorption characteristics of various wavelengths at thermal interaction between lasers and tissues. (10 Marks)
- 3 a. Discuss different attenuation process of Laser in materials. (10 Marks)  
b. Explain the phenomena of Luminescence and Fluorescence. (10 Marks)
- 4 a. Discuss in detail the principles of light transmission in optical fibers. (12 Marks)  
b. Discuss optical properties of optical fibers. (08 Marks)

**PART – B**

- 5 a. Describe the fabrication process of Nonordered fiberoptics. (10 Marks)  
b. Describe Fiberscope. Give its applications. (10 Marks)
- 6 a. With a schematic, explain major components of a medical endoscope. (12 Marks)  
b. Discuss characteristics parameters of clinical endoscopes. (08 Marks)
- 7 a. Explain principles of Endoscopic imaging. (10 Marks)  
b. Give clinical application of Lasers. (10 Marks)
- 8 a. With neat flow diagram explain Laser angioplasty and photodynamic therapy. (12 Marks)  
b. Discuss Ophthalmology. (08 Marks)

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10ML65

**Sixth Semester B.E. Degree Examination, June/July 2017**  
**C++ and Data Structure**

Time: 3 hrs.

Max. Marks: 100

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

**PART – A**

- 1 a. Define object – oriented language. Explain its characteristics. (10 Marks)  
b. Write the basic C++ variable types. (03 Marks)  
c. Write a note on  
i) type long  
ii) compiling and linking. (07 Marks)
- 2 a. Write a C++ program using structure to display the output as follow, model 1234, part 567, cost Rs. 8910. (06 Marks)  
b. Define overloaded function. Explain inline function with an example. (07 Marks)  
c. Write a C++ program in which three functions all access an external variable. (07 Marks)
- 3 a. Define a class. Write its syntax and one example. (06 Marks)  
b. Write a C++ program, COUNTER, providing a counter variable that can be modified only through its member functions. the program output should be as follows :  
C1 = 1  
C2 = 1.2  
C1 = 1 (08 Marks)  
c. Write a note on strings. (06 Marks)
- 4 a. Write a C++ program by overloading + operator to add two objects of type polar (to add two points in polar coordinates). (10 Marks)  
b. Write a C++ program to add three distances in terms of feet and inches. Display the result. (10 Marks)

**PART – B**

- 5 a. Define inheritance. Explain multiple inheritances with example. (10 Marks)  
b. Explain overriding member functions with example. (10 Marks)
- 6 a. Write a C++ program to sort an array of integers using pointers. (10 Marks)  
b. Define virtual function. Write a C++ program which asks the name and age about an object of class person, and then write this object to the disk file PERSON.DAT. (10 Marks)
- 7 a. Write the class matrix using one-dimensional array element to store the rows \* cols elements of a rows X cols matrix. (10 Marks)  
b. Write the class skiplist to represent skip list. (10 Marks)
- 8 a. Explain the linked representation of binary trees. (10 Marks)  
b. Explain the four common ways to traverse a binary tree. (10 Marks)

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10ML662

**Sixth Semester B.E. Degree Examination, June/July 2017**  
**DSP Architecture**

Time: 3 hrs.

Max. Marks:100

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

**PART – A**

- 1 a. What is digital signal processing? List the unique architectural features of DSP processors. (05 Marks)
- b. Find the magnitude and phase response of an FIR filter represented by the difference equation  $y(n) = 0.5x(n) + 0.5x(n - 1)$ . (07 Marks)
- c. With a neat block diagram, explain the scheme of DSP system. (08 Marks)
- 2 a. Calculate the dynamic range and precision of each of the following number representation formats.
  - i) 24-bit, signal – 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. (09 Marks)
- b. Write a note on A/D conversion errors. (05 Marks)
- c. Explain fixed – point format to represent signed integers and signed fractions. (06 Marks)
- 3 a. Explain the status registers of C54XX DSP processor. (08 Marks)
- b. Explain the following addressing modes with a suitable examples :
  - i) Immediate addressing
  - ii) Accumulator addressing
  - iii) Memory mapped register addressing
  - iv) Stack addressing. (08 Marks)
- c. Assume the current contents of AR3 to be 200h, what will be its contents after each of the following C54XX addressing modes used? Assume that the contents of AR0 are 20h
  - i) \*Ar3 + 0B
  - ii) \*AR3 – 0B. (04 Marks)
- 4 a. Draw the schematic diagram of saturation logic and explain the same. (06 Marks)
- b. Explain the purpose of program sequencer. (06 Marks)
- c. What is meant by circular addressing mode? Write pointer updating algorithm for the circular addressing mode and show different cases that encounter during the updating of the pointer. (08 Marks)

**PART – B**

- 5 a. Describe the different stages of pipelining in CS5XX processor. (07 Marks)
- b. Describe the operation of the following instructions of CS4XX processor.
  - i) MPY \* AR2, \*AR4 + 0, B
  - ii) MAC \*AR1, \*AR2 –, A. (08 Marks)
- c. Write an ALP of C54XX processor to compute the sum of three product terms given by the equation  $y(n) = h_0x(n) + h_1x(n - 1) + h_2x(n - 2)$  using MAC instructions. (05 Marks)

- 6 a. Write a program to multiply two QIS numbers using TMS320C54XX processor instruction sets. (07 Marks)
- b. Briefly explain scaling and derive the expression for optimum scaling factor for DIT- FFT butterfly algorithm. (07 Marks)
- c. Write the subroutine for bit reverse address generation. Explain the purpose of each signal involved. (06 Marks)
- 7 a. Draw the timing diagram for memory interface for read-read-write sequence of operation. Explain the propose of each signal involved. (06 Marks)
- b. What are interrupts? How interrupts are handled by the C54XX DSP processor. (07 Marks)
- c. Describe DMA with respect to C54XX DSP processor. (07 Marks)
- 8 a. With the help of block diagram, explain PCM3002 CODEC. (10 Marks)
- b. With the help of block diagram, explain the image compression and reconstruction using JPEG encoder and decoder. (10 Marks)

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