USN | | | | | | | | | |

06EC71

Seventh Semester B.E. Degree Examination, June/July 2011
Computer Communication Networks

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 diagram, explain the TCP/IP reference model, giving a brief description of the protocols in each layer. **(10 Marks)**
     b. Differentiate between CM and CMTS. **(04 Marks)**
     c. Explain the operation of ADSL using discrete multi one modulations indicating the different channels, with a neat diagram. **(06 Marks)**

2   a. Explain byte stuffing and unstuffing and bit stuffing and unstuffing, with necessary diagrams. **(10 Marks)**
     b. With a neat diagram, explain three different types of HDLC frames. **(10 Marks)**

3   a. Define random access method explain three different protocols in this category. **(10 Marks)**
     b. Explain reservation, polling and token passing in controlled access method. **(10 Marks)**

4   a. What are the advantages of dividing an Ethernet LAN with a bridge? Explain with a neat diagram. **(06 Marks)**
     b. Compare the data rates for standard, fast, gigabit and ten-gigabit Ethernet. Mention one example in each case. **(04 Marks)**
     c. Explain DCF and PCF modes of 802.11 MAC protocol. **(10 Marks)**

PART – B

5   a. Define repeater, hub, switch, router and gate way with necessary neat diagrams. **(10 Marks)**
     b. Create a system of three LANs with four bridges. The bridges (B1 to B4) connect the LANs as follows :
         i)   B1 connects LAN1 and LAN2
         ii)   B2 connects LAN1 and LAN3
         iii) B3 connects LAN2 and LAN3
         iv)   B4 connects LAN1, LAN2 and LAN3.
         Choose B1 as the root bridge. Show the forwarding and blocking parts, after applying the spanning tree procedure. **(10 Marks)**

6   a. Distinguish between class A, class B and class C addressing. **(06 Marks)**
     b. What is subnetting? Why it is required? What is the maximum number of subnets in class C networks with the following subnet mask?
         i)   255.255.255.0
         ii)   255.255.255.224
         iii) 255.255.255.248. **(06 Marks)**
     c. Explain IPV4 header format. **(08 Marks)**

7   a. With necessary diagrams, explain distance vector routing. **(10 Marks)**
     b. Explain briefly forwarding techniques. Explain three different forwarding techniques. **(10 Marks)**

8   a. Explain connection establishment and connection termination in TCP. **(10 Marks)**
     b. Describe DNS in the internet. **(10 Marks)**

* * * * *

Seventh Semester B.E. Degree Examination, June/July 2011

Optical Fibre 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. Discuss briefly the inherent advantages of optical fibers over conventional copper systems.
                                                                                (06 Marks)
   b. Describe the different types of optical fiber waveguide structures, using ray theory with neat diagrams. Explain the light propagation.   (08 Marks)
   c. Briefly discuss modified chemical vapor deposition (MCVD) process of fabrication of optical fiber, with neat diagrams.   (06 Marks)

2 a. Describe the different types of attenuation mechanism for an optical fiber.   (08 Marks)
   b. Derive an equation for material dispersion and waveguide dispersion in an optical fiber.
                                                                                (08 Marks)
   c. A 30 km long optical fiber has an attenuation of 0.4 dB/km at 1310 nm, with input decibel power level referred to 1 mW. Find out the optical power output, if 200 µW of optical power is launched into the fiber.   (04 Marks)

3 a. With a neat diagram, explain the working of an edge-emitting double-heterojuction LED structure.   (08 Marks)
   b. Discuss the different types of noise which occur in photo detectors.   (08 Marks)
   c. An InGaAs pin-photodiode has the following parameters at a wavelength of 1300 nm.
       i)   Quantum efficiency = 0.90
       ii)   Plank's constant = 6.625×10^{-34} J.S.
       iii) Electron charge = 1.6×10^{-9} C. (Assume velocity = 3×10^8 m/sec)
       Assume surface leakage current negligible. Find out the primary photo detector current.
                                                                                (04 Marks)

4 a. Explain the different types of fiber splicing techniques, with neat diagrams.   (06 Marks)
   b. With the principal requirements of a good connector design, explain basic coupling mechanism used in Butt-Joint and expanded-beam connectors.   (10 Marks)
   c. A GaAs optical source with refractive index of 3.6 is coupled to a silica fiber that has a R.I. of 1.48. If the fiber end and the source are in close physical contact, find out the Fresnel reflection (R) and power loss in dB.   (04 Marks)

PART – B

5 a. With a neat diagram, explain the working of optical receiver.   (08 Marks)
   b. Discuss briefly, how the eye diagram is powerful measurement tool for assessing the data-handling ability in a digital transmission system.   (08 Marks)
   c. Differentiate between Heterodyne and Homodyne coherent detection schemes, with respect to probability of error function of a BER.   (04 Marks)

6 a. Discuss the basic elements of an analog link and the major noise contributors of an analog link, with a neat diagram. **(08 Marks)**

  b. With a simplex point-to-point link, explain the key system requirements which are needed in analyzing a link and how to fulfill these requirements. **(08 Marks)**

  c. Explain the polarization mode dispersion penalty in power penalties of a digital link. **(04 Marks)**

7 a. With a neat diagram, explain the working of dielectric thin film filters. **(08 Marks)**

  b. With basic operational principles of WDM, explain the working of typical WDM network and mention WDM standards. **(08 Marks)**

  c. Explain MEMS technology, with a simple diagram. **(04 Marks)**

8   Write short notes on:

  a. Optical amplifiers **(10 Marks)**

  b. SONET/SDH **(10 Marks)**

* * * * *

Seventh Semester B.E. Degree Examination, June/July 2011
Power Electronics

Time: 3 hrs.   Max. Marks:100

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

PART – A

1   a.   Give the definition of power electronics. Explain the relationship of power electronics to power, electronics and control. Mention any two applications of PE. **(06 Marks)**
    b.   With the circuit diagram, input and output waveforms, explain the control characteristics of SCR and IGBT. **(06 Marks)**
    c.   Explain any four different types of power converter circuits with the circuit, input and output waveforms. Also, mention one application of each type. **(08 Marks)**

2   a.   What is the necessity of base drive control in a power transistor? Explain proportional base control. **(08 Marks)**
    b.   A transistor switch of Fig.Q2(b) has β in the range of 8 to 40. Calculate i) the value of R_B that results in saturation, with an overdrive factor of 5. ii) The forced β_f and iii) The power loss in the transistor. **(06 Marks)**
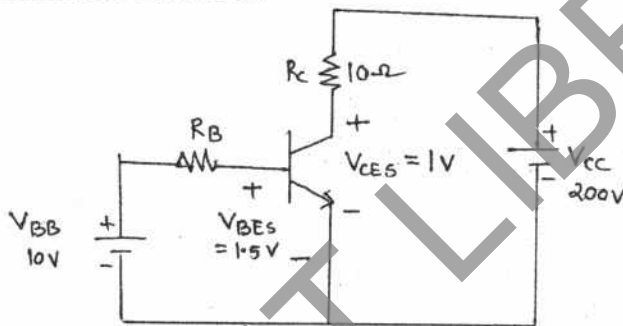

Fig.Q2(b)   Fig.Q3(c)
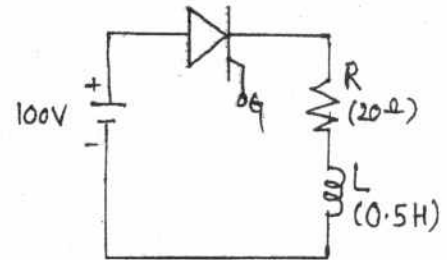
    c.   With necessary sketches, explain briefly the switching characteristics of an IGBT. **(06 Marks)**

3   a.   Sketch the gate characteristics of an SCR and explain the different regions of gate characteristics. Also indicate different regions, different voltages and different currents on the gate characteristics. **(10 Marks)**
    b.   With a neat circuit diagram and waveforms, explain the resistor triggering circuit. **(06 Marks)**
    c.   The latching current of a thyristor shown in Fig.Q3(c) is 50 mA. The duration of gate pulse is 50 µsec. Will the thyristor get fired? **(04 Marks)**

4   a.   With a neat circuit diagram and waveforms, explain the working of a single phase full converter feeding highly inductive load. Derive the expression for the average output voltage and rms output voltage. **(10 Marks)**
    b.   Give the equations to show that the power factor of semiconverter is better than that of full converter. **(04 Marks)**
    c.   Design UJT relaxation oscillator for triggering of thyristor. The UJT has the following parameters $\eta = 0.7$, $I_P = 50$ µA, $V_V = 2V$, $I_V = 6$ mA, $V_{BB} = 20V$, $R_{BB} = 7$ kΩ, $I_{EO} = 2$ mA. Also determine the limits for the output frequency of the oscillator. Assume $V_{g(min)} = 0.2V$. **(06 Marks)**

PART – A

5   a.   With a neat circuit diagram and waveforms, explain the auxiliary commutation.   **(10 Marks)**

     b.   For the complementary commutation circuit show in Fig.Q5(b), calculate the values of C to provide circuit turn off time of 20 μsec.   **(06 Marks)**
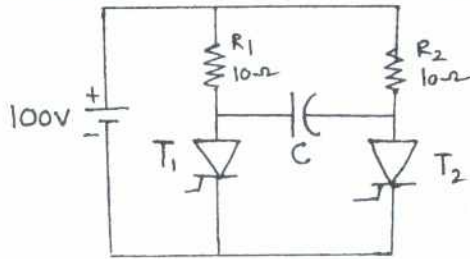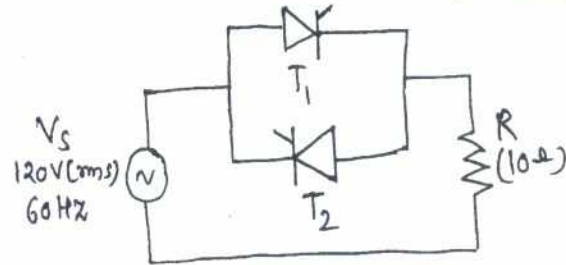

Fig.Q5(b)

Fig.Q6(c)

     c.   State the conditions under which load carrying thyristor can be successfully commutated.   **(04 Marks)**

6   a.   With a necessary waveforms, explain the operation of a single phase full wave controller with inductive load. Derive the expression for rms output voltage.   **(08 Marks)**

     b.   What is an ac voltage controller? With the help of circuit diagram and waveform, explain the principle of phase control.   **(06 Marks)**

     c.   A 1ϕ full wave ACVC has a resistive load of R = 10 Ω as shown in Fig.Q6(c). The input is V_S = 120 V(rms), 60 Hz. The delay angle of thyristors T_1 and T_2 are equal to $\alpha_1 = \alpha_2 = \pi/2$. Calculate i) rms output voltage ii) the average current through thyristors I_A iii) rms current of thyristors I_R iv) the input P.F.   **(06 Marks)**

7   a.   Explain the different control strategies used in choppers.   **(06 Marks)**

     b.   With a neat circuit diagram and waveforms, explain the operation of Jones chopper.   **(10 Marks)**

     c.   In the chopper circuit shown in Fig.Q7(c), the average output voltage is 109 V. The voltage drop across chopper switch when it is ON is V_S = 2 V. The load resistor R = 10Ω, f =1.5 kHz and duty cycle ratio δ = 50%. Calculate the i) dc input voltage to the chopper ii) rms output voltage.   **(04 Marks)**
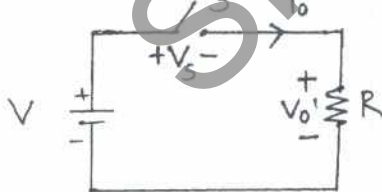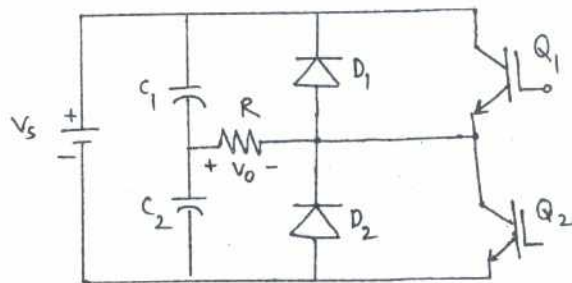

Fig.Q7(c)

Fig.Q8(c)

8   a.   With necessary sketches, explain the single phase transistorized current source inverter.   **(08 Marks)**

     b.   With necessary waveforms, explain the single pulse width modulation technique of varying the magnitude of output voltage in a single-phase inverter.   **(06 Marks)**

     c.   The single phase bridge inverter in Fig.Q8(c) has a resistive load of R = 2.4Ω and the dc input voltage is V_S = 48V. Calculate i) the rms output voltage at the fundamental frequency V_{01} ii) the output power iii) the average and peak currents of each transistor iv) the peak reverse blocking voltage V_{BR} of each transistor v) the THD vi) D.F.   **(06 Marks)**

* * * * *

Seventh Semester B.E. Degree Examination, June/July 2011
DSP Algorithms & Architecture

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 a digital signal processing system with the help of a block diagram. **(08 Marks)**
 b. The signal shown in the following figure is to be sampled. Determine the minimum sampling rate without any aliasing effect. If the signal is sampled at a rate 8 kHz, determine the cut off frequency of the anti-aliasing filter. **(06 Marks)**
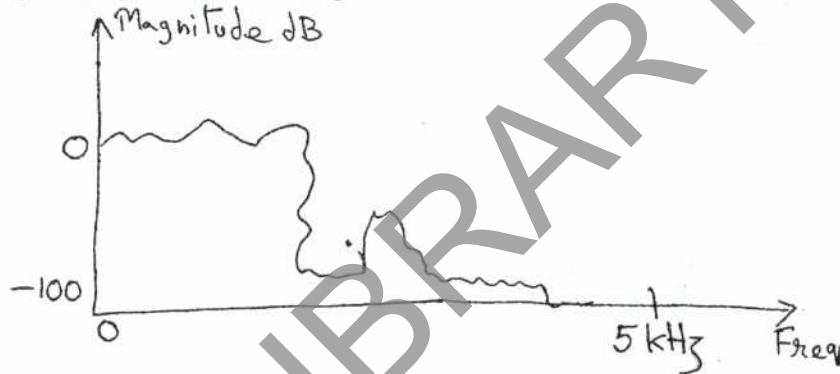

Fig. Q1 (b)

 c. Explain with the help of mathematical equations, how signed numbers can be multiplied. **(06 Marks)**

2 a. Implement a 3-bit shift right, barrel shifter. Tabulate the outputs for different bit shifts. **(10 Marks)**
 b. 256 unsigned numbers, 16 bit each are to be summed up in a processor. How many guard bits are needed to prevent overflow? **(03 Marks)**
 c. Discuss the role of saturation logic. Explain its function with the help of a block diagram. **(07 Marks)**

3 a. Implement an 8 tap or 8 co-efficients FIR filter using a single MAC unit and other standard blocks. **(04 Marks)**
 b. Discuss any three data addressing modes of a TMS320C54XX processor. Give one example for each mode. **(09 Marks)**
 c. Explain sequential and other types of program control. **(07 Marks)**

4 a. Find out the contents of accumulators A, B and T register after execution of each of the following instructions:
 i) MAC *AR5+,#0123h, A
 ii) MPY #0123, A
 Initial contents in both the cases are as follows:

 A 010h,   AR5   0410h
 0410h 10h   T   020h
 0411h 11h   B   030h   **(10 Marks)**

b. Show the pipeline operation with the help of a table, for the following sequence of instructions if the initial value of AR3 is 81 and the values stored in memory location 81, 82, 83 are 1, 2 and 3 respectively. Also tabulate the contents of AR3 and A at the end of each cycle.
Instructions:
LD*AR3+,A
ADD #1000h, A
STL A, *AR3+ (10 Marks)

PART – B

5 a. What values are represented by the 16 bit fixed point number N = 2000 h in the Q0, Q7 and Q15 notations? (09 Marks)
   b. Explain with the help of a block diagram and mathematical equations, the implementation of a second order IIR filter. No program code is expected. (11 Marks)

6 a. Sketch a signal flow graph for a general butterfly computation. (04 Marks)
   b. Derive the expressions for computation of outputs of the butterfly sketched in Q6 (a). (06 Marks)
   c. Determine the optimum scaling factor to prevent overflow. (10 Marks)

7 a. Sketch the I/O interface signals at the pins $R/\overline{W}$, IS and $\overline{IOSTRB}$ for a read-write-read sequence of operations. (08 Marks)
   b. What is the range of addresses that can be decoded if A19 is pulled low in a processor with 20 address lines? (06 Marks)
   c. What is interrupt? (02 Marks)
   d. What are the various classes of interrupts available in the TMS320C5416 processor? (04 Marks)

8 a. Explain with the help of a block diagram, how DMA operation is configured. (05 Marks)
   b. Explain each instruction in the following code:
   DMSA, set 55h
   DMSDN, set 57h
   DMSRC2, set 0Ah
      STM DMSRC2, DMSA
      STM #1110h, DMSDN
   What will be the content of DMSRC2 after execution of this instruction? (05 Marks)
   c. Explain JPEG encoding and decoding with the help of a block diagram. (10 Marks)

* * * * *

Seventh Semester B.E. Degree Examination, June/July 2011
Data Structure Using 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 function overloading? Explain with an example.   (08 Marks)
   b. Write a program to display the Age, Name and Salary of a person using Now and delete operators.   (12 Marks)

2 a. What is linear list? Write the ADT of linear list.   (06 Marks)
   b. What is doubly linked representation? Explain with an example.   (08 Marks)
   c. Give the comparison between formula based representation and linked representation.   (06 Marks)

3 a. What is Row major and column major mapping? Explain with an example. (08 Marks)
   b. Write a program to illustrate the class Diagonal matrix.   (12 Marks)

4 a. What are the ADT of stack? Write a programme to illustrate the customized version of stack.   (10 Marks)
   b. Write a program to explain the concept of Rearrange Rail Road calls with an example.   (10 Marks)

PART – B

5 a. What is circular queue representation? Write a program to implement the linked queue function implementation.   (10 Marks)
   b. Explain the ADT of a Dictionary. Write a program to insert an element into a sorted chain. (10 Marks)

6 a. Explain the concept of Hashing with linear open addressing with an example.   (12 Marks)
   b. Reduce the condition for performance analysis in the Hash table with an example. (08 Marks)

7 a. Explain the properties of Binary tree.   (08 Marks)
   b. Write a program to illustrate the post order, preorder and inorder. (12 Marks)

8 a. What is MaxHeap? Write a program to insert an element into a MaxHeap. (10 Marks)
   b. What is binary search tree? Write a program to delete an element from a Binary search tree. (10 Marks)

* * * * *

06EC762

Seventh Semester B.E. Degree Examination, June/July 2011
Real Time Systems

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 the real time system? Explain the computer control system showing communication tasks with the block diagram. **(10 Marks)**
   b. Explain the following types of programming:
      i) Multitasking   ii) Real time   **(06 Marks)**
   c. Differentiate between clock based and event based tasks. **(04 Marks)**

2 a. Explain the sequence control by taking the example of a simple chemical reactor vessel. Show the block diagram of a typical chemical batch process. **(10 Marks)**
   b. Explain the dual computer scheme. **(05 Marks)**
   c. List out the responsibilities of a control engineer in designing the suitable computer system. **(05 Marks)**

3 a. Write the block diagram of a single chip micro computer and explain the following blocks:
      i) Interrupt controller   ii) Series communication   iii) EPROM   **(06 Marks)**
   b. Write the block diagram of an interrupt vectoring using priority encoding circuit and explain. Show the timing diagram of simplified READ operation. **(10 Marks)**
   c. Explain the following : **(04 Marks)**
      i) HDLC protocol   ii) Asynchronous and synchronous transmission techniques.

4 a. A stream of data in character form is received from a remote station over a serial link. The data has to be processed character by character by a routine process item until the EOT character is received. The EOT must not be processed. Write a simple loop structure using EXIT statement. **(06 Marks)**
   b. List out some major requirements that CUTLASS language has to meet. **(08 Marks)**
   c. Explain the use of co-routines showing an example. **(06 Marks)**

PART – B

5 a. Explain the typical structure of a RTOS. **(08 Marks)**
   b. What is task management? Explain the typical task state diagram. **(08 Marks)**
   c. Write notes on : i) Semaphore   ii) Swapping. **(04 Marks)**

6 a. Explain the following loss system commands :
      i) DTRC01   ii) INRC02   iii) OVCC01   iv) OURC01
      v) FMRC01   vi) SCRC11   vii) DORC04   viii) RMRC01   **(08 Marks)**
   b. Define the following :
      i) Live lock   ii) Dead lock   iii) Indefinite postponement   **(06 Marks)**
   c. Show the OS Kernel Hierarchy and briefly explain them. **(06 Marks)**

7 a. Considering a system comprising of several hot air blowers. Prepare a specificator document of the same. (Assume planning phase has been completed) **(10 Marks)**
   b. Write the flow chart for a single program approach. **(05 Marks)**
   c. Explain the concept of data sharing using common memory. **(05 Marks)**

8 a. Show the outline of abstract modeling approach of Ward and Mellor and explain. **(10 Marks)**
   b. Differentiate between Ward Mellor and Hatley and Pirbhai methodologies. **(05 Marks)**
   c. Explain the CFDO drying over controller using Hatley and Pirbhai notation. **(05 Marks)**

* * * * *

Seventh Semester B.E. Degree Examination, June/July 2011
Human Resource Management

Time: 3 hrs.   Max. Marks:100

Note: *Answer FIVE full questions selecting atleast TWO*
questions each from Part – A and Part - B.

PART – A

1 a. What are the main features of HRM?   (06 Marks)
   b. Outline the impact of political - legal, economical and technological factors on HR function.
                                                                            (07 Marks)
   c. Differentiate between personnel management and Human Resource Management. (07 Marks)

2 a. Explain Human resources planning in detail.   (08 Marks)
   b. What are the factors to be considered in formulating the recruitment policy? (06 Marks)
   c. Differentiate between Recruitment and Selection.   (06 Marks)

3 a. What is selection? What is its importance?   (05 Marks)
   b. List the advantage and disadvantage of having a complete medical insurance given to all
      new employees.   (06 Marks)
   c. Bring out the factors which influence the recruitment and explain the external sources of
      recruitment.   (09 Marks)

4 a. What do you understand by employee remuneration? What is its significance? (05 Marks)
   b. Evaluate the 360 degree feedback as a technique of appraisal.   (06 Marks)
   c. Bring out the need, criteria and techniques of evaluation of training results. (09 Marks)

PART – B

5 a. Explain the nature, importance and drawbacks of incentive payments in detail. (10 Marks)
   b. Bring out the various employee benefits and services. Describe each in brief. (10 Marks)

6 a. Why is work stress caused? How can it be eliminated?   (05 Marks)
   b. What is safety? Explain the safety programme.   (05 Marks)
   c. Establish a correlation between welfare and productivity.   (05 Marks)
   d. List out various types of welfare.   (05 Marks)

7 a. Define a trade union. Why do employees join unions?   (05 Marks)
   b. Bring out the provisions of the trade unions act 1926.   (07 Marks)
   c. Bring out the parties and their roles in IR.   (08 Marks)

8 a. What are the natures of Industrial Relations?   (08 Marks)
   b. "The role of judiciary in IR has been regressive". Give your view point. (12 Marks)

*****