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06EC71

Seventh Semester B.E. Degree Examination, December 2010
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. What are the levels of addresses that are used in an internet, employing the TCP/IP protocols? **(10 Marks)**
    b. What are different types of services provided by telephone networks? **(06 Marks)**
    c. Name the major components of a telephone network. **(04 Marks)**

2   a. Explain the stop-and-wait protocol, for noisy channels. **(10 Marks)**
    b. What are the three types of frames in HDLC protocol? Explain each of them briefly. **(10 Marks)**

3   a. Explain pure ALOHA protocol. **(06 Marks)**
    b. Pure ALOHA network transmits 200-bit frames on a shared channel of 200 Kbps. What is the throughput if the system produces :
       i) 1000 frames/sec   ii) 500 frames/sec   iii) 250 frames/sec? **(04 Marks)**
    c. Discuss the three controlled access methods. **(10 Marks)**

4   a. Explain the goals, MAC sub layer and physical layer of the fast Ethernet. **(10 Marks)**
    b. Explain briefly the baseband layer in the Bluetooth layers. **(10 Marks)**

PART – B

5   a. Explain briefly the three criteria of the transparent bridge. **(10 Marks)**
    b. Explain virtual LANs systems. **(10 Marks)**

6   a. Find the class of the following IP addresses:
       i)   237.14.2.1
       ii) 208.35.54.12
       iii) 129.14.6.8
       iv) 114.34.2.8 **(04 Marks)**
    b. What is NAT? How can NAT help in address depletion? **(06 Marks)**
    c. Explain IPV6 addresses. **(10 Marks)**

7   a. Explain the path vector routing, for an interdomain system. **(10 Marks)**
    b. Explain the Core-Based Tree (CBT). **(10 Marks)**

8   Write short notes on any TWO of the following : **(20 Marks)**
    a. UDP
    b. TCP
    c. DNS

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Seventh Semester B.E. Degree Examination, December 2010

Optical Fiber 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 are the advantages of optical fiber communication? **(06 Marks)**
    b. Explain the structure of single mode and multimode step index and graded-index optical fibers with cross section and ray path. **(07 Marks)**
    c. What are the different fiber materials used in optical communication? Explain briefly. **(07 Marks)**

2   a. Explain the different types of bending losses in optical fiber. **(08 Marks)**
    b. Explain the material dispersion in optical waveguides. **(06 Marks)**
    c. Explain the following parameters on optical fiber:
       i)   Absorption
       ii) Scattering loss **(06 Marks)**

3   a. With schematic of an edge-emitting double heterojunction LED, explain the operation. **(06 Marks)**
    b. Give comparison between LED and laser diode considering the different parameters. **(06 Marks)**
    c. A given APD has a quantum efficiency of 65% at wavelength of 900 nm. If 0.5 microwatt of optical power produces a multiplied photocurrent of 10 micro Amps, find the multiplication factor M. **(08 Marks)**

4   a. Explain the mechanical misalignment between two fibers. **(06 Marks)**
    b. An optical source has refractive index of 3.6 and is coupled to a fiber of 1.48 refractive index. Consider the medium between fiber and source has similar index as that of fiber. Calculate Fresnel reflection and loss of power in dBs. **(06 Marks)**
    c. Explain the following briefly:
       i)   Fiber splices
       ii) Fiber connectors. **(08 Marks)**

PART – B

5   a. With a neat diagram, explain the operation of transimpedance preamplifier equivalent circuit. **(06 Marks)**
    b. An In GaAs PIN photodiode has the following parameters at a wavelength of 1300 nm :
       I_D = 4 nA, η = 0.9, R_L = 1000 Ω and the surface leakage current is negligible. The incident optical power is 300 nw (-35 dBm) and the receiver bandwidth is 20 MHz. Find the various noise terms of the receiver. **(08 Marks)**
    c. Explain the analog receiver briefly. **(06 Marks)**

6   a. With a diagram, explain the operation of multichannel AM briefly. **(06 Marks)**
    b. Explain the radio over fiber concept of a broadband wireless access network for interconnecting antenna base stations with the central controlling office. **(07 Marks)**
    c. What is rise time budget? Explain. Derive an expression for total rise time or total system rise time (t_{sys}). **(07 Marks)**

7   a. Explain the implementation of a typical WDM network containing various types of optical amplifiers. **(06 Marks)**
    b. Explain the operation of a polarization-independent isolator made of three miniature optical components. **(07 Marks)**
    c. Explain the operation of optical adding and dropping wavelengths with a 4×4 OADM device that uses miniature switching mirrors. **(07 Marks)**

8   Write short notes on the following: **(20 Marks)**
    a. Optical amplifier
    b. Semiconductor optical amplifier
    c. SONET / SDH network services
    d. Optical interface.

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Seventh Semester B.E. Degree Examination, December 2010
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.   Mention and explain the different types of power electronic converter systems. Draw their input/output characteristics.   **(06 Marks)**
   b.   Mention and explain the classification of power semiconductor switching devices, on the basis of control characteristics. Give an examples.   **(06 Marks)**
   c.   Give symbol, characteristic features of the following devices :
     i) GTO ;   ii) TRIAC ;   iii) MOSFET ;   v) MCT.   **(08 Marks)**

2   a.   With the necessary waveforms, explain the switching characteristics of a power transistor.   **(08 Marks)**
   b.   The bipolar transistor of Fig.Q.2(b) is specified to have β in the range 8 to 40. The load resistance is $R_C = 11\Omega$. The dc supply voltage is $V_{CC} = 200V$ and the input voltage to the base circuit is $V_B = 10V$. $V_{ce(sat)} = 1.0V$ and $V_{BE(sat)} = 1.5V$. Find : i) The value of R_B that results in saturation with an overdrive factor of 5 ;   ii) The forced β_f ;   iii) The power loss P_T in the transistor.   **(06 Marks)**
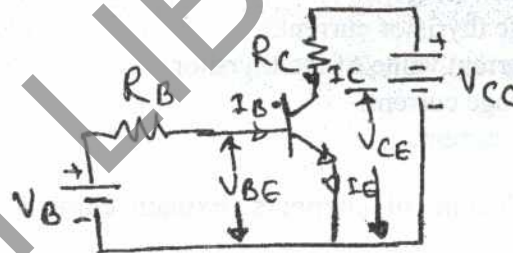

Fig.Q.2(b).

   c.   Give the comparison between MOSFET and IGBT.   **(06 Marks)**

3   a.   Draw the two transistor model of a thyristor and derive an expression for the anode current in terms of the common base current gain α_1 and α_2 of the transistors.   **(08 Marks)**
   b.   Distinguish between :
     i)   Latching current and holding current.
     ii)   Converter grade thyristor and inverter grade thyristor.
     iii)   Thyristor turn – off time and circuit turn – off time.   **(08 Marks)**
   c.   A thyristor is supplied from 230V, 50Hz mains. If the conduction angle is 120°, determine the voltage at which the thyristor is triggered.   **(04 Marks)**

4   a.   With the necessary circuit and waveforms, explain the principle of operation of single phase full converter with R – L load. Derive an expression for the average output voltage.   **(08 Marks)**
   b.   With a neat circuit diagram, and waveforms, explain the principle of operation of dual converter, with and without circulating current.   **(08 Marks)**
   c.   What are the advantages and drawbacks of circulating current mode of operation of a dual converter?   **(04 Marks)**

PART – B

5 a. What do you mean by commutation? Explain briefly the different types of commutation.
(08 Marks)

   b. With necessary circuit and waveforms, explain self commutation scheme. (06 Marks)

   c. In the impulse commutated thyristor circuit of Fig.Q.5(c), determine the available turn – off time of the circuit, if $V_S = 200V$, $R = 10\ \Omega$ $C = 5\ \mu F$ and $V_O = V_S$. (06 Marks)

Fig.Q.5(c).
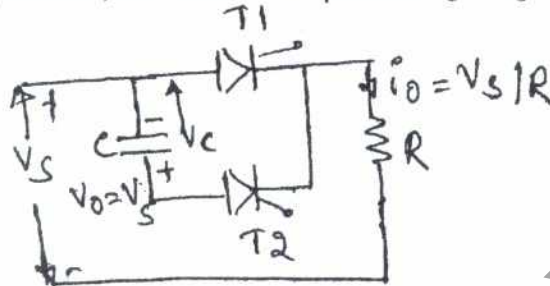
6 a. Define the following ;
   i) Delay angle ; ii) Extinction angle ; iii) Conduction angle (03 Marks)

   b. What problem is caused by sharp single pulse triggering in a 1 ϕ AC voltage controller, when the load is inductive? How can this be solved? (05 Marks)

   c. A 1 ϕ halfwave ac voltage controller has an input voltage of 230 V, 50 Hz and a load resistance of 10 Ω. The firing angle of thyristor is 90° in each positive half cycle. Find :
   i)   Average output voltage.
   ii)   RMS output voltage.
   iii) The average thyristor current.
   iv)   The rms current value of the thyrsitor.
   v)   Diode average current.
   vi)   Diode rms current. (12 Marks)

7 a. Give the classification of choppers. Explain class E chopper with circuit and quadrant diagram. (06 Marks)

   b. A chopper is feeding an RL load as shown in Fig.Q.7(b). The chopper frequency is 1 kHz and duty cycle K = 0.5.
   Calculate :
   i)   The minimum instantaneous load current I_1 ; ii) The peak instantaneous load current I_2 ;
   iii) The average value of load current I_a ; iv) The rms load current I_o. (08 Marks)

Fig.Q.7(b).
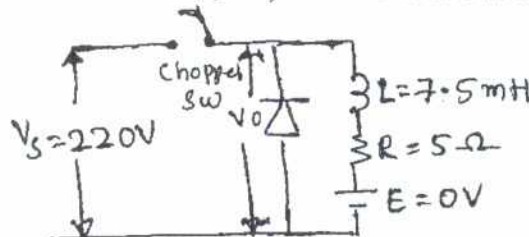
   c. With the help of a circuit diagram and waveforms, explain the working principle of a step - up chopper. (06 Marks)

8 a. What do you mean by inverters? Explain the principle of operation of 1 ϕ half bridge inverter. (08 Marks)

   b. Write and explain the performance parameters of an inverter. (06 Marks)

   c. With a neat circuit, explain the variable DC link inverter. (06 Marks)

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Seventh Semester B.E. Degree Examination, December 2010
DSP Algorithms and 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. An analog signal is sampled at the rate of 8 kHz. If 512 samples of this signal are used to compute DFT, X(k), determine the analog and digital frequency spacing between adjacent X(k) elements. Also, determine analog and digital frequencies corresponding to k = 64. **(06 Marks)**

   b. With a neat block diagram, explain the scheme of a DSP system. **(08 Marks)**

   c. Let x(n) = [3, 2, - 2, 0, 7]. It is interpolated using an interpolation filter b_k = [0.5, 1, 0.5], with interpolation factor 2. Determine the interpolated sequence. **(06 Marks)**

2 a. Draw the schematic diagram of the saturation logic and explain the same. **(06 Marks)**

   b. Explain how the circular addressing mode and bit reversal addressing mode are implemented in a digital signal processor. **(08 Marks)**

   c. Explain the purpose of program sequencer. **(06 Marks)**

3 a. Identify the addressing mode of the source operand in each of the following instructions:
   i) ADD *AR2, A   ii) ADD *AR2+, A   iii) ADD *AR2+%, A
   iv) ADD #OFFh, A   v) ADD ABCDh, A   vi) ADD *AR2+OB, A **(06 Marks)**

   b. Explain the PMST register. **(08 Marks)**

   c. With an example each, explain immediate addressing mode, absolute addressing mode, direct addressing mode. **(06 Marks)**

4 a. Differentiate between MAC & MACD instructions by way of explaining them. **(06 Marks)**

   b. Write a program to find the sum of series of signed numbers as specified below.

   $$A = \sum_{i=410h}^{41Fh} x(i)$$

   Assume AR1 as pointer to x(i) and AR2 as counter for the numbers. **(06 Marks)**

   c. By means of a figure, show the pipeline operation of the following sequences of TMS320C54XX instructions. Assume initial value of AR3 is 80h and the values stored in memory locations 80h, 81h, 82h as 1, 2 & 3.
   ```
   LD *AR3+, A
   ADD #1000h, A
   STL A, *AR3+
   ```
   (08 Marks)

PART – B

5 a. i) Determine the value of each of the following 16-bit numbers represented using the given Q-notation 4400h as a Q0 number, 4400h as a Q15 number and 4400h as a Q7 number.

   ii) Represent each of the following as 16-bit numbers in the desired Q-notation. 0.3125 as a Q15 number, -0.3125 as a Q15 number and 3.125 as a Q7 number.
   (06 Marks)

   b. Analyze the following program to answer the questions at the end. Assume that all specified data locations are on the same page starting at ao. Q15 notation is assumed.

```
    .data
        ao      .word 6000h
        b1      .word 2000h
        xn      .word 4000h
        yn      .word 0h
        ynm1    .word 3000h
    .text
        ld      #ao, dp
        ld      ao, t
        mpy     xn, a
        ld      b1, t
        mac     ynm1, a
        sth     a, 1, yn
```

   i) Determine the decimal values represented by yn.
   ii) Determine the equation for yn implemented by the above program.   **(06 Marks)**

   c. Write a program to multiply two Q15 numbers.   **(08 Marks)**

6 a. i) Derive the equation to implement a butterfly structure in DITFFT algorithm.

   ii) How many add/subtract and multiply operations are needed to compute the butterfly structure?

   iii) Determine the optimum scaling factor.   **(08 Marks)**

   b. i) What minimum size FFT must be used to compute a DFT of 40 samples?

   ii) How many stages are required for FFT computation?

   iii) How many butterflies are there per stage?

   iv) How many butterflies are needed for the entire computation?   **(04 Marks)**

   c. Write the subroutine for bit reverse address generation. Explain the same.   **(08 Marks)**

7 a. Draw the timing diagram for memory interface for read-read-write sequence of operation. Explain the purpose of each signal involved.   **(08 Marks)**

   b. Explain the register subaddressing technique for configuring DMA operation.   **(06 Marks)**

   c. Explain the ADC interface in programmed I/O mode.   **(06 Marks)**

8 a. With a neat block diagram and timing diagram for both transmit and receive, explain the signals involved in synchronous serial interface.   **(08 Marks)**

   b. Explain how PPM signal is decoded at the receiving end using digital signal processor.
   (06 Marks)

   c. Write a pseudo algorithm for determining heart rate (HR), using the digital signal processor.
   (06 Marks)

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Seventh Semester B.E. Degree Examination, December 2010
Image Processing

Time: 3 hrs. 　　　　　　　　　　　　　　　　　　　　　Max. Marks:100

Note: *1. Answer any FIVE full questions, selecting*
at least TWO questions from each part.
2. Missing data may be suitably used.
3. Draw neat diagrams wherever necessary.

PART – A

1 a. Explain the process of image acquisition, using sensor strips and sensor arrays. **(12 Marks)**
   b. Explain the following terms :
      i)　Adjacency ;　ii) Connectivity ;　iii) Gray level resolution ;　iv) Spatial resolution.
      (08 Marks)

2 a. Explain the process of image sampling and quantization in the digital image formulation.
      (10 Marks)
   b. Explain some of the widely used gray – level transformations. **(10 Marks)**

3 a. Explain the histogram equalization technique for image enhancement. Also give the digital
      formation for the same. **(10 Marks)**
   b. Perform histogram equalization of the image. **(10 Marks)**

$$\begin{bmatrix} 4 & 4 & 4 & 4 & 4 \\ 3 & 4 & 5 & 4 & 3 \\ 3 & 5 & 5 & 5 & 3 \\ 3 & 4 & 5 & 4 & 3 \\ 4 & 4 & 4 & 4 & 4 \end{bmatrix}$$

4 a. Explain the homomorphic filtering approach for image enhancement. **(10 Marks)**
   b. Compute the median value of the marked pixels shown in the Fig.Q.4(b), using a 3 x 3
      mask. **(10 Marks)**

$$\text{Fig.Q.4(b).} \quad \begin{bmatrix} 18 & 22 & 33 & 25 & 32 & 24 \\ 34 & 128 & 24 & 172 & 26 & 23 \\ 22 & 19 & 32 & 31 & 28 & 26 \end{bmatrix}$$

PART – B

5 a. Explain HADAMARD transform and its applications. **(10 Marks)**
   b. Compute the Discrete Cosine Transform (DCT) matrix for N = 4. **(10 Marks)**

6 a. Define the process of image restoration. Explain the order statistics filter for restoring
      images in the presence of noise. **(10 Marks)**
   b. Explain the following methods to estimate the degradation function, used in image
      restoration : i) Estimation by image observation ;　ii) Estimation by experiment ;
      iii) Mathematic modelling. **(10 Marks)**

7 a. Explain the following color models : i) RGB color model ;　ii) HIS color model. **(10 Marks)**
   b. Explain the procedure in converting colors from RGB to HIS and vice versa. **(10 Marks)**

8 　　Write short notes on :
   a. Noise models ;　　　　　　　　　b. Smoothing frequency domain filters.
   c. Power – law transformation ;　　　d. KL transform. **(20 Marks)**

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Seventh Semester B.E. Degree Examination, December 2010
Real Time Systems

Time: 3 hrs.

Max. Marks:100

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

PART – A

1   a. Define real time system. Explain the different classifications of RTS with examples. **(10 Marks)**

b. Define the term "time constraint". How are RTS classified based on time constraint? Explain them with appropriate equations. **(10 Marks)**

2   a. What do you mean by adaptive control? With a neat block diagram, explain any two types. **(10 Marks)**

b. What is a DDC? What are the advantages of DDC over analog control? Discuss PID control algorithms. **(10 Marks)**

3   a. Explain pulse interface for input and output operation, with a neat block diagram. **(10 Marks)**
    b. Explain the ISO seven layer model for data communication. **(10 Marks)**

4   a. How do strong data typing contribute to the security of programming language? **(10 Marks)**
    b. What are the requirements, which CUTLASS has to meet? With a neat diagram, show CUTLASS host – target configuration. **(10 Marks)**

PART – B

5   a. With a neat block diagram, the explain typical structure of RTOS. **(10 Marks)**
    b. Explain the different priority structures, adopted in designing a real – time system. **(10 Marks)**

6   a. What is task management? List the functions of task management. With a neat diagram, discuss different tasks. **(10 Marks)**
    b. Discuss the significance of memory management and hence explain task chaining and task overlapping. **(10 Marks)**

7   a. Explain the different phases involved in the design of a RTS. **(10 Marks)**
    b. Explain foreground and background system with flow chart. **(10 Marks)**

8   a. With a general arrangement for a drying oven, explain its requirements. **(10 Marks)**
    b. Write about the environmental model, with context diagram for drying owen. **(10 Marks)**

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Seventh Semester B.E. Degree Examination, December 2010
Human Resource Management

Time: 3 hrs.   Max. Marks:100

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

PART – A

1 a. Explain the HRM models. Which according to you is the most comprehensive?   (08 Marks)
   b. Outline the impact of political – legal, economic, cultural and technological factors on HR function.   (08 Marks)
   c. Define HRM. What do you understand by HRM environment?   (04 Marks)

2 a. List out the techniques of employee demand forecasting. Explain any one method. (08 Marks)
   b. Bring out the factors affecting job design.   (06 Marks)
   c. Define recruitment. Bring out the factors, which influence recruitment.   (06 Marks)

3 a. List out advantages and disadvantages of internal and external recruitment. (06 Marks)
   b. Bring out the various factors, which influence the selection process.   (06 Marks)
   c. Define selection. What are the barriers to effective selection?   (08 Marks)

4 a. Define the term "training and development". Bring out the importance of training and development.   (08 Marks)
   b. How do the results of performance appraisal affect other HR activities?   (06 Marks)
   c. Outline the external as well as internal environments influencing the employee remuneration.   (06 Marks)

PART – B

5 a. Explain different types of incentive systems.   (08 Marks)
   b. Bring out the steps in the introduction of incentive payments.   (06 Marks)
   c. Outline the principles of fringe benefits.   (06 Marks)

6 a. How is welfare administered in a typical organization?   (06 Marks)
   b. What is employee safety? How is safety disrupted? Explain.   (08 Marks)
   c. Why is work stress caused? How can it be minimized?   (06 Marks)

7 a. List out the factors affecting employee relations strategy.   (08 Marks)
   b. Define the term 'industrial relations'. Bring out its importance.   (06 Marks)
   c. Bring out the tactics adopted by unions to influence the management.   (06 Marks)

8 a. Define the term ethics. Explain the various HR ethical issues.   (08 Marks)
   b. What are the approaches to HRM evaluation?   (06 Marks)
   c. Explain the different activities of IHRM.   (06 Marks)

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