BE- Sem-VII - EXTC - OLD

7/6/12

Q.P. Code : 629002

(3 Hours)   Total Marks : 100

Note :(1) Q. 1 is compulsory
         (2) Answer any four out of remaining six questions
         (3) Figure to right indicate full marks

1. a) What is port address? What is significance of port address?   **20**
    b) Differentiate between circuit switching and packet switching.
    c) Compare Go back N and Seletive repeat ARQ protocol.
    d) Explain ALOHA and Slotted ALOHA.
    e) Explain bit stuffing and byte stuffmg.

2. a) What does the term error control mean in data link layer? Derive expression   **10**
        for efficiency of stop and wait flow control. (assume channel to be error free)
    b) Discuss various network topologies. Give advantages and disadvantages of   **10**
        each topology.

3. a) Explain in detail HDLC protocol with all the frame types supported by HDLC.   **10**
        Differentiate between HDLC and PPP protocols.
    b) What is OSI model of network architecture? Explain advantages and   **10**
        disadvantages of OSI model. Explain data encapsulation in OSI model.

4. a) What is exterior and interior routing? Explain in brief distance vector routing   **10**
        and Link state routing
    b) Write a note on IEEE 802.3 standard in detail.   **10**

5. a) Explain IP datagram format in detail.   **10**
    b) Discuss Queuing system classification. Explain M/M/I queuing system.   **10**

6. a) Explain the meaning of various fields in the TCP header format.   **10**
    b) Explain Bellman ford Algorithm using graph.   **10**

7. Write short notes on   **20**
         i) Count to infinity problem in routing protocol
         ii) Collision and Broadcast domain
         iii) ARP and RARP

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Q.P. Code : 628302

(3 Hours)   [Total Marks : 100

N.B. : - i) Question No. 1 is **compulsory**.
   ii) Answer any **four** questions out of remaining **six** questions.
   iii) Figure to the **right** indicates **full marks**.
   iv) **Illustrate** the answers with **sketches** wherever **required**.

1 (a) What is the relation between DFT and DTFT?   [20]
   (b) What are the advantages and disadvantages of FIR filter and IIR filter?
   (c) State and prove circular time shift and circular frequency shift
      property of DFT.
   (d) What is the need of multirate signal processing?
   (e) Compare various windows for design of FIR filters.

2 (a) Given
      X[k]={36, -4+j9.656, -4+j4, -4+j1.656, -4, -4-j1.656, -4-j4, -4-j9.656}
      using IFFT algorithm calculate x(n).   [10]
   (b) By means of DFT and IDFT technique compute the circular convolution of the following
      sequences
      $$x_1(n) = \{1,2,3,4\} \ and \ x_2(n) = \{5,6,7,8\}$$

3 (a) Show Direct Form-I, Direct Form-II realization.   [10]

$$H(z) = \frac{1 - \frac{1}{2}z^{-1}}{1 - z^{-1} + \frac{3}{16}z^{-2}}$$

   (b) An all pole IIR filter has transfer function   [10]

$$H(z) = \frac{1}{1 + \frac{3}{4}z^{-1} + \frac{1}{2}z^{-2} + \frac{1}{4}z^{-3}}$$

   Obtain the lattice coefficients and show lattice realization.

4 (a) Design low pass filter for following specification   [10]

$$H_d(e^{j\omega}) = \begin{cases} e^{-j2\omega} , & -\frac{\pi}{4} \leq \omega \leq \frac{\pi}{4} \\ 0 , & \frac{\pi}{4} < \omega \leq \pi \end{cases}$$

   Determine the filter coefficient $h_d(n)$ if the window function is
   defined as
$$w(n) = \begin{cases} 1 & 0 \leq n \leq 4 \\ 0, & otherwise \end{cases}$$

   (b) i) Explain Polyphase decomposition process.   [10]
      ii) Write a short on Adaptive television echo cancellation.

TURN OVER

5   (a) What are the effects of finite word length in digital filter.   [08]

     (b) A low pass filter has following specifications   [12]

$$0.8 \leq \left|H\left(e^{j\omega}\right)\right| \leq 1 \quad \text{for } 0 \leq \omega \leq 0.2\pi$$

$$\left|H\left(e^{j\omega}\right)\right| \leq 0.2 \quad \text{for } 0.6\pi \leq \omega \leq \pi$$

Find the filter order and analog cutoff frequency using Impulse Invariance technique.

6   (a) Determine the response of the system with impulse response   [10]

$$h[n] = \left(\tfrac{1}{2}\right)^{n} u[n]$$

when the input is

$$x[n] = 10 - 5\sin\tfrac{\pi}{2}n + 20\cos\pi n \qquad -\infty < n < \infty$$

     (b) Convert the analog filter with system function   [10]

$$H(s) = \frac{s + 0.1}{(s + 0.1)^{2} + 9}$$

into a digital IIR filter using Bilinear transformation. The digital filter should have a resonant frequency of $\omega_r - \tfrac{\pi}{4}$

7   (a) $x(n) = \{1 + 5j, 2 + 6j, 3 + 7j, 4 + 8j\}$, Find DFT X(k).   [10]

Using the result obtained above find the DFT of the following

sequence $x_1(n) = \{1, 2, 3, 4\}, x_2(n) = \{5, 6, 7, 8\}$

     (b) Draw and explain the block diagram of a multistage decimator   [10]
         and integrator.

Q.P. Code : 628401

(3 Hours) [Total Marks : 100

N.B. : (1) Question **No.1** is **compulsory**.
(2) Answer **any four** out of remaining.
(3) Assume suitable **data** if **necessary** and **justify the same.**

1. Answer in brief (**Any Four**) : 20
   (a) Explain the working of ADPCM audio compression.
   (b) Explain the concept of Information Theory with respect to Data Compression.
   (c) What are Active and passive attacks on the security of a system? Compare conventional and public key encryption.
   (d) Write a short note on Discrete Cosine Transform.
   (e) Differentiate between Substitution Cipher and Transposition Cipher.
   (f) Describe the features of Video Compression as compared to Image Compression.

2. (a) Write a short note on µ-law and A-law companding. 10
   (b) Consider a Diffie-Hellman scheme with a common prime q = 11 and a 10 primitive root α = 2.
      (i) Show that 2 is primitive root of 11.
      (ii) If user A has public key Y_A = 9, what is A's private key X_A?
      (iii) If user B has public key Y_B = 3, what is the shared secret key K?

3. (a) Calculate public key and private key based on RSA algorithm choosing 5 10 and 11 as two prime numbers. Use these keys to encrypt and decrypt a plain text input of N = 17.
   (b) Describe various approaches for image compression and discuss any one 10 of them in detail.

TURN OVER

4. (a) Solve for x using Chinese Remainder Theorem :   **10**

        $x = 1 \bmod 2$

        $x = 1 \bmod 3$

        $x = 3 \bmod 5$

        $x = 1 \bmod 7$

  (b) Explain the MPEG standard for video coding.   **10**

5. (a) Encode the data "SWISS MISS" using arithmetic coding and thus decode   **10** it to recover the original data.

  (b) Encode and decode the following sequence using LZ – 77 and LZ –78   **10** algorithm "sir_ sid_eastman_ easily_ teases_ sea_ sick_ seals".

6. (a) Give overall block diagram of the DES standard. Explain one round in detail.   **10**

  (b) What are MAC and Hash functions? Give one example of each. Also explain   **10** what are the requirements on MAC and Hash functions.

7. Write short notes on **any two** :   **20**

    (1) MPEG – 3 Audio compression standard

    (b) JPEG – 2000 standard

    (c) Viruses and worms

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