B.E (EXTC) Sem VII (R) 17/12/2011

Con: 6644-11. (REVISED COURSE) MP–5680

(3 Hours) [Total Marks : 100

Computer Communication Network

Instructions

(1) Question No 1 is compulsory.
(2) Solve any 4 out of remaining questions.
(3) Figure to the right indicate full marks.

Q1.(A) Why does UDP exist? Would it not have been enough to just let user processes send raw IP packets? [5]

(B) It was shown that flooding can be used to determine the minimum hop route. Can it be used to determine the minimum delay route? [5]

(C) What do we mean we say that a bridge can filter traffic? Why is filtering important? [5]

(D) Why does the internet use a connection less network service? [5]

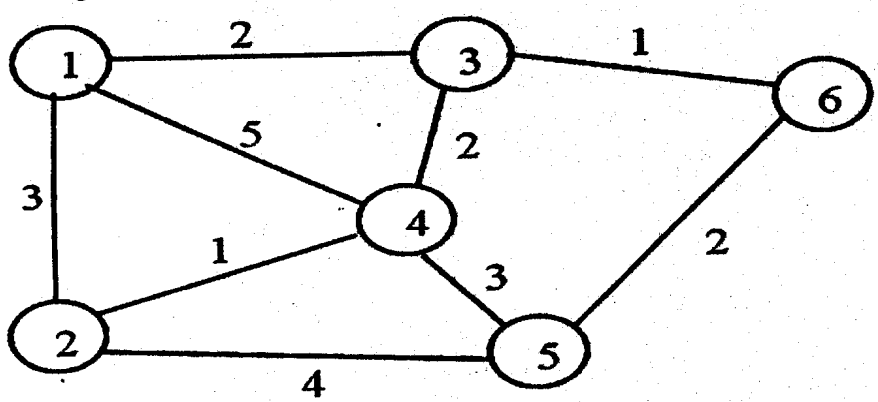
Q2.(A) What is ALOHA? Derive the expression for the slotted and pure ALOHA. [10]

(B) What is collision and collision domain? How collision and collision domain can be reduced? How collision can be detected? Explain CSMA/CD. [10]

Q3.(A) What is ARQ? What are types of ARQs? Explain Go Back N ARQ in detail. [10]

(B) What is HDLC? What are HDLC fame types and mode of operation? Explain in detail one mode. [10]

Q4.(A) Write Dijkstra's Algorithm. Find shortest path (Fig 4A) to destination node 6. Will Bell Man Ford algorithms yield same solution? Why or why not? [10]



(B) What is QoS? Explain various techniques to improve QoS. [10]

Q5.(A) Explain TCP Header in details. [10]

(B) What is classful IP addressing? Find maximum addresses provided by each class. [10]

Q6.(A) What is open system? Explain OSI model by drawing sender, receiver, intermediate node and Various communication between them. [10]

(B) Compare various switching techniques. [10]

Q7.(A) Write a note on delay model. [7]

(B) Write detail note on Leaky Bucket algorithm. [7]

(C) Transmission impairment cause and solution.[6]

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13/12/2011

BE EXTC Sem-VII (R)
Fundamentals of microwave Engineering

ws Sept-2011-189

Con. 6530–11. **(REVISED COURSE)** **MP–5695**

(3 Hours) **[Total Marks : 100**

N. B. : (1) Question No. 1 is **compulsory** and answer any **four** questions out of remaining **six** questions.
(2) Assume **suitable** data wherever **necessary**.
(3) **Figures** to the **right** indicate **full** marks.

1. (a) Give reasons why GaAs MESFET perform better than Si MESFET. **5**
(b) Explain microwave propagation in Ferrites. **5**
(c) State and explain Lorentz Reciprocity Theorem. **5**
(d) An IMPATT diode has a drift length of 2 μm and drift velocity is of the order of 10^5 m/s. Determine – **5**
(i) the drift time of the carriers
(ii) the operating frequency of the IMPATT diode.

2. (a) Mention different types of electron flow. Explain Brillouin flow and derive an expression for Brillouin magnetic field Br. **10**
(b) Describe the mechanism of velocity modulation in a two cavity klystron and hence obtain an expression for the bunched beam current. Also find out condition for maximum power output. **10**

3. (a) A microstrip transmission line uses a substrate with dielectric constant $\epsilon_r = 9{\cdot}7$ and thickness 0·5 mm. The stripwidth is also 0·5 mm. Find the effective dielectric constant, the characteristic impedance and the microstrip wavelength at a frequency of 2 GHz. **8**
(b) Discuss the differences between transfered electron devices and avalanche transit time devices. Give example. **6**
(c) Discuss the factors that limit the high frequency response of a microwave BJT. **6**

4. (a) Design a double stub matching system to match a normalized load admittance $\bar{y}_L = 0{\cdot}4 + j1$. The stubs ae spaced $\lambda/8$ apart. **10**
(b) Discuss the operation of backward wave devices. **10**

5. (a) What are different microwave band classification ? Give applications of various microwave bands. What is the band of rectangular waveguide with dimensions 2·3 cm and 1 cm. **10**

(b) Calculate – (i) the generated power (ii) the total r.f. power output (iii) the power gain in dB for a CFA operating with the following parameters :– **10**

Anode dc current I_{a0} = 1·30 Amp
Anode dc voltage = V_{a0} = 1·80 KV
Electronic efficiency = η_e = 22%
Input r.f power P_{in} = 70 Watts.

6. (a) Explain the working of Magic Tee. Design a circulator using Magic Tees. **10**

(b) Design a low pass composite filter with cutoff frequency of 2 MHz and impedance of 75 Ω. Place the infinite attenuation pole at 2·05 MHz. **10**

7. (a) Explain the working of a negative resistance parameteric amplifier. **10**

(b) Explain the procedure of measurement of Dielectric constant at microwave frequency. **10**

8/12/2011

BE EXTC sem-VII CBSGS
mobile Communication system

Con. 6302-11. **(REVISED COURSE)** **MP–5674**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Make **suitable** assumptions wherever necessary and clearly justify them.

Q.1.

(A) Compare SDMA,TDMA,FDMA and CDMA mechanism
(B) Explain mobile assisted soft handoff procedures in a CDMA based secular system
(C) Explain data oriented CDPD network.
(D) What is meaning of traffic channel, signaling channel, broadcast channels & common Control channel w.r.t. G.S.M (20)

Q.2.

(A) Assume a receiver is located 10 km from a 50 W transmitter. The carrier frequency is 900 MHz, free space propagation is assumed,Gt = 1,and Gr=2,find (a) the power at the receiver,(b) the magnitude of the E-field at the receiver antenna, (c) the rms voltage applied to the receiver input assuming that the receiver antenna has a purely real impedance of 50and is matched to the receiver.

(B) Explain free space propagation model. (20)

Q.3.
(A) Draw the block diagram and explain GSM architecture in details indicating all the interfaces.
(B) Explain the frequency and channel specification of IS-95. (20)

Q.4.
(A) Explain forward link features of CDMA 2000 and also explain basic services provided by upper layers of CDMA 2000.
(B) Describe open loop and closed loop system of power control in a CDMA system. (20)

Q.5.
(A)Give the technical differences in W-CDMAand CDMA-2000.

(B) Write short note on any two path loss models. (20)

Q.6.
(A) Explain in details signaling protocol architecture used in GSM.
(B) Explain Handoff and Power control in 3G system. (20)

Q.7 Write short notes on:
(A) Rake receiver
(B) security algorithms in GSM
(C) Raleigh and Rican distribution
(D) Improving coverage and capacity in cellular system. (20)

2/12/2011 BE EXTC Sem-VII (Rev) Discrete Time Signal Processing.

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Con. 6149-11. **MP-5689**

(REVISED COURSE)

(3 Hours) **[Toral Marks : 100**

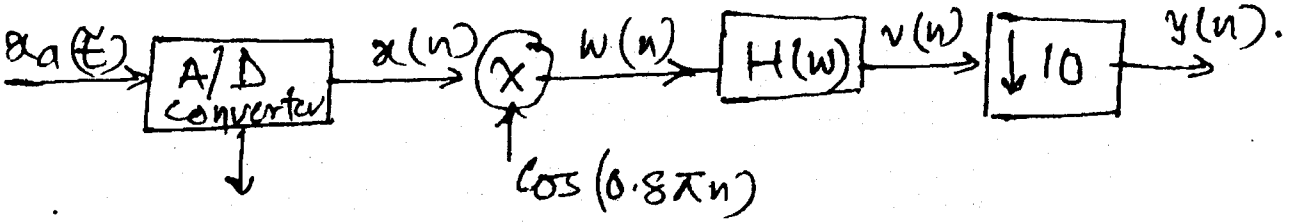
N.B. (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining Six questions.
(3) Assume any **data** wherever **required**, but **justify** the same.
(4) **Figure** to the **right** indicate **full** marks.

1. (a) Derive the Parsevel's Energy relation. State the significance of Parsevel's theorem. **5**
(b) One of zeros of a Causal Linear phase FIR filter is at $0{\cdot}5\, e^{j\pi/3}$. Show the locations of other zeros and hence find the transfer function and impulse response of the filter. **5**

(c) A two pole pass filter has the system function $H(z) = \dfrac{b_o}{\left(1 - pz^{-1}\right)^2}$. Determine the values of b_0 and P. Such that the frequency response H(w) satisfies the condition H(0) = 1 and $\left|H\left(\pi/4\right)\right|^2 = 1/2$. **5**

(d) Consider the signal $x(n) = a^n u(n)$, $|a| < 1$:— **5**
(i) Determine the spectrum.
(ii) The signal x(n) is applied to a decimator that reduces the rate by a factor 2. Determine the output spectrum.

2. (a) An analog signal $x_a(t)$ is band limited to the range $900 \le F \le 1100$ Hz. It is used as an input to the system shown in **figure**. In this system, H(w) is an ideal lowpass filter with cut-off frequency $F_C = 125$ Hz. **10**



$$F_S = \frac{1}{T_S} = 2500 \qquad F_Y = \frac{1}{T_Y} = 250.$$

(i) Determine and sketch the spectra x(n), w(n), v(n) and y(n).
(ii) Show that it is possible to obtain y(n) by sampling $x_a(t)$ with period T = 4 milisecond.

(b) Derive and draw the FFT for N = 6 = 2·3 use DITFFT method. **10**
x(n) = { 1 2 3 1 2 3 }
↑
find x(k) using DITFFT for N = 6 = 2·3.

3. (a) Design a digital Butterworth low pass filter satisfying the following specifications using bilinear transformations. (Assume T = 15). **12**

$$0 \cdot 9 \leq \left| H\left(e^{jw}\right) \right| \leq 1 \; ; \quad 0 \leq W \leq \pi/2$$

$$\left| H\left(e^{jw}\right) \right| \leq 0 \cdot 2 \; ; \quad \frac{3\pi}{4} \leq W < \pi$$

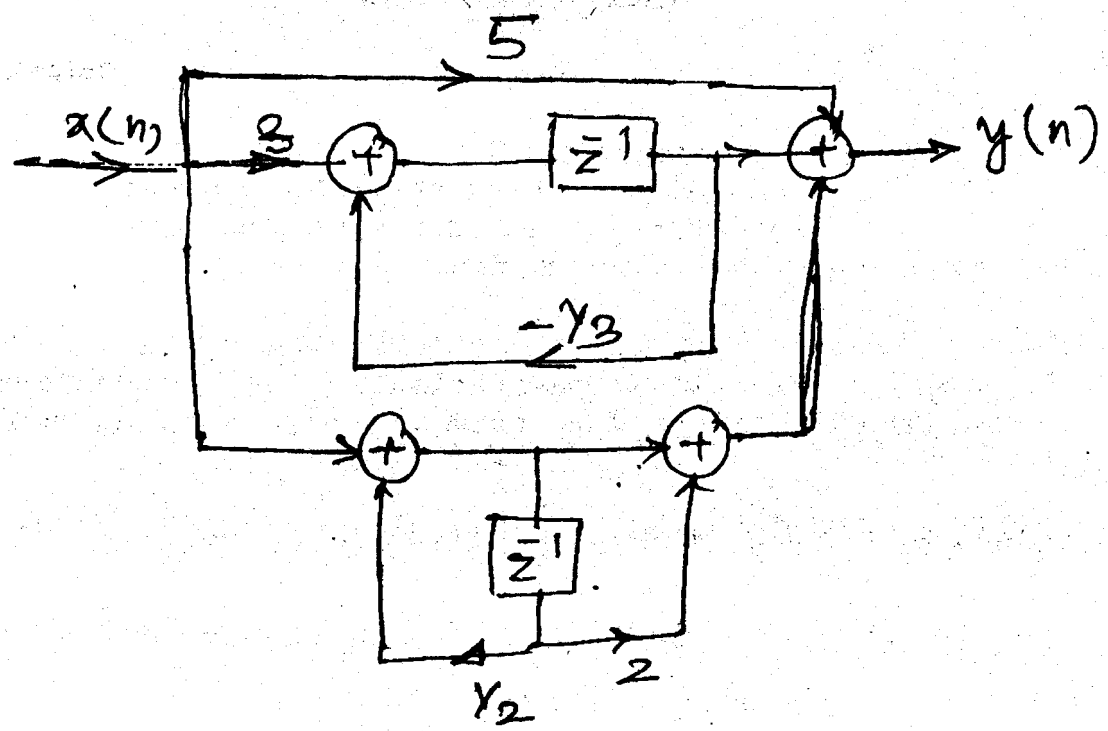
(b) (i) If $x(n) = \{ 1 + 5j,\ 2 + 6j,\ 3 + 7j,\ 4 + 8j \}$. Find DFT X(K) using DIFFFT. **4**

(ii) Using the results obtained in (i) not otherwise , find DFT of following sequences :— **4**

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

[TURN OVER

4. (a) Consider the realisation of system shown in **figure.**



(i) Obtain System Function. **4**

(ii) Obtain Difference Equation. **2**

(iii) Find the impulse response of system. **3**

(iv) Draw pole-zero plot and comment on System Stability. **3**

(b) Derive the Expression for impulse invariance technique for obtaining transfer function of digital filter from analog filter. **8**
Derive the necessary equation for relationship between frequency of analog and digital filter.

5. (a) What do you mean by inplace computations in FFT algorithms ? **4**

(b) Find number of Real additions and multiplications required to find DFT for 82 point. Compare them with number of computations required if FFT algorithms is used. **4**

(c) Design a digital Chebyshev filter to satisfy the following constraints :— **12**

$$0{\cdot}707 \le \left| H\left(e^{jw}\right) \right| \le 1 ; \quad 0 \le w \le 0{\cdot}2\,\pi$$

$$\left| H\left(e^{jw}\right) \right| \le 0{\cdot}1 ; \quad 0{\cdot}5 \le w < \pi$$

Use bilinear transformation and assume T = 1 second.

6. (a) Given x(n) = n + 1 and N = 8, find DFT X(K) using DIFFFT algorithms. **8**

(b) Obtain direct form I, Direct form II realization to second order filter given by — **8**
$y(n) = 2b \cos w_0 y(n-1) - b^2 y(n-2) + x(n) - b \cos w_0 x(n-1)$.

(c) Explain the concept of decimation by integer (M) and interpolation by integer factor (L). **4**

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$$\left| H\left(e^{jw}\right) \right| \leq 0 \cdot 1 \; ; \quad 0 \cdot 5 \leq w < \pi$$

Use bilinear transformation and assume T = 1 second.

6. (a) Given x(n) = n + 1 and N = 8, find DFT X(K) using DIFFFT algorithms. 8

(b) Obtain direct form I, Direct form II realization to second order filter given by — 8

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(c) Explain the concept of decimation by integer (M) and interpolation by integer factor (L). 4

7. (a) Write short note on set top box for digital TV receiver. 4

(b) Application of Signal Processing in Radar. 4

(c) What is linear phase filter ? What conditions are to be satisfied by the impulse response of an FIR system in order to have a linear phase ? Define phase delay and group delay. 8

(d) Short note on Frequency Sampling realization of FIR filters. 4

AGJ 2nd half (i+) 7

22/12/11 BE EXTC sem - VII CBSGS Data compression & Encryption

Con. 6862-11. **(REVISED COURSE)** **MP–5683**

(3 Hours) **[Total Marks : 100**

N.B.: **1. Question Number Q1 is compulsory**

2. Attempt Any four Questions Out of Remaining Six Questions

Q1. **(a)** What is the need for data compression. **5**

(b) Discuss the application of JPEG 2000. **5**

(c) Compare Cryptography and steganography. **5**

(d) What is Secure Electronic Payment System. **5**

Q2. **(a)** A source emits letter from an alphabet A={ a1 , a2 , a3 , a4 , a5 } with probabilities P(a1) = 0.15 , P(a2) = 0.04 , P(a3) = 0.26 , P(a4) = 0.05 and P(a5)=0.50. **10**

a) Calculate the entropy of this source

b) Find the Huffman code for this source.

c) Find the average length of the code in

d) and its redundancy.

(b) Explain ADPCM Encoder and Decoder for audio compression **10**

Q3.(a) Describe the features of video compression as compared to image compression. Explain MPEG industry standards for video compression . **10**

(b) The o/p of the LZW encoder is the following sequence **05**

6	3	4	5	2	3	1	6	2	9	11	16	12	14	4	20	23	13

Decode the sequence.

(c) Discuss in brief lossless audio compression **05**

Q4. **(a)** Explain the working of DES with block diagram **10**

(b) Discuss and explain security attacks on the system. **10**

Q5. **(a)** Explain algorithms for RSA using Chinese Remainder Theorem **10**

(b) Discuss Classical Encryption Techniques. **10**

Q6. **(a)** Explain Hash and MAC algorithms used for authentication. **10**

(b) Discuss certificate based and biometric system. **10**

Q7. Write short notes on any three :

(a) Approaches to Image Compression.

(b) S-Box Design.

(c) Digital signatures.

(d) Performance and quality measures for compression.