BE|EXTC|VII (R) 16|5|12

Con. 3626-12. (REVISED COURSE) DTSP GN-6380

(3 Hours) [Total Marks : 100

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of the remaining **six** questions.
(3) Assume **suitable** data if **required**.

Q.1a) Show that FIR filters are linear phase filters. Define group delay and phase delay. **(8)**

Q.1 b) Find the response of the system given by difference equation **(6)**

$y(n) - 5y(n-1) + 6y(n-2) = x(n)$ for i) $x(n) = \delta(n)$ and ii) $x(n) = U(n)$

Q.1 c) Draw Direct form-I and Direct form-II realization of the system given by **(6)**

$y(n) - 3/4 \cdot y(n-1) + 1/8 \cdot y(n-2) = x(n) + 1/3 \cdot x(n-1)$

Q.2 a) Derive Radix-2 Decimation in Time Fast Fourier Transform and draw its' signal flow graph **(10)**

Q.2 b) Design FIR digital filter by using window method for the following specifications: **(10)**

$H(e^{j\omega}) = e^{-j3\omega}$ $-3\pi/4 \le \omega \le 3\pi/4$

$H(e^{j\omega}) = 0$ $3\pi/4 \le |\omega| \le \pi$

Use Hamming window of length = 7

Q.3 a) If $H_d(\omega) = 1$ for $0 \le f \le 800$ Hz and **(10)**

$H_d(\omega) = 0$ for $f \ge 800$ Hz

Given that sampling frequency Fs = 5000Hz Design FIR filter for length M=5 using Bartlett window

Q.3 b) Find 8-point FFT of x(n) = {1, 2, 2, 2, 1} using signal flow graph of Radix-2 **(10)**

Decimation in Frequency FFT

Q.4 a) Design a digital Butterworth filter satisfying the following constraints: **(12)**

$0.9 \le |H(e^{j\omega})| \le 1$ $0 \le \omega \le \pi/2$

$|H(e^{j\omega})| \le 0.2$ $3\pi/4 \le \omega \le \pi$

with sampling period T = 1 sec, use Bilinear transformation method.

Q.4 b) State and derive Goertzel algorithm, also state its application **(8)**

[TURN OVER

Q.5 a) For the analog transfer function (10)

$$H(s) = \frac{3}{(s+2)(s+3)}$$

Determine H(z) with sampling period T = 0.1 sec using

i) Impulse Invariant method

ii) Bilinear Transformation method

Q.5 b) Describe the application Goertzel algorithm in dual tone multi-frequency detection. (10)

Q.6 a) With a suitable block diagram describe sub-band coding of speech signals. (10)

Q.6 b) With a neat diagram describe frequency sampling realization of FIR filters. (10)

Q.7 a) Explain up-sampling by non-integer factor, with a neat diagram and waveforms (10)

b) Explain the application of DTSP in adaptive echo cancellation. (5)

c) Describe the concept of digital resonator. (5)

BE | EXTC | VII (REV) 21/5/2012
mobile Communication system

PH March Exam (4) 125

Con. 3721-12. **GN-6389**

(REVISED COURSE)

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

N.B. (1) Question No. **1** is **compulsory.**
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume suitable **data** wherever **necessary**.

1. (a) Explain security algorithm in GSM. 5
   (b) Discuss about frequency reuse used in cellular system. 5
   (c) What are the factors influencing in small scale fading ? 5
   (d) Explain RAKE Receiver in CDMA system. 5

2. (a) How does sectoring improve S/I in cellular system ? 10
   (b) Explain GSM Network architecture in detail. 10

3. (a) For the two ray ground reflection model, derive the expression for received power at a distance 'd' from the transmitter. 10
   (b) With a neat block diagram, explain reverse CDMA channel. 10

4. (a) Discuss IMT 2000 system. 10
   (b) Discuss GPRS technology. 10

5. (a) How is power control applied in forward CDMA channel ? 10
   (b) Elaborate on forward w-CDMA channel. 10

6. (a) Explain the knife-edge diffraction model. 10
   (b) What are the different methods to improve the capacity of cellular systems. Explain it 10

7. Write short notes on :– 20
   (a) Multiple access technique.
   (b) Handoff procedure.
   (c) SMS in GSM
   (d) Channel assignment strategies in cellular system.

BE | EXTC | VII (Rev) 25|5|12
Fundamentals of Microwave Engg.

Con. 3930-12. **(REVISED COURSE)** **GN-6372**

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

N.B. (1) Question No. **1** is **compulsory.**
(2) Answer any **four** out of remaining **six** questions.
(3) **Assumptions** made should be **clearly stated.**
(4) Assume suitable **data** wherever required and justify **same.**
(5) **Figures** to **right** indicates **full** marks.
(6) Illustrate answer with **sketches** wherever **required.**

1. (a) Solution for magnetic vector potential. **5**
   (b) Microstrip transmission line **5**
   (c) Power dividers **5**
   (d) Gyrotrons. **5**

2. (a) Derive plane wave equation and explain the significance. **10**
   (b) Derive the expression for reflection and transmission coefficient of finite length. **10**

3. (a) Derive the electro magnetic equations for TE modes in rectangular waveguide. **10**
   (b) A TE_{11} mode is propogating through a circular waveguide. The radius of the guide is 5 cm and the guide contains a air dielectric. **10**
      (i) Determine the cut off frequency
      (ii) Determine the guide wavelength for an operating frequency of 3 GHz
      (iii) Determine the wave impedance in the guide.

4. (a) Explain various types of microwave solid state devices along with their applications. **10**
   (b) A Silicon n-p-n bipolar transistor operates in common-base mode at 300°K and has the following parameters : **10**

Silicon intrinsic density	:	n_i	$= 1{\cdot}5 \times 10^{10}\ cm^{-3}$
Acceptor density in base region	:	N_a	$= 5 \times 10^{16}\ cm^{-3}$
Donor density in emitter region	:	N_d	$= 5 \times 10^{18}\ cm^{-3}$
Hole Lifetime	:	τ_p	$= 1\ \mu s$
Electron Lifetime	:	τ_n	$= 1\ \mu s$
Cross Section	:	A	$= 10^{-4}\ cm^2$
Base width	:	w	$= 10^{-3}\ cm$
Emitter length	:	L_E	$= 10^{-2}\ cm$

Determine :—
(i) The mobilities μ_n and μ_p
(ii) The diffusion coefficients D_n and D_p
(iii) The emitter efficiency factor **y**
(iv) The transport factor β
(v) The current gain α.

5. Explain various avalanche transit-time devices with reference to construction, operation and applications. **20**

5. Explain various avalanche transit-time devices with reference to construction, operation and applications. **20**

6. (a) A two cavity amplifier Klystron has the following characteristics : **10**

Voltage gain : 15 dB

Input power : 5 mW

Total shunt impedance of input cavity R_{sh} : 30 kΩ

Total shunt impedance of output cavity R_{sh} : 40 kΩ

Load impedance at o/p cavity R_l : 40 kΩ

Determine :—

(i) The input Voltage (Vms)

(ii) The output Voltage (Vms)

(iii) The power delivered to the load in watts.

(b) Explain the concept velocity madulation and explain cylindrical magnetron. **10**

7. Write short notes on following :— **20**

(a) Microwave filters

(b) Travelling wave tube

(c) Measurement of impedance

(d) Hybrid junctions.

30|5|12
B.E (VII) Rev EXTC - CCN

Con. 4504-12. (REVISED COURSE) **GN–8501**

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

N.B. (1) Question No. **1** is **compulsory**.
(2) Solve any **four** questions from the remaining.
(3) **Marks** are indicated by **figures** on **right**.

1. (a) Discuss the various network topologies along with the advantages and disadvantages of each. **8**
   (b) Explain the ISO-OSI network model and discuss the functions of each layer. **12**

2. (a) Explain the Go-back-n and selective reject techniques of sliding window ARQ. **10**
   (b) List the various networking and internetworking devices and explain their working in detail. **10**

3. (a) Discuss the various configurations, modes and frame types of HDLC in detail. **10**
   (b) Compare circuit switching, packet switching and message switching. **10**

4. (a) Explain distance vector routing in detail. **10**
   (b) Draw an IP datagram header and explain the function of every field. **10**

5. (a) What is IP fragmentation ? Why is it needed ? Explain with an example. **10**
   (b) Compare TCP and UDP. **10**

6. (a) Explain the M/M/I model of queuing theory. **10**
   (b) Explain the ARP and RARP protocols in detail. **10**

7. Write short notes on any **three** :— **20**
   (a) IEEE standards
   (b) Dijkstra's algorithm
   (c) Classful addressing.

BE/EXTC/VII (REV) 4/6/2012
Data Compression & Encryption

mk.l.1stHlf12.22

Con. 4636-12. (REVISED COURSE) GN-8942

(3 Hours) [Total Marks : 100

N.B. (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of the remaining **six** questions.

1. (a) What are the various models used for data compression ? 5
   (b) Compare between A-Law and μ-Law companding. 5
   (c) What are active and passive attacts ? 5
   (d) What is Biometric Authentication ? Explain with examples. 5

2. (a) A source A = { a, b, c, d } has propabilities { 0·7, 0·15, 0·1, 0·05 } respectively. Generate a tag for the sequence { a b c d a } using arithmetic code. 10
   (b) Explain the working of DES. 10

3. (a) Take an example and show the difference in the encoding procedures of LZ78 and LZW. 10
   (b) Explain RSA algorithm with an example. 10

4. (a) Discuss the various lossless techniques for image compression. 10
   (b) How are the keys distributed in conventional encryption systems ? 10

5. (a) How is motion compensation used in video compression ? 10
   (b) What are digital signatures and how are they implemented ? 10

6. (a) Why are Transforms used in compression ? How is JPEG different from JPEG2000 ? 10
   (b) What are the various aspects of a firewall design ? 10

7. Write notes on (any **two**) :— 20
   (a) Chinese Remainder Theorem
   (b) Elliptic curve cryptography
   (c) MPEG audio standard
   (d) Steganography.