19/12/2011 ME/EXTC/Sem-II CREN DCM

AGJ 2nd half (v) 48

Con. 6087-11. **BB–2764**

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

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

1. (a) Compare lossy and lossless compression giving examples. **5**
   (b) What are the various models considered for compression and how are they useful ? **5**
   (c) What is the difference between Scalar and Vector quantization ? **5**
   (d) How is differential coding useful in speech compression ? **5**

2. (a) Generate a standard Huffman code for a source A { a, b, c, d, e } with probabilities { 0·15, 0·05, 0·25, 0·20, 0·35 } respectively. Also find the average length, entropy, efficiency and redundancy of the code. **10**
   (b) Discuss the sibling properties in the Adaptive Huffman coding technique with an example. **10**

3. (a) With S = { p, q, r, s } and P = { 0·2, 0·1, 0·3, 0·4 } respectively, encode the message 'pq q rs'. Generate an arithmetic coding tag for encoding and also decipher the tag to decode the sequence. **10**
   (b) What is Run Length Encoding and for which applications is this technique used ? **10**

4. (a) Encode the string, 'abracadabradabra with LZ 78 method and decode the coded stream toget back the string. **10**
   (b) What is Progressive Image Transmission and how is it useful ? **10**

5. (a) What are the different Adaptive Quantization Techniques ? **10**
   (b) What are the steps involved in L-B-G Algorithm ? **10**

6. (a) Discuss the various steps involved standard JPEG for still image compression. **10**
   (b) Discuss how sub-band coding is used for Image Compression. **10**

7. (a) Discuss various methods for speech synthesis. **10**
   (b) How is motion compensation useful in video compression ? **10**

94: 2nd Half-Exam.-11 mina (a). 14/12/11

ME Sem-II EXTC
Mobile Communication System

Con. 6086-11.

BB-2758

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

N. B. : (1) Question No. **1** is **compulsory**, solve any **4** questions from the remaining **6** questions.
(2) Assume **suitable** data wherever **necessary**.
(3) **Figures** to the **right** indicate **full** marks.

1) a) Explain the sequence of events in GSM system for:- (10)

i) Location Updating

ii) Call establishment from mobile.

b) Give the system architecture for TETRA System, describing all the details and compare it with GSM. (10)

2) a) Draw the functional model for DECT and explain DECT/GSM interworking Architecture. (10)

b) Explain Network Configuration in PDC system. Give its signaling structure. (10)

3) a) Draw and explain functional architecture of UPT. Explain numbering, routing and billing aspects of Universal Personal Telecommunication. (10)

b) Explain briefly Private Mobile Radio (PMR) configurations and applications. (10)

4) a) Explain the following features of IS-95 system:- (10)

i) Diversity (ii) Power Control (iii) Soft Hand off

b) Write about the radio characteristics of CT2 system and also about its layer 1 signaling. (10)

5) a) What are the objectives of addresses and identities of TETRA ? Explain. (10)

b) List the different logical channels in a TETRA system and explain the functions of each of them. (10)

6) a) Explain the Mobile to base station protocol stack for V + D TETRA system. (10)

b) Explain Authentication in TETRA system. (10)

7) Write short notes on (any two) :- (20)

(i) TETRA inter system signaling

(ii) Intelligent cell concept

(iii) Hand off strategies

9/12/2011 ME EXTC Sem-II
Advanced Digital Communication

Con. 6171-11. **(REVISED COURSE)** **BB-2755**

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

N. B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) **Figures** to **right** indicates **full** marks.

1. Write short notes ; (20)
   a). Average mutual information and entropy
   b). Vector Quantization.
   c). Miller codes
   d). Fractionally spaced equalizers.

2. a).Prove that, for the existence of a binary code with codeword length, $n_1, n_2 \ldots n_k$,
$$\sum_{k=1}^{L} 2^{-n_k} \leq 1$$ (06)
   b).A DMS has an alphabet of eight letters with probabilities 0.25, 0.2, 0.15, 0.12, 0.10, 0.08, 0.05, 0.05. Use Huffman code to find out the efficiency (08)
   c). Explain source coding techniques with examples. (06)

3. a). Explain the working of QFSK transmitter and receiver. (10)
   b). What is CPFSK system? Give an expression for power spectral density and plot the same (10)

4. a). Describe the basic concept of ISI. State and prove Nyquist theorem for band limited signals. (10)
   b). For a binary data 1 0 0 0 0 11 1 1 0 1 0, draw the output waveforms for duo binary encoder with pre coder. What are the drawbacks of duo binary encoder? Derive the transfer function and plot it. Also derive the impulse response . (10)

5. a). What are linear equalizers? Explain peak distortion criteria for linear equalizers in detail. (10)
   b). What are adaptive equalizers? With neat block diagram, explain the working of adaptive equalizers with feedback. (10)

6. a). Explain the working of FHSS in detail (10)
   b). What are the properties of PN sequences?. Explain any one method of PN sequence generation. (10)

7. Discuss any two in detail ; (20)
   a). Kalman Algorithm
   b). Decision feedback equalizers.
   c). Markov Process

3/12/2011 ME : EXTC - II
Satellite Commu. System

PR-Oct. (1) 115
Con.5933-11.

BB-2752

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

N.B. : (1) Question No. **1** is **compulsory.**
(2) Answer any **four** questions out of remaining **six** questions.
(3) Assume suitable **data** wherever **required** but justify the **same.**

1. (a) Why is low bit rate preferred for Telemetry Tracking and Command (TTC) Operations ? **5**
(b) Why is it necessary to split the received signal into different bands at the satellite and then combine them before transmitting to earth station ? **5**
(c) Explain the effect of oblateness of earth on orbital plane of satellite. **5**
(d) Why is downlink C/N usually less than uplink C/N. ? **5**

2. (a) Explain what do you understand by link budget. Derive link budget equation. How does link budget help in improving reliability of satellite signals ? **10**
(b) A satellite carries a Ku-band transponder which transmits 20 W through an antenna of 32 dB directivity and 70% antenna aperture efficiency. An earth station is located at 36000 at km from the satellite. For down link-frequency of 14 GHz. **10**
(i) Calculate incident power density in W/m^2 and dB w/m^2
(ii) The earth station has an antenna of 60 cm diameter and 60% aperture efficiency. Calculate the received power level in W and dBW at the antenna output terminal.
(iii) Calculate directivity and gain of received antenna in dB.

3. (a) A geostationary satellite is located 90° W. Calculate– **10**
(i) the azimuth angle for earth station antenna at latitude 35° N and longitude 100° W
(ii) range
(iii) Antenna elevation angle.

(b) Explain earth eclipse of an earth orbiting satellite. How earth eclipse affects satellite payload and its position with respect to earth station ? **10**

4. (a) Explain cross polarization discrimination and polarization isolation. How depolarisation is caused by rain ? **10**
(b) Explain various factors on which rain attenuation of a satellite signal depends. Also derive an expression of rain attenuation of a satellite signal. **10**

5. (a) Explain, with the help of suitable diagrams, the working of a parabolic reflector antenna. What are the advantages and disadvantages of parabolic reflector antenna ? How one can mitigate the limitations of parabolic reflector antenna ? **10**
(b) How synchronization is achieved in a TDMA system ? What is the function of– **10**
(i) Burst code word and
(ii) Guard time in a reference burst in TDMA.

6. (a) Explain the typical launch process of satellite from time of launch. **10**
(b) Compare :– **10**
(i) Uplink power requirement of FDMA and TDMA
(ii) Spin stabilization and 3 aixs stabilization.

7. Write short notes on :–
   (a) Propulsion subsystem
   (b) Radiation flux of high energy particles
   (c) Satellite system availability
   (d) VSAT networks.

29/11/11

ME EXTC Sem-II
microware devices &
amplifier design

80 2nd Half-Exam.-11 mina (a).

Con. 5803-11.

BB-2749

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

N. B. : (1) Solve **five** questions.
(2) Question No. **1** is **compulsory**.
(3) Solve any **four** questions out of remaining **six**.
(4) Make use of **Graphs** and **Smith Chart**, wherever **necessary**.
(5) Assume suitable data wherever **necessary**.
(6) Nos. on the **right** hand side indicate **Max. Marks** for the question.

1. Write a short on the following:
   A). TRAPATT Diode 05
   B). A Quarter Wave Transformer 05
   C). Measurement of Noise in a Transistor 05
   D). Tuning of an Amplifier 05

2. A). Explain the Domain Formation in GUNN Diode & derive its expressions for large signal Dipole Domain Analysis 14
   B). An n type GaAS Gunn Diode has the following parameters: Ethreshold E_{th}= 2800 V / cm, Applied field E = 3200 V / cm, Device Length L = 10 μm, Doping Concentration $n_0 = 2\times10^{14}$, Operating Frequency f = 10 GHz. Find out the electron drift velocity, the current density & the negative electron mobility of the diode. 06

3. A). How many types of Two port N/Ws are there. Convert the h parameters of 2 Port N / W into Z, Y & ABCD N/Ws 14
   B). A 50 ohms transmission line is connected to an antenna with Z_L = 25-j50. Find the position and length of the short circuited stub connected as shunt, to match the line. 06

4. A). Define the S parameters & explain the techniques used to measure them. 10
   B). Find out the S parameters of a transmission line & prove that its S matrix is Symmetrical as well as Reciprocal. 10

5. A). Derive the conditions for an amplifier to be unconditionally stable. 12
   B). A BJT with Ic= 30 mA & Vce = 10V is operated at a frequency of 1.0 GHz in a 50 ohms system. Its S parameters are, S11 = 0.73 ∠175°, S22= 0.21∠-80°, S12 = 0.0, S21= 4.45∠65°. Determine whether the transistor is unconditionally Stable. If yes, calculate the optimum terminations, G_{smax}, G_{Lmax}, G_{TUmax}. 08

6. A). Describe in detail the techniques used in making a Broad Band Amplifier. Explain the method of analyzing its bandwidth. 15
   B). Explain briefly the DC Biasing N/Ws 05

7. A). Derive the conditions for stable & sustainable oscillations in one & two port Negative Resistance Oscillators. 12
   B). Describe in detail the Dielectric Resonance Oscillator, its coupling & tuning mechanism. 08