

ME/EXTC/Sem II (CBSS)

Advanced Digital Comm

May-2015

QP Code : **2756**

(3 Hours)

[Total Marks : 80

- N. B. : (1) Question No. 1 is **compulsory**.
(2) Solve any **three** from remaining.
(3) Assume suitable data if required.

1. (a) A DMS has an alphabet of seven letters x_i , $i = 1, 2, 3, \dots, 7$ with probabilities 0.35, 0.30, 0.20, 0.10, 0.04, 0.005 & 0.005. Use Huffman encoding procedure to determine the binary code for the source o/p, also determine the efficiency of the code. 10
(b) Describe basic concept of ISI? State & prove Nyquist theorem for band limited signals. 10
2. (a) Derive waveform receiver in colored Gaussian noise using Time-Sampling approach. 10
(b) Design the error probability performance of coherent receiver for binary signaling. 10
3. (a) Design the optimum coherent receiver for Rician channel. 10
(b) Design and implement the M-ary non-coherent receiver for equiprobable, equal energy signals using matched filter. 10
4. (a) Explain relevant and irrelevant noise? Also prove that n_j and n_k are uncorrelated and independent Gaussian random variables. 10
(b) Explain in brief analogy for spectral broadening in fading channels. 10
5. (a) Explain (i) Model based coding (ii) L-Z algorithm 10
(b) Explain average cost of decision in Bayes detection of received signal. 10
6. (a) Explain optimum waveform receiver in white Gaussian noise. 10
(b) Explain I-Q modulator and demodulator using real signals with functional diagram. 10

ME / sem II / CBSHS / May 2015
Mobile & wireless^{EXTC} communications.

QP Code : 2760

(3 Hours)

[Total Marks : 80

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

1. (a) Discuss the significance of hand off procedure in CDMA (IS-95). 5
(b) What are the major functions of the RNC in UTRAN architecture? 5
(c) What is the fundamental difference between Wi-Fi and Bluetooth? 5
(d) Discuss power control in WCDMA and CDMA2000. 5
 2. (a) How does cell sectoring improves S/I ratio in cellular system? Derive the expression for S/I ratio in a worst case scenario with 60° and 120° sectorization. 10
(b) Discuss IMT-2000 in detail. 10
 3. (a) With a neat diagram, explain working principle of adaptive equalizer in detail. 10
(b) Explain forward and reverse channels of IS-95 in detail. 10
 4. (a) Compare Hiper LAN 2 with IEEE 802.11 a/b. Highlight advantages and disadvantages of Hiper LAN technology. 10
(b) Explain intelligent cell concept and its application. 10
 5. (a) Describe the various criteria that decide placement of cell-site antennas and mobile antennas 10
(b) Compare various WPAN standards. 10
 6. Write short notes on (any four):- 20
 - (a) Wireless sensor network.
 - (b) Diversity techniques.
 - (c) Mobile IP and Mobility management.
 - (d) Rake receivers.
 - (e) RFID Technology.
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QP Code : **2762**

(3 Hours)

[Total Marks : 80]

- N.B.: (1) Question No. 1 is **compulsory**.
(2) Solve any three questions from the remaining.
(3) Assume suitable data if required.

1. (a) Explain how balanced architecture in novel balanced FSK demodulation is used to eliminate the DC offset and enhanced noise. 5
(b) Explain polarization diversity in millimeter wave antennas. 5
(c) Discuss use of PN sequence as preamble in SC-FDE system. 5
(d) Explain transceiver without mixer.
2. (a) What is beam switching array ? Compare them. 10
(b) Write acquisition and tracking algorithm for beam steering. 10
3. (a) Explain operational principle of OFDM with symbol pattern. 10
(b) Explain noise coupling in a MIMO system and derive the formula for the total noise for two coupled antenna elements. 10
4. (a) In QAM justify, the higher the value of M is, the lower power efficiency will be. Also explain bit error probability of QAM signal. 10
(b) Explain adaptive channel estimation for SC-FDE wireless system. 10
5. (a) Describe a microwave repeater. Contrast baseband and IF repeaters. 10
(b) Give advantages of $\frac{\pi}{4}$ -QPSK over other QPSK modulation schemes and explain its modulator with block diagram. 10
6. (a) Draw block diagram of SC-FDMA system and explain. 10
(b) Explain different manufacturing technologies that are suitable for millimeter wave antenna production. 10

QP Code : 2787

(3 Hours)

[Total Marks : 80

- N.B. :** (1) Question No.1 is Compulsory.
(2) Solve any three questions from remaining five questions.
(3) All questions carry equal marks.

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|--------|---|----|
| 1. (a) | List network security domain. | 5 |
| (b) | What do you mean by computer crime. | 5 |
| (c) | What is Authentication and Authorization | 5 |
| (d) | Explain the importance of biometric authentication over conventional authentication | 5 |
| 2. (a) | What are the roles of firewall? Explain the types of firewall in detail. | 10 |
| (b) | Explain the role of honey pot in network security. | 10 |
| 3. (a) | Describe how a security association is formed in IPsec protocol | 10 |
| (b) | List the types of Intrusion Detection system (IDS). What are limitations of IDS? | 10 |
| 4. (a) | Explain the role of Telecommunication Regulation Authority of India (TRAI). | 10 |
| (b) | Explain symmetric key generation techniques using Diffie-Hellman method | 10 |
| 5. (a) | What is equipment security testing? Describe core network security testing. | 10 |
| (b) | How can we ensure message authentication and message integrity using public and private keys? | 10 |
| 6. | Write short notes on : | 20 |
| (a) | Session Hijacking | |
| (b) | Network security audit | |
| (c) | Ethical issues in Intellectual property and copyright | |
| (d) | Fingerprint Recognition system. | |

Q.P. Code : 2771

(3 Hours)

[Total Marks : 80

- N.B. :** (1) Question No. 1 is Compulsory.
(2) Attempt any four questions out of six questions.
(3) Assume suitable data is necessary.
(4) Figures to right indicate the maximum marks.

1. Write short notes on following,
 - (i) Helical Antenna 5
 - (ii) Radiation Pattern 5
 - (iii) Ferrite Loop Antenna 5
 - (iv) Smart Antenna 5
 2. (a) What are uniform Arrays? Design an uniform array to realize gain of 12 dBi in the broadside direction at frequency of 1 GHz? Draw the radiation pattern of the array if array consist of linearly polarized dipole antenna? 20
 3. (a) List down and compare various methods of Antenna Synthesis? 10
(b) Discuss the Woodward Lawson method of Antenna Synthesis? 10
 4. (a) Draw the appropriate feed point locations and the field distribution to excite TM_{10} , TM_{01} modes in rectangular Microstrip Antenna? 5
(b) Design rectangular Microstrip antenna at 1.2 GHz using glass epoxy substrate? ($h = 1.6 \text{ mm}$, $\tan\delta = 0.02$, $\epsilon_r = 4.3$) 15
 5. (a) Explain the mechanism to realize broadband response using parasitic patches in Microstrip antenna? 10
(b) Explain the working of radiating and non-radiating edge coupled rectangular Microstrip antenna? 10
 6. (a) Why compact Microstrip antennas are needed? 5
(b) Discuss the various shorted variations of rectangular and circular Microstrip antenna? 15
 7. (a) Explain the working of rectangular monopole antenna with orthogonal ground plane? 10
(b) What are non-uniform arrays? Compare them with uniform arrays? 10
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