

**[M17 CS 1101]**  
**I/II MTECH I SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**DETECTION AND ESTIMATION THEORY**  
**MODEL QUESTION PAPER**

**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

1. a Define an Autoregressive Process. Calculate the values of mean, variance and autocorrelation values of a First order auto regressive model. 7M  
 b Define shot noise. Calculate the values of mean, autocorrelation, and the power spectral density of the shot noise. 7M
2. a Find the digital filter diagram and the state model of an ARMA (3, 1) model. 7M  
 b Define and derive an expression for noise equivalent bandwidth of a filter. 7M
3. a What is Minimum Probability of Error? Explain Baye's decision rule. 7M  
 b Explain the operation of a Correlation receiver for detecting deterministic signals corrupted by additive white Gaussian noise and derive an expression for decision threshold. 7M
4. a Mathematically explain the operation of scalar kalman filter. 7M  
 b Explain the implementation of digital wiener filter. 7M
5. a Let p represent the probability that an integrated circuit is good. Show that the maximum likelihood estimator of p is  $N_G/n$  where  $N_G$  is the number of good circuits in n independent trials 7M  
 b Define the following : 7M
  - i. Empirical Distribution Function
  - ii. Joint Empirical distribution Functions
  - iii. Histograms.
6. a
  - i. If  $X$  is uniform (0, 10) and 20 cells are used in a histogram with 200 samples, find the bias, MSE, and normalized RMS error in the histogram. 7M
  - ii. Repeat part (a) if  $X$  is normal with a mean of 5 and a standard deviation of 1.5
 b Discuss about 7M
  - i. Bayesian Estimators
  - ii. Maximum Likelihood estimators.
7. a  $X(n)$  is a stationary zero-mean Gaussian random sequence with an autocorrelation function,  $R_{XX}(k)=\exp(-0.2k^2)$ , Show that  $X(n)$  is ergodic. 7M  
 b Explain the procedure for the Windowed or smoothed estimators of power spectral density functions. Also explain different windows used for this purpose. 7M
8. a If an estimated ARMA model is,  $X(n) = 0.9X(n - 1) - 0.2X(n - 2) + 0.5e(n - 1) + e(n)$ .find the corresponding autocorrelation function, autocorrelation coefficient, and power density spectrum. 7M  
 b Explain the Flowchart in Box-Jenkins method of estimation of random sequence models. 7M

**[M17 CS 1102]**

**[M17 CS 1102]**  
**I/II MTECH I SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**DIGITAL DATA COMMUNICATIONS**  
**MODEL QUESTION PAPER**

**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

1. a Explain the principle of QAM with the help of a neat diagram. 7M  
b What is a constellation diagram? Explain the constellation diagram of 16QAM. 7M
2. a Explain the OSI model for networking in brief. How does it differ from TCP/IP model? 7M  
b What are different types of digital data transmission modes? Explain with examples. 7M
3. a With the help of a neat diagram, explain the DTE-DCE interface. 7M  
b Explain the various network topologies and compare the performance of each topology. 7M
4. a What are the various types of error correction codes? Explain any one. 7M  
b Compare the synchronous and asynchronous data link protocols. 7M
5. a What are the different types of packet switching? Explain. 7M  
b Explain the architecture of IEEE 802.6. 7M
6. a What are the different functions of bridges in the network? Explain various types of bridges used in the network. 7M  
b Compare the time division and frequency division multiplexing techniques. 7M
7. a Explain the principle of TDMA and derive the expression for efficiency of TDMA. 7M  
b What are the demerits in OFDMA? Explain how they can be overcome? 7M
8. a Explain the principle, advantages and applications of CDMA. 7M  
b What are the demerits of CDMA? Explain. 7M

**[M17CS1102]**



**[M17 CS 1102]**  
**I/II MTECH I SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**CODING THEORY AND APPLICATIONS**  
**MODEL QUESTION PAPER**

**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

1. a) What are different types of errors and explain the control strategies. 7M  
b) State and prove theorems related to minimum distance of linear block codes. 7M
2. a) Explain encoding and decoding circuits of a systematic  $(n,k)$  codes. 7M  
b) Form a parity check matrix for  $(15,11)$  hamming code and design a decoder for this. 7M
3. a) List out and prove any five theorems related to cyclic codes. 7M  
b) Design an encoder and decoder for the  $(7,4)$  cyclic code generated by  $1+X+X^3$ . 7M
4. a) Explain the operation of any two error trapping decoder circuit. 7M  
b) Consider  $(4,3,2)$  convolutional code. Find the generator sequences of the code. Find the generator matrix  $G$ . Find the code word  $v$  corresponding to the information sequence  $u=(110, 011, 110)$ . 7M
5. a) Explain about viterbis decoding algorithm. 7M  
b) Explain the application of sequential decoding of convolutional codes. 7M
6. a) Explain about  $(2,1,3)$  Convolutional Encoder. 7M  
b) Consider  $(2,1,2)$  code with  $G(D)=[1+D^2, 1+D+D^2]$ . Find the GCD of the of its generator polynomial. 7M
7. a) Determine the generator polynomial for all primitive BCH codes of length 7. 7M  
b) Explain the syndrome computation circuit for the double error correcting  $(15,7)$  BCH Code. 7M
8. Write short notes on the following  
a) Bounds on Burst Error Control 5M  
b) Encoder of the Burst Error control Code 5M  
c) Interleaved Cyclic 4M

**[M17CS1103]**

**[M17 CS 1104]**  
**I/II MTECH I SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**ADVANCED DIGITAL SIGNAL PROCESSING**  
**MODEL QUESTION PAPER**

**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

1. a Using in Decimation in Time algorithm find the FFT of  $x[n]=\{1,2,3,1,-1,3,-4\}$ . 7M  
b Perform the two-band poly-phase decomposition of the transfer function 7M  

$$H(z) = \frac{2 + z^{-1}}{1 + 0.5z^{-1}}$$
2. a Describe the frequency domain description of an Interpolator. 7M  
b Calculate the DFT of  $x[n]=\{1,0,1,2,1,3,1,4\}$ . 7M
3. a Describe the oversampling A/D and D/A converters. 7M  
b Explain the implementation of sampling rate converters using Poly phase filters. 7M
4. a Explain the Welch's method for the power spectrum estimation. 7M  
b Explain Bartlett method. 7M
5. a Obtain Direct form-I, Direct form-II and cascade form realizations of the following 7M  
system,  $y[n]=-0.25y[n-1]+0.82y[n-2]+0.65x[n]-0.252x[n-2]$ .  
b Explain Frequency sampling structure of FIR Filter. 7M
6. a Explain the operation of Backward Linear predictor with a neat derivation 7M  
b Realize the following FIR filter,  $H(z)=1-2.5z^{-1}+4.75z^{-2}-3.475z^{-3}+1.2015z^{-4}-$   
 $0.16897z^{-5}$  as i) cascade of five first order sections ii) cascade of one third order and 7M  
second order sections.
7. a What are the quantization errors in FFT algorithm? Explain them 7M  
b Describe the Yule-Walker method of power spectrum estimation. 7M
8. a Explain Burg method of power spectrum estimation. 7M  
b Explain the quantization and round off errors in a digital filter. 7M

**[M17CS1104]**

**[M17 CS 1105]**  
**I/II MTECH I SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**RADAR SIGNAL PROCESSING**  
**MODEL QUESTION PAPER**

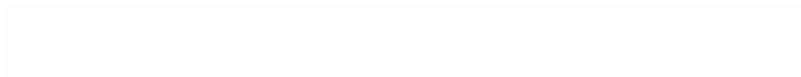
**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

- |      |   |    |
|------|---|----|
| 1. a | Draw the block diagram of a Radar and explain   | 7M |
| b    | Obtain the frequency response of a Matched filter with non-white noise.   | 7M |
| 2. a | Discuss the efficiency of a non-matched filter  | 5M |
| b    | Explain the role of beacon and repeater expressions n Radar.  | 4M |
| C    | Discuss the CFAR use in Radar.  | 5M |
| 3. a | Explain the I,Q detector with a block diagram.  | 7M |
| b    | What is CFAR explain the cell averaging CFAR technique.   | 7M |
| 4. a | Obtain the ambiguity diagram for a pulse train consisting of five pulses.   | 7M |
| b    | Explain the optimization for detecting signals in clutter when the relative Doppler shift is zero or unknown                              | 7M |
| 5. a | What are the advantages of the thumb lack ambiguity diagram? And sketch the ideal thumb lack ambiguity diagram by a noise like waveforms. | 7M |
| b    | Explain the basic principle of the linear FM pulse compression.   | 7M |
| 6. a | Discuss the applications, advantages and disadvantages of short pulse in a radar  | 7M |
| b    | Explain the SAW pulse compression in detail.  | 7M |
| 7. a | Discuss the principle of the binary phase coded pulse compression.  | 7M |
| b    | Explain the properties of the frank poly phase codes.   | 7M |
| 8.   | Write short notes on  |    |
| a.   | Barker code   | 7M |
| b.   | Maximal length sequences using PN codes   | 7M |

**[M17 CS 1105]**



**[M17 CS 1106]**  
**I/II MTECH I SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**OPTICAL COMMUNICATIONS TECHNOLOGY**  
**MODEL QUESTION PAPER**

**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

1. a What is dispersion in fibers? What are the causes and types of fiber dispersion loss? Explain. 7M  
b Explain the principle and applications of solitons. 7M
2. a Explain Cross-Phase modulation. 7M  
b Explain the principle of Mach Zander interferometer with a neat diagram. 7M
3. a What are the functions of optical switches? Explain. 7M  
b Explain the principle of optical circulator with the help of a neat diagram. 7M
4. a Explain the Duobinary optical modulation scheme with necessary diagrams. 7M  
b What is the need for equalization in optical receivers? Explain. 7M
5. a What are the different types of error detection codes in optical system? Explain. 7M  
b What are the different types of demodulation techniques used in optical receivers? Explain any one. 7M
6. a Explain the principle of operation of semiconductor optical amplifier. 7M  
b What are the different crosstalk reduction techniques in an optical system? Explain. 7M
7. a Write about wavelength planning. 7M  
b What are the different non-linear effects in optical network? Explain. 7M
8. Write short notes on  
a Four Wave Mixing. 7M  
b Bragg Gratings. 7M

**[M17 CS 1106]**

**[M17 CS 1107]**  
**I/II MTECH I SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**ADVANCED COMPUTER NETWORKS**  
**MODEL QUESTION PAPER**

**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

- |  |     |
|--|-----|
| 1.a) How are congestion control and quality of service related?                                    | 5M  |
| b) What is the difference between open-loop congestion control and closed-loop congestion control? | 9M  |
| 2.a) Explain about X.25 layers and frame relay operation?  | 7M  |
| b) Briefly discuss about ATM layers. ?   | 7M  |
| 3.a) Describe the physical configuration of SONET with required diagrams?                          | 9M  |
| b) Explain folding algorithm in interconnection networks?  | 5M  |
| 4.a) Describe the structure of feedback shift register for generating PN sequence?                 | 9M  |
| b) Briefly explain the significance of Virtual private networks?                                   | 5M  |
| 5.a) Explain about MAC sub layer and its addressing mechanism?                                     | 7M  |
| b) Write short notes on frequency reuse and channel assignment strategies of cellular networks?    | 7M  |
| 6.a) Explain the four general techniques to improve quality of service?                            | 9M  |
| b) Compare IPv4 and IPv6?  | 5M  |
| 7.a) Explain DSSS system with neat block diagram?  | 7M  |
| b) Explain about Interconnection networks and their properties?                                    | 7M  |
| 8. With neat sketches explain about Bluetooth architecture and its layers?                         | 14M |

**[M17 CS 1107]**

**[M17 CS 1108]**  
**I/II MTECH I SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**WIRELESS LANS AND PANS**  
**MODEL QUESTION PAPER**

**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

1. Discuss about the technical issues in wireless communications. 14M
2. Explain the WLAN Components with examples. 14M
3. Write about PMD and PLCP layers in IEEE 802.11 Infrared WLAN Standard with neat diagrams. 14M
4. What are the unlicensed frequency bands used for WLANs and how the channel allocation is done in IEEE 802.11a standard? 14M
5. What are the attacks against WLANs and explain the security measures. 14M
6. Explain IEEE 802.15.3 high rate WAPNs with respect of protocol stack and network topology. 14M
7. Discuss about IEEE 802.16 WiMAX standard and its protocol stack in detail. 14M
8. Explain the Routing Protocols in Ad-Hoc Wireless networks 14M

**[M17CS1108]**



**[M17 CS 1109]**  
**I/II MTECH I SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**MOBILE COMPUTING TECHNOLOGIES**  
**MODEL QUESTION PAPER**

**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

- |  |    |
|--|----|
| 1.a) Discuss about the mobile services and data services in GSM.   | 7M |
| b) Describe in detail with the architecture for mobile communications.   | 7M |
| 2. a) Write in detail about Code division multiple access (CDMA).  | 7M |
| b) What are benefits of reservation schemes? How are collisions avoided during data transmission, why is the probability of collisions lower compared to classical Aloha? What are disadvantages of reservation schemes? | 7M |
| 3.a) What is the basic purpose of DHCP? Name the entities of DHCP and give basic DHCP configuration.   | 7M |
| b) List the entities of mobile IP and describe data transfer from a mobile node to a fixed node and vice versa. Why and where is encapsulation needed?   | 7M |
| 4. a) Discuss about snooping TCP. Also focus on its advantages and its disadvantages.  | 7M |
| b) Explain the usage of selective retransmission in TCP in mobile networks.  | 7M |
| 5. a) Discuss in detail about different hoarding techniques for databases.   | 7M |
| b) Explain about transactional models in detail.   | 7M |
| 6. a) Explain in detail about pull based data dissemination mechanism.   | 7M |
| b) Discuss in detail about communication asymmetry and illustrate with an example.   | 7M |
| 7. a) Define MANET. Give spectrum of MANET applications in detail.   | 7M |
| b) Name the main differences between multi-hop ad-hoc networks and other networks. What advantages do these ad-hoc networks offer?   | 7M |
| 8.a) Discuss in detail about hierarchical routing algorithms in mobile adhoc networks.   | 7M |
| b) Describe in detail about security in MANETs.  | 7M |

**[M17 CS 1109]**

**[M17 CS 1110]**  
**I/II MTECH I SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**NETWORK SECURITY AND CRYPTOGRAPHY**  
**MODEL QUESTION PAPER**

**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

- |   |  |     |
|---|--|-----|
| 1 | a) Describe the relationship between security services and mechanisms.                                       | 7M  |
|   | b) What are the different types of attacks? Explain with examples  | 7M  |
| 2 | a) What is double DES? What kind of attack is possible on double DES?  | 7M  |
|   | b) Explain AES encryption round with a neat diagram  | 7M  |
| 3 | a) Perform encryption/decryption using RSA algorithm for the following:<br>$p = 3, q = 11, e = 7, m = 5$     | 9M  |
|   | b) Explain digital signature standard algorithm for authentication   | 5M  |
| 4 | a) Describe the different cryptographic functions provided by PGP.   | 7M  |
|   | b) What is MIME? What are the different content types of MIME?   | 7M  |
| 5 | Explain in detail the architecture of IPSecurity.  | 14M |
| 6 | a) How web security can be achieved? What are the different mechanisms?                                      | 7M  |
|   | b) Explain the operation of SSL Record protocol with a neat diagram.   | 7M  |
| 7 | Explain the architecture of SNMP in detail   | 14M |
| 8 | a) Define the three classes of intruders and mention the intrusion techniques to protect from the intruders. | 7M  |
|   | b) Explain the different types of viruses.   | 7M  |

**[M17 CS 1110]**

**[M17 CS 1201]**  
**I/II MTECH II SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**RF CIRCUIT DESIGN**  
**MODEL QUESTION PAPER**

**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

- 1.a) Explain why skin effects are considered important for RF circuit design. 7M
- b) Describe briefly how passive components are realized on printed circuit boards at RF. 7M
  
- 2.a) Compare the characteristics of co-axial line, two-wire line and a parallel plate transmission line. 7M
- b) An input impedance of  $25 \Omega$  of a  $\lambda / 4$  transformer is to be matched to a  $50 \Omega$  micro strip transmission line at 500 MHz compute the length, width and characteristic impedance of the quarter-wave parallel plate transmission line. The thickness and relative dielectric constant of the substrate material are given as 1mm and 4.0 respectively. Make assumptions if necessary. 7M
  
- 3.a) Define the following terms for a transmission line.  
i) Standing wave ratio ii) Return loss  
iii) Power in dBm iv) characteristic impedance 7M
- b) Derive the expression for characteristic impedance of a short circuited transmission line. 7M
  
- 4.a) Describe how a tunable RF active filter can be realized. 7M
- b) With the help of neat diagrams describe the structure and functioning of a HEMT. 7M
  
5. Write a short note on low noise, linear RF BJT operation based on its structure. 7M
  
- 6.a) Enumerate the importance of 'power relations' in the design of an amplifier at high frequencies. 7M
- b) Explain how stable performance can be assured for an RF transistor amplifier using corresponding stability circles. 7M
  
7. Draw neat circuit diagrams to explain how gain-bandwidth product limitation can be overcome in an RF broadband amplifier design. 7M
  
8. With the help of neat schematics explain how oscillators should be configured to obtain high frequencies of oscillation. State the principle of operation. State the principle of operation of a dielectric resonator oscillator. 14M

**[M17 CS 1201]**

**[M17 CS 1202]**  
**I/II MTECH II SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**WIRELESS COMMUNICATIONS AND NETWORKS**  
**MODEL QUESTION PAPER**

**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

1. a Explain about 7M  
i. TDMA  
ii. SDMA  
b Consider a wired point-to-point network. List some performance measures. 7M
2. a Explain how the two-ray model is used when a single ground reflection 7M  
dominates the multipath effect.  
b Draw the programming model for WAP and explain its functioning 7M
3. a What is the difference between frequency selective fading and flat fading? 7M  
b How the received signal strength is predicted using the free space 7M  
propagation Model? Explain
4. a Explain the algorithms for adaptive equalization. 7M  
b What are the different receiver diversity combining techniques? Explain. 7M
5. a What is the need for link calculation? Explain with suitable example 7M  
b Explain Maximum Likelihood Sequence Estimation (MLSE) Equalizer 7M
6. a Explain how Inter Symbol Interference, and cochannel interference is caused and 7M  
how they are eliminated.  
b What is small-scale fading? Write the factors influencing fading. 7M
7. a Draw and explain the various fields in a IEEE 802.11 MAC frame. 7M  
b List and explain L2CAP logical channels? 7M
8. a Write short notes on Blocking probability 7M  
b Explain, When does a WLAN become a personal area network (PAN)? 7M

**[M17 CS 1202]**

**[M17 CS 1203]**  
**I/II MTECH II SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**IMAGE AND VIDEO PROCESSING**  
**MODEL QUESTION PAPER**

**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

1. a) What is KL transform? What are the disadvantages of KL transform? Explain. 7M  
b) Explain about Haar transform. 7M
2. a) Which criteria highlight certain features of the interest? Explain about it. 7M  
b) Explain about the Image file formats. 7M
3. a) What is high pass filter? Discuss about butter worth high pass filter. 7M  
b) What is histogram matching? Discuss. 7M
4. a) Differentiate between linear and nonlinear image restoration techniques. 7M  
b) Discuss about Blind deconvolution. 7M
5. What is clustering? Explain about different clustering techniques with examples. 7M
6. a) What is redundancy in images? Discuss about Shannon Fano coding. 7M  
b) Discuss about wavelet based image compression. 7M
7. a) Explain about Photometric image formation. 7M  
b) How sampling is done for video signals. 7M
8. Explain about the following terms  
a) Predictive coding 5M  
b) Region based motion estimation 5M  
c) Hadamard transformation 4M

**[M17 CS 1203]**

**[M17 CS 1204]**  
**I/II MTECH II SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**SOFTWARE DEFINED RADIO**  
**MODEL QUESTION PAPER**

**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

- |   |     |
|---|-----|
| 1. a) Explain the benefits and significance of SDR.   | 7M  |
| b) Explain the Noise and Distortion in the RF chain.  | 7M  |
| 2. a) Explain Digital filter banks.   | 7M  |
| b) Discuss about Timing recovery in Digital Receivers using Multirate Digital filters.            | 7M  |
| 3. Explain in detail about comparison of Direct Digital synthesis with Analog Signal synthesis.   | 14M |
| 4. a) Describe in detail about Generation of Random sequences.                                    | 7M  |
| b) Explain parameters of ideal data converters.   | 7M  |
| 5. Discuss in detail about ADC and DAC with neat architectures.                                   | 14M |
| 6. a) Explain about FPGAs.  | 7M  |
| b) Write one short note on Power management issues using a combination of DSPs, FPGAs, and ASICs. | 7M  |
| 7. a) Explain about Object Oriented Programming.  | 7M  |
| b) Write a short notes Joint Tactical Radio System.   | 7M  |
| 8. a) Explain SDR-3000 Digital Transceiver Subsystem.   | 9M  |
| b) Discuss about CHARIOT.   | 5M  |

**[M17 CS 1204]**

**[M17 CS 1205]**  
**I/II MTECH II SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**SOFT COMPUTING TECHNIQUES**  
**MODEL QUESTION PAPER**

**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

1. a) Explain about Biological Neuron. 7M  
b) Explain the characteristics of ANN and write the applications of ANN 7M
2. a) Explain different types of ANN architectures 7M  
b) Explain activation and synaptic dynamics of neural networks. 7M
3. a) Explain in detail about Learning and neural network. 7M  
b) Discuss about Neural Network based controller. 7M
4. a) Describe in detail Fuzzy relations. 7M  
b) Explain about the Fuzzy logic control for nonlinear time delay system. 7M
5. Describe the basic concept of Genetic algorithm and explain in detail about algorithm steps. 14M
6. a) Explain about applications of GA to power system optimisation problem. 9M  
b) Write one short note on case study of GA 5M
7. a) Explain the stability analysis of fuzzy control systems 7M  
b) Write a short note on Hopfield network. 7M
8. Explain the differences between the Tabu search and D-colony search techniques for solving optimization problems. 14M

**[M17 CS 1205]**

**[M17 CS 1206]**  
**I/II MTECH II SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**SMART ANTENNAS**  
**MODEL QUESTION PAPER**

**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

- |    |   |     |
|----|---|-----|
| 1. | a) Explain the features and benefits of smart antenna systems.                                | 7M  |
|    | b) Explain Friis transmission formula in antennas   | 7M  |
| 2. | Explain about Fixed Beam Arrays and Retrodirective Arrays                                     | 14M |
| 3. | a) Explain about probability density functions in random process with mathematical equations. | 7M  |
|    | b) Explain Stationarity and Ergodicity in random process.                                     | 7M  |
| 4. | a) Explain the historical development of Smart Antennas.                                      | 7M  |
|    | b) Explain code division transmit diversity method.   | 7M  |
| 5. | a) Explain constant modulus algorithm for adaptive Beamforming.                               | 7M  |
|    | b) Compare LMS and RLS algorithms for adaptive Beamforming.                                   | 7M  |
| 6. | a) Compare Bartlett and Capon methods of spectral estimation .                                | 7M  |
|    | b) Explain Linear Prediction method for Angle of Arrival estimation.                          | 7M  |
| 7. | a) Explain Maximum Entropy Angle of Arrival Estimate.   | 7M  |
|    | b) Explain MUSIC algorithm for AOA estimate.  | 7M  |
| 8. | a) Explain about optimum antenna element spacing in beamforming array performance.            | 7M  |
|    | b) Explain different multi user modulation schemes.   | 7M  |

**[M17 CS 1206]**



**[M17 CS 1207]**  
**I/II MTECH II SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**SECURE COMMUNICATIONS**  
**MODEL QUESTION PAPER**

**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

1. a) Explain the benefits and significance of Shannon's theory. [7M]  
b) Discuss about the Pseudo random sequence generators. [7M]
2. Briefly explain about the following terms: [14M]  
a) Block ciphers      b) Stream ciphers      c) Security mechanism.
3. a) Explain various Multilevel relational data models. [7M]  
b) Explain Internet security Protocols. [7M]
4. a) Discuss about the Policy enforcement and related issues. [7M]  
b) What is Software penetrating testing. [7M]
5. Explain in detail about the Intrusion detection with various security concepts. [14M]
6. a) Explain various types of Biometrics. [7M]  
b) Give the comparison between the Behavioural and Esoteric Biometric Technologies [7M]
7. Explain the following terms: [14M]  
a) Public Key Infrastructure  
b) Technical Issues relating to Intrusion detection.
8. Explain the following terms: [14M]  
a) Iris and Retina scanning      b) Network security      c) Define a Discipline.

**[M17 CS 1207]**

**[M17 CS 1208]**  
**I/II MTECH II SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**OPTICAL NETWORKS**  
**MODEL QUESTION PAPER**

**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

- |   |   |    |
|---|---|----|
| 1 | a) Discuss the SONET frame structures   | 7M |
|   | b) Explain the following functions of ATM   | 7M |
|   | i. Connections and cell forwarding  |    |
|   | ii. Signaling and Routing   |    |
| 2 | a) Discuss different OADM architectures with neat figures.                                      | 7M |
|   | b) Draw the block diagram of broadcast and select ROADM and explain its functioning.            | 7M |
| 3 | a) Discuss cost trade-offs by considering a PWDM ring architecture.                             | 7M |
|   | b) Explain light path topology design (LTD) problem in brief.                                   | 7M |
| 4 | a) Mention the key attributes of optical layer (light path) service.                            | 7M |
|   | b) Explain adaptation management in WDM optical networks with neat diagrams                     | 7M |
| 5 | a) Explain unidirectional path switched rings used in the protection of SONET / SDH             | 7M |
|   | b) Discuss the protection in IP with an example.  | 7M |
| 6 | a) Draw the block diagram of wavelength routing PON (WRPON) and explain its working             | 7M |
|   | b) Explain the functions of each element of an access network with a neat architectural diagram | 7M |
| 7 | a) Explain optical time division multiplexing (OTDM) with a neat figure.                        | 7M |
|   | b) Explain the following:   | 7M |
|   | i. Recirculation Buffering  |    |
|   | ii. Burst Switching   |    |
| 8 | a) Discuss architectural choices for next generation transport networks with neat diagrams.     | 7M |
|   | b) Explain how the transmission capacity of an optical link is increased by SDM.                | 7M |

**[M17 CS 1208]**

**[M17 CS 1209]**  
**I/II MTECH II SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES**  
**MODEL QUESTION PAPER**

**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

- 1.a Draw and explain the block diagram of a Digital Signal-Processing system. 7M
- b What are the different number formats that are used to represent signals and coefficients in DSP systems? Explain any two of them. 7M
2. Discuss in brief about the data addressing capabilities of programmable DSP devices with examples. 14M
3. Describe the following on-chip peripherals of TMS320C54xx processors.
  - (a) Hardware Timer 7M
  - (b) Host port interface 7M
4. a Write a brief note on Micro Signal architecture. 6M
- b Explain in detail about Blackfin processor. 8M
5. a Draw and explain the block diagram of memory interface for TMS320C5416 processor. 7M
- b How does DMA help in increasing the processing speed of a DSP processor? 7M
6. a Explain in brief about errors in A/D conversion process. 7M
- b Explain the concept of Pipelining for speeding up the execution of an instruction. 7M
7. a Describe the operation of the following instructions: 7M
  - (i) MAS \*AR3-, \*AR4+, B, A
  - (ii) MAC \*AR1+, \*AR2-, A
- b Discuss in brief about the basic peripherals in analog devices family of DSP devices. 7M
8. Write short notes on any **TWO** of the following: 14M
  - (a) Parallel I/O Interface
  - (b) Memory map of TMS320C5416
  - (c) Barrel Shifter

**[M17CS1209]**

**[M17 CS 1210]**  
**I/II MTECH II SEMESTER REGULAR EXAMINATIONS**  
**COMMUNICATION SYSTEMS**  
**DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING**  
**INTERNET OF THINGS**  
**MODEL QUESTION PAPER**

**TIME: 3 Hours**

**Max.Marks: 70**

**ANSWER ANY 5 QUESTIONS**  
**ALL QUESTIONS CARRY EQUAL MARKS**

- |   |     |
|---|-----|
| 1. a. Explain about web networking interface to cloud harnessing.                                       | 7M  |
| b. Discuss Block diagram of IOT with smart objects and its platforms.                                   | 7M  |
| 2. a. What are the different communication technologies and mobile data technologies used in IOT?       | 7M  |
| b. Discuss different low power wireless technologies used in IOT.                                       | 7M  |
| 3. Discuss about RTLS+GPS agent and Multi agent systems. Differentiate RTLS+GPS and Multi agent system. | 14M |
| 4. a. Explain architecture of IOT with machine to machine concept.                                      | 9M  |
| b. What are the different communication patterns used in the field of IOT?                              | 5M  |
| 5. a. Discuss about IOT protocol Architecture.  | 9M  |
| b. What is the role of 6LOWPAN-IPv6 in IOT?   | 5M  |
| 6. Discuss different applications of IOT in the real time with the issues in it.                        | 14M |
| 7.a. Discuss about the IOT role in Manufacturing or health care or retail.                              | 7M  |
| b. Explain different models with support IOT prototype?   | 7M  |
| 8. a. How gateways are built based on Raspberry PI or beagle board?                                     | 7M  |
| b. Discuss different data analysis techniques.  | 7M  |

**[M17 CS 1210]**