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Code No. : 21503

**VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD**  
**M.E. (ECE: CBCS) I-Semester Main Examinations, January-2018**  
(Communication Engineering & Signal Processing)

**Advanced Digital Modulation Techniques**

Time: 3 hours

Max. Marks: 60

*Note: Answer ALL questions in Part-A and any FIVE from Part-B*

**Part-A (10 × 2 = 20 Marks)**

1. Define Inter Symbol Interference (ISI).
2. State the reasons for superiority of digital communication over analog communication.
3. Compare bandwidth and power spectra of BPSK and QPSK schemes.
4. Draw the structure of QPSK modulator.
5. List the channel impairments that effect by channel to the signal transmitted.
6. Discuss maximum likelihood criterion used for optimum detection.
7. Differentiate between slow and fast frequency hopping.
8. Illustrate the characteristics of spreading codes.
9. Discuss the suitability of space time codes for MIMO communications.
10. Write the applications of Smart Antenna.

**Part-B (5 × 8 = 40 Marks)**

11. a) Describe the working of Non Coherent BFSK Modulation technique. [5]  
b) Compare basic digital modulation techniques with respect to bit rate, power requirement, bandwidth, noise immunity etc., [3]
12. a) Discuss about the error performance of BPSK signals over AWGN channel. [3]  
b) With the help of block diagram and mathematical analysis, explain the generation and detection of MSK signal. [5]
13. a) Briefly write about waveform and vector channel model of optimal detection. [3]  
b) Write about the parameters required for OFDM system design. Explain the working of OFDM system with transmitter and receiver block diagrams. [5]
14. a) Write in detail about the role of DS-SS system in CDMA. [4]  
b) Explain how synchronization is established in FH-SS systems. [4]
15. a) Explain the operation of RAKE demodulator under fading channel conditions. [4]  
b) Elaborate on the structure of MIMO antenna system and its role in space diversity. [4]
16. a) Analyze power spectra of ASK, FSK and PSK modulation techniques. [4]  
b) Discuss the significance of GMSK in mobile communication. [4]
17. Answer any *two* of the following:  
a) Equalization techniques [4]  
b) Near Far problem [4]  
c) Differential Space time block codes. [4]