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Code No.: 21513

**VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD**  
**M.E. (ECE: CBCS) I-Semester Main Examinations, January-2019**  
 (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*

Q. No	Stem of the Question	M	L	CO	PO
<b>Part-A (10 × 2 = 20 Marks)</b>					
1.	How do you eliminate the Inter Symbol Interference (ISI) effect in digital communication?	2	2	1	1
2.	Why MSK is called shaped QPSK?	2	2	1	1
3.	Give the principle of operation of OFDM technique.	2	2	1	1
4.	List the benefits of OFDM technique.	2	2	2	2
5.	How the sensitivity of a system can be determined from eye pattern?	2	1	3	2
6.	What are the parameters required for OFDM system designing?	2	1	4	2
7.	Analyse how channel coding can achieve immunity against noise and other interferences?	2	3	2	3
8.	What are the advantages of CDMA technique?	2	1	2	3
9.	What is AWGN channel? Why its study is important?	2	2	2	3
10.	List the applications of smart antennas.	2	2	2	2
<b>Part-B (5 × 8 = 40 Marks)</b>					
11. a)	Illustrate the working of different phase modulation schemes?	4	2	1	2
b)	Derive the power spectral density of linearly modulated signals.	4	3	2	2
12. a)	Explain in detail about optimum demodulation of digital signals in presence of ISI and AWGN.	4	2	3	2
b)	Describe how a binary FSK modulated signal can be demodulated non coherently?	4	3	3	2
13. a)	Demonstrate the working of OFDM system with the help of neat block diagram.	4	2	2	2
b)	How synchronization is established in FH-SS technique in wireless communications?	4	2	2	3
14. a)	Explain how RAKE demodulator helps under multipath fading conditions.	4	3	3	3
b)	Discuss the applications of DS-SS technique in wireless communications?	4	4	5	3
15. a)	How spatial diversity is achieved in a MIMO antenna system?	4	3	4	3
b)	Find the error probability for transmission of a symbol or message for a general vector channel?	4	3	4	3

16. a) Derive the SNR of the matched filter in frequency domain.	4	5	4	3
b) Analyse and compare the power spectra of ASK, FSK and PSK modulation techniques.	4	4	4	3
17. Answer any <i>two</i> of the following:				
a) Distinguish between carrier synchronization and Timing synchronization.	4	3	3	3
b) Need for differential space time block codes.	4	2	2	2
c) Slow Vs fast hopping techniques.	4	3	3	3

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

S. No.	Criteria for questions	Percentage
1	Fundamental knowledge (Level-1 & 2)	48%
2	Knowledge on application and analysis (Level-3 & 4)	42%
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable)	10%

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