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**Question Paper Code: 41224**

M.E. DEGREE EXAMINATION, DECEMBER 2014.

First Semester

Communication Systems

14PCM103 – ADVANCED MODULATION AND CODING TECHNIQUES

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions.

PART A - (5 x 1 = 5 Marks)

1. Which one of the following is not a continuous phase modulation technique?  
(a) QPSK      (b)MSK      (c)CPFM      (d)CPFSK
2. When the number of subcarriers in the OFDM signal increases, the PAPR will  
(a) increase      (b)decrease      (c) remains the same      (d)be doubled
3. The bandwidth expansion factor due to block codes are  
(a)  $1/R$       (b) 0      (c) 2      (d) R where R is the code rate
4. The asymptotic coding gain in TCM can be increased, if we increase the number of  
(a) states      (b) single state errors      (c) iterations      (d) constellation points
5. The MAP algorithm used in Turbo decoders is applicable for  
(a) convolutional codes only      (b) block codes only  
(c) cyclic codes      (d) both (a) and (b)

PART - B (5 x 3 = 15 Marks)

6. List the causes for ISI.
7. Why does the peak power problem occur in OFDM?
8. Justify the necessity of coding in a communication system.
9. What is called Coded modulation?
10. Give the properties that decide the quality of turbo codes.

PART - C (5 x 16 = 80 Marks)

11. (a) (i) How MSK is better than QPSK? (4)  
(ii) Derive the decision rule for optimum demodulation of digital signal in the presence of ISI and AWGN. (12)
- Or
- (b) (i) Explain in detail about the generation and detection of MSK. (12)  
(ii) Define Eye pattern and also mention its significance. (4)
12. (a) (i) Explain in detail about the Windowing Technique in OFDM signal processing. (8)  
(ii) Explain the effects of PAPR in OFDM. (8)
- Or
- (b) Explain the various PAPR reduction schemes in detail. (16)
13. (a) (i) Derive the channel capacity equation for BSC. (10)  
(ii) Discuss about the modulation constrained information rate. (6)
- Or
- (b) (i) Write a brief note on different channel models. (8)  
(ii) Explain the different tradeoffs in selecting the channel coding. (8)
14. (a) (i) What is the function of interleaver in a turbo encoder? (4)  
(ii) Define ACG. Explain the Ungerboeck partitioning procedure for designing trellis coded modulation with 8-PSK. (12)
- Or
- (b) Explain how TCM can be considered as an efficient coded modulation for bandwidth-constrained channels? (16)
15. (a) Explain in detail about the iterative turbo decoding principles with necessary mathematical preliminaries. (16)
- Or
- (b) Explain in detail about the turbo coding performance over Rayleigh channels. (16)