EHB308E – COMMUNICATIONS II

Basic Questions - 2

1. Draw bit error probability vs SNR per bit (E_b/N_0) in AWGN channel for BPSK and QPSK with Gray coding.
2. Draw symbol error probability vs SNR per symbol (E_s/N_0) in AWGN channel for BPSK and QPSK with Gray coding.
3. Why do we need DPSK? What is it's advantage and disadvantage compared to BPSK?
4. Which of the modulations has the best bandwidth efficiency? (a)BPSK (b)QPSK (c)16-ASK (d)32-FSK
5. Which of the modulations have the smallest symbol error rate with same symbol SNR (E_s/N_0)? (a) BPSK (b) QPSK (c) 16-ASK (d) 32-FSK
6. Draw the block diagram of M-FSK receiver with matched filter.
7. Draw the block diagrams for M-PSK transmitter and correlator-type receiver.
8. What are the benefits of vectorial representation of digitally modulated signals? Depict 8-PSK signal in vector form, and plot the signal space.
9. Draw the transmitter and receiver block diagrams using vectorial representation.
10. Write the optimum decision rule based on the decision regions that uses noisy received vector for AWGN channel.
11. Draw general block diagram of a digital communication system including the source coder.
12. Express the self-information and the expected information (entropy) analytically.
13. What is the purpose of source coding? Give some examples of source coding tecniques.
14. Write and explain Shannon's "noiseless coding theorem".
15. A discrete memoryless source generates 8 different messages with following probabilities: $p_1 = 0.3,\ p_2 = 0.25,\ p_3 = 0.15,\ p_4 = 0.1,\ p_5 = 0.1,\ p_6 = 0.05,\ p_7 = 0.025,\ p_8 = 0.025$. Design a Huffman code with based on the alphabet $A = \{0,1\}$.
16. Express Shannon's "noisy channel theorem".
17. Explain the relationship between "channel capacity", "mutual information", and "entropy". Write the channel capacity for AWGN channels.
18. Under what value of E_b/N_0 reliable communication theoretically not possible?
19. Draw roughly bandwidth-efficiency vs SNR curves for the modulations covered in the lecture.
20. Is there a difference between codeword and channel coding? Are the codewords themselves enough to define a channel code?
21. What is the purpose of channel coding? Give some examples of channel coding techniques.
22. Give some examples of basic block codes.