Exam.Code:0930
Sub. Code: 33675

2055

B.E. (Electronics and Communication Engineering)-6th Semester

EC-603: Digital Communication

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: ***Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part.***

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1. (a) What is the difference between PSK and FSK (2)

(b) What role does a correlator play in the detection of digital signals? (2)

(c) Define the Nyquist rate and describe how it helps minimize intersymbol interference (ISI). (2)

(d) What is entropy, and how does it relate to information? (2)

(e) What is meant by soft decision decoding? (2)

Part- A

2. (a) What are main components of digital communication? Discuss recent trends in digital communication. (5)

(b) Discuss signal space representation of waveforms with relevant examples. (5)

3. (a) Draw the state diagram, tree diagram, and trellis diagram for a convolutional code with a constraint length K=3, and rate = ½ , generated by the polynomials:

$$g_1(X) = X + X^2$$

$$g_2(X) = 1+X+X^2$$ (5)

(b) What is channel capacity, and how does it impact the data rate of a system? Plot channel capacity C versus B, with s/η = constant, for the Gaussian channel. (5)

4. (a) What is Coherent detection? Draw the block diagram of QPSK modulation and explain its working. (5)

(b) Draw the block diagram of MSK modulation and demodulation and explain its working. (5)

P.T.O.

Part-B

5. (a) What randomness properties give pseudorandom signals the appearance of true randomness? (3)

(b) What is the difference between fast hopping and slow hopping? (2)

(c) How synchronization is achieved in Frequency hopped spread spectrum systems? Which technique performs better in achieving synchronization? (5)

6. (a) What is the need of multiple access in digital communications? Explain multiple access communications and architecture. (5)

(b) What is Pure ALOHA, and what are its disadvantages? How does Slotted ALOHA improve throughput compared to Pure ALOHA? (5)

7.(a) Compare the system bandwidth requirements for a terrestrial 3-kHz analog telephone voice channel with that of a digital one. For the digital channel, the voice is formatted as a PCM bit stream, where the sampling rate for the analog-to-digital (A/D) conversion is 8000 samples/sec and each voice sample is quantized to one of 256 levels. The bit stream is then transmitted using a PCM waveform and received with zero ISI. (5)

(b) Increasing E_b/N_0 often does not reduce the degradation caused by intersymbol interference (ISI). Explain why this occurs. (5)

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