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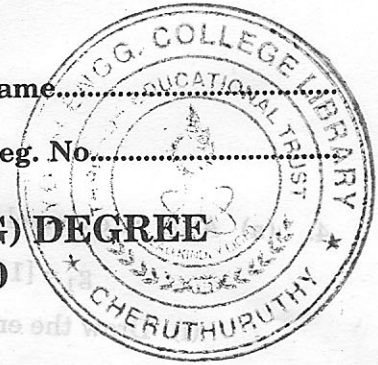
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SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, DECEMBER 2010

EC 2K 603 – DIGITAL COMMUNICATION

Time : Three Hours

Maximum : 100 Marks

Answer **all** *questions.*

1. (a) What do you understand by the term aliasing?

   (b) A signal $x(t) = 5\cos(1000\pi t)$ is sampled and quantized using 8 bit PCM system. Find the signal to quantization noise ratio.

   (c) State nyquist criterion for zero ISI.

   (d) What is meant by correlative coding?

   (e) Explain ML Detection.

   (f) State Shannon's theorem on channel capacity.

   (g) Write down the properties of PN sequences.

   (h) How do you define processing gain for a DS-COMA system?

   $(8 \times 5 = 40 \text{ marks})$

2. (a) Discuss about pulse amplitude modulation, generation and demodulation scheme.

   (15 marks)

   Or

   (b) (i) Derive an expression for signal to quantization noise ratio for linear quantization in a PCM system.

   (ii) Explain the two types of quantization noise in delta modulation system.

   (15 marks)

3. (a) Draw the block diagram of duo-binary and modified duo-binary system and explain with and without precoder.
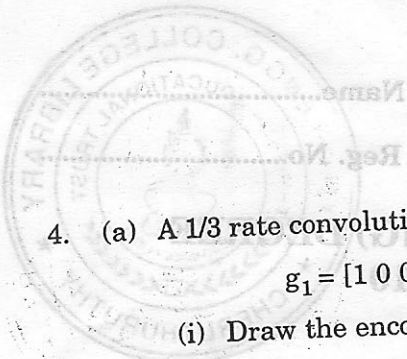
   (15 marks)

   Or

   (b) (i) Derive the expression for probability of error for matched filter.

   (ii) Draw the block diagram of adaptive equalisation and explain.

   (15 marks)

Turn over

4. (a) A 1/3 rate convolutional code has the following generators.

$$g_1 = [1\ 0\ 0]\ ;\ g_2 = [1\ 0\ 1]\ \text{and}\ g_3 = [1\ 1\ 1]$$

   (i) Draw the encoder circuit corresponding to this code.

   (ii) Draw the state transition diagram for this code.

   (iii) Draw the state diagram for this code.

   (iv) Draw the trellis diagram for this code.

   (v) This code is used for transmission over a AWGN channel with hard decision decoding the output of the demodulation detector is (101001011110111...) using viter bi-decoding algorithm, find the transmitted sequence.

   (15 marks)

Or

(b) State and prove the properties of matched filter.

(15 marks)

5. (a) (i) Draw the block diagram of direct sequence spread spectrum signal demodulator and explain.

   (ii) Derive the expression for processing gain of direct sequence spread spectrum system.

   (15 marks)

Or

(b) (i) Explain carrier synchronisation in QPSK signal.

   (ii) Explain the detection of binary FSK signal with block diagram.

   (iii) Explain binary PSK signal with geometrical representation.

   (15 marks)

[4 × 15 = 60 marks]