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Total Number of Pages: 02

**B.Tech**  
**PCEE4304**

**6<sup>th</sup> Semester Regular / Back Examination 2016-17**  
**COMMUNICATION ENGINEERING**  
**BRANCH: ELECTRICAL**  
**Time: 3 Hours**  
**Max Marks: 70**  
**Q.CODE: Z679**

**Answer Question No.1 which is compulsory and any five from the rest.**  
**The figures in the right hand margin indicate marks.**

- Q1 Answer the following questions: (2 x 10)**
- a) State sampling theorem for band-limited signals of finite energy.
  - b) An FM signal with modulation index of 9 is applied to a frequency tripler. Find the modulation index of the output signal.
  - c) What is Inter Symbol Interference?
  - d) Define energy and power signal.
  - e) An FM transmitter with a carrier frequency of 80 MHz has a deviation sensitivity of 4KHz/Volt. Determine the frequency deviation and modulation index for a signal  $m(t) = 12 \sin(2\pi 2000t)$ .
  - f) Define threshold effect.
  - g) Explain the term shot noise.
  - h) What is the difference between coherent and non-coherent receiver?
  - i) Draw the waveform for the digital signal [1100101], while it is transmitted with Manchester coding format.
  - j) Why the performance of an FM radio station is better than an AM station radiating the same total power?
- Q2 a) Define white noise. Plot the power spectral density and auto correlation function of ideal low pass filtered white noise. (5)**
- b) Explain with diagram, how a square law modulator is used in generation of AM signal? (5)**
- Q3 a) A signal band-limited to 2.5 KHz is sampled at 20% higher than the Nyquist rate. The maximum accepted error in the sampled amplitude due to quantization must not exceed 0.4 % of the peak amplitude. The quantized samples use binary coding. Find the required sampling rate, number of bits required to encode each sample and the bit rate of resulting PCM signal. (5)**
- b) What do you mean by DSB-SC modulation? Explain the generation of DSB-SC modulated signal using ring modulator. (5)**

- Q4** a) Explain the noise performance of AM receiver and derive expression for Figure of Merit. (5)
- b) Draw and explain in brief the Super Heterodyne Receiver in AM systems. (5)
- Q5** a) Draw and explain the Pre-emphasis and De-emphasis circuit. What are their uses? (5)
- b) The equation for FM signal is given by  $s(t) = 10 \sin [5.7 \times 10^8 + 5 \sin (12 \times 10^3 t)]$  volts. Calculate carrier frequency, modulation frequency, modulation index, frequency deviation and power dissipation in  $100 \Omega$  resistor. (5)
- Q6** a) What is a PLL? Describe the principle of a PLL as frequency demodulator. (5)
- b) Discuss the generation and detection of pulse-amplitude modulation. (5)
- Q7** Explain the process involved in quantization and derive expression for signal to noise ratio for uniform quantization. (10)  
What are the drawbacks of this system? Suggest a method to overcome these drawbacks.
- Q8** **Write short answer on any TWO:** (5 x 2)
- a) Balanced slope detector
- b) Noises in SSB receiver
- c) Adaptive Delta modulation
- d) Nonlinear effects in FM system