



B.Tech III Year II Semester (R09) Supplementary Examinations May/June 2017 DIGITAL COMMUNICATIONS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions All questions carry equal marks

- 1 What is companding? Explain the process in digital communications.
- 2 (a) What is delta modulation technique? Comment on the motivation for this technique.
 - (b) In a single integration DM system, the voice signal is sampled at a rate of 128 kHz, similar to PCM. The maximum signal amplitude is normalized as $A_{max} = 1$.
 - (i) Determine the minimum value of the step size to avoid slope overload.
 - (ii) Determine the granular noise power N_{\circ} if the voice signal bandwidth is 15.0 kHz.
 - (iii) Assuming that the voice signal is sinusoidal, determine S_o and the SNR.
- 3 (a) Distinguish between pass band and base band transmission.
 - (b) Derive the power spectral density of NRZ unipolar format.
- 4 (a) What are optimal filters? Derive the transfer function of optimum filter.
 - (b) What is the difference between base band transmission and band pass transmission? Distinguish both features.
- 5 (a) Explain encoding using an (n-k) bit shift register
 - (b) Explain Syndrome calculation and BCH codes.
- 6 (a) Explain the Shannon-Hartley theorem and its implications.
 - (b) Calculate the capacity of low pass channel with a usable bandwidth of 3000 Hz and S/N = 10^3 at the channel output. Assume the channel noise to be Gaussian and White.
- 7 (a) Derive an expression for probability of bit error of a binary coherent FSK receiver.
 - (b) Derive an expression for probability of bit error of a binary non-coherent ASK.
- 8 Explain the operation of 16-QAM system with neat block diagram in detail and also give the constellation diagram.
