Exam.Code:0928
Sub. Code: 6583

2054

B.E. (Electronics and Communication Engineering)

Fourth Semester

EC-401: Communication Engineering

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 Unit. Use of scientific calculator is allowed.

x-x-x

I. Attempt the following:-

a) What will be the power in each sideband of AM wave if power of carrier is 176w and with 60% Modulation?

b) What do you mean by Companding?

c) What do you mean by Quantization noise. How it can be minimized.

d) In A FM system, if m_f is doubled by halving modulating frequency. What will be the effect on maximum deviation?

e) What is the relation between phase modulation and frequency modulation? (5x2)

UNIT - I

II. a)What are the different parameters to characterize AM receivers? Give significance of each Parameter.

b) Prove that FM wave contains infinite number of sidebands? (2x5)

III. a) Explain FM threshold effects and its reduction methods.

b) Explain PWM systems. How the generation and demodulation is done. How PWM signals are converted to PPM signals. (2x5)

IV. a) Explain FM detection using PLL method.

b) The signal $x(t) = 2\cos 200\pi t + 6 \cos 180\pi t$ is ideally sampled at a frequency of 150 samples per second. The sampled version $x_\delta(t)$ is passed through a unit gain ideal LPF with a cut-off frequency of 110 Hz. What frequency components will be present in the output of the LPF? (2x5)

UNIT - II

V. a) A PCM system uses a step size of Δ. If the quantization error is uniformly distributed, determine the mean-square value of the quantization error.

b) Discuss the limitations of Delta modulation. How it can be overcome? (2x5)

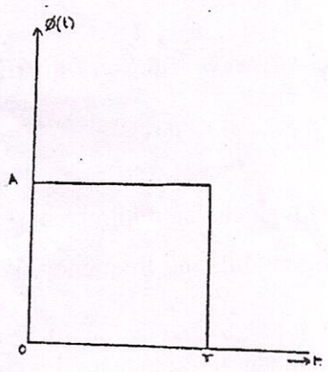
VI. a) Draw encoding waveforms (i) NRZ unipolar (ii) NRZ polar (iii) NRZ bi-polar (iv) RZ for 10110100010 data steam.

b) Explain Raised Cosine pulse. How it is useful to control ISI. (2x5)

P.T.O.

VII. a) Derive Figure of Merit (FoM) in FM Systems.

b) The figure shows a finite energy signal $\Phi(t)$. (i) Sketch the impulse response $h_{opt}(t)$ of the optimum filter matched to $\Phi(t)$ and (ii) Determine the value of the output of the matched filter at $t = T$, assuming noise is zero and input is $\Phi(t)$. (2x5)



x-x-x