Exam.Code:0928
Sub. Code: 6582

2053

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 Part. Use of scientific calculator is allowed.

x-x-x

I. (a) Why modulation index greater than one is not used commercially in full carrier AM transmission system. (2)

(b) Under what conditions the bandwidth of FM signal is same as that of AM signal. (2)

(c) What would be the optimum decision criterion for decoding in communication systems. (2)

(d) Define slope overload and granular noise in DM systems. How these noises can be eliminated. (2)

(e) Calculate the bandwidth of following angle modulated wave.

$x(t) = 10\cos(2\pi \times 10^8 t + 200\cos 2\pi \times 10^3 t)$ (2)

Part- A

II. (a) What are the different parameters to characterize AM receivers? Give significance of each Parameter. (5)

(b) Prove that FM wave contains infinite number of sidebands? (5)

III. (a) A modulated signal is given as

$$u(t) = 100\cos\left[200\pi t + 10\int_{-\infty}^{\tau} m(\tau)d\tau\right]$$ where m(t) is

(i) is this a PM or FM signal (ii) Find the modulation index and the estimated transmission bandwidth (iii) Find peak frequency deviation. (5)

(b) Explain PWM systems. How the generation and demodulation is done. How PWM signals are converted to PPM signals. (5)

IV (a) Derive linear and non-linear model of PLL systems. (5)

(b) Derive low and upper sampling frequency conditions for proper reconstruction of band-Pass signals. (5)

P.T.O.

Part-B

V. Consider Delta Modulation (DM) system designed to accommodate analog message signal limited to bandwidth W = 5KHz, A sinusoidal test signal of amplitude A = 1volts and frequency f_m = 1 KHz is applied to the system. The sampling frequency of the systems is 50KHz.

(a) Calculate step size Δ required to minimize slope overload.

(b) Calculate the signal to quantization noise ratio of the DM system. **(10)**

VI. **(a)** Draw encoding waveforms (i) NRZ unipolar (ii) NRZ polar (iii) NRZ bi-polar (iv) RZ for 0110100011 data steam. **(5)**

(b) Prove that SNR would be improved by 6dB with every single bit added during encoding process of PCM systems. **(5)**

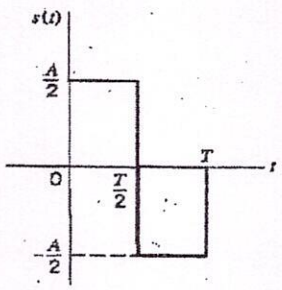
VII.**(a)** Explain the effects of noise in FM systems. **(5)**

(b) Consider signal shown below. **(5)**

(i) Determine impulse response of filter matched to this signal and sketch it as function of time.

(ii) Plot the matched filter output as function of time.

(iii) What is the peak value of the output?



X-X-X