DEPARTMENT OF ELECTRONICS & COMMUNICATION.
NIT SRINAGAR.
MAJOR EXAMINATION.

Sub:Communication Systems	M.Marks : 50	Branch: IT
DATE: 2 July,14	Time: 2Hrs	Semester: 4^{th}

NOTE:- ATTEMPT ANY FOUR AND DRAW DIAGRAMS WHEREVER NECESSARY.

Q1) (a)Find the fourier transform of $e^{-at}.u(t)$. (5)

(b)Discuss a suitable method for the recovery of the SSB signals using envelope detection technique by carrier reinsertion. (5)

(c)What is a single sided spectrum and a two sided spectrum. (2.5)

Q2) (a)What are the design constraints of a VSB filter at the cut off. (5)

(b)The output current of a 60% modulated AM generator is 1.5A. To what value will this current rise if the generator is modulated additionally by another audio-wave whose modulation index is 0.7.What will be the percentage power saving if the carrier and one of the side bands are now suppressed. (5)

(c)What is Warbling effect. (2.5)

Q3) (a)Where and why is the requirement of a differentiator in the FM demodulator. (5)

(b)In a FM system, when the audio frequency(AF) is 500Hz and the AF voltage is 2.4V,the deviation is 4.8 kHz. If the AF voltage is now increased to 7.2V,what is the new deviation. If the AF voltage is raised to 10V while the AF is dropped to 200 Hz, what is the deviation? Find the modulation index in each case. (5)

(c) Compare and contrast the spectra of NBFM and AM in the frequency domain. (2.5)

Q4 (a) With the help of a block diagram, show how image rejection and proper selectivity is achieved by a double conversion receiver. (5)

(b) Compare the performance of the DSB-C system in large noise case and small noise case and hence define the threshold effect in AM. (5)

(c) What is the significance of the ganged tuning in the super heterodyne receiver? (2.5)

Q5 (a) What is pre-emphasis and de-emphasis. (5)

(b) Derive an expression for the quantization noise and SNR for a pulse code modulated signal.(5)

(c) A Tv signal having bandwidth of 4.2 MHz is transmitted using PCM. If no. of quantization levels is 512, determine (2.5)

i) Code-word length.
ii) Bit rate.
iii) SNR.

i) Upper and lower side frequencies.

ii) Modulation coefficient and percent modulation.

iii) Peak amplitude of the modulated carrier and upper and lower side frequency voltages.

iv) Maximum and Minimum amplitudes of the envelope.

v) Draw the output spectrum and skete' the output envelope.

(5, 5)

(1) 700 Hz

50 cos 10

$\frac{2.5 V_p}{20 V_p}$

=

(2)

$$\Rightarrow f_n \quad \frac{1}{T} \int_{-T/2}^{T/2} s_T(t) \; e^{-j n \omega_0 t}$$

Interval $(-T/2, T/2)$

TOC JP CS maths

$$f_n = \frac{1}{T} \int_{-T/2}^{T/2} s(t) \; e^{-j n \omega_0 t} \; dt$$

$$f_n = \frac{1}{T}$$