

Lib Principles of Communication Engg.

N.B. : (1) Question No. 1 is **compulsory**.

(2) Attempt any **four** questions out of remaining **six** questions.

(3) Assume **suitable** data if necessary and state if **clearly**.

2.30 to 5.30.

1. Answer the following any **four** :- 20
 - (a) Why do the amplifiers that follow the modulator circuit in AM DSBFC transmitter have to be linear ?
 - (b) What is the purpose of AFC loop in FM ?
 - (c) What is gearband when and where is it used ?
 - (d) Explain the use of limiter in a FM receiver.
 - (e) What are the causes of foldover distortion or aliasing ? How can it be prevented or removed ?
2. (a) Draw the block diagram of an AM superhetrodyne receiver. Describe its operation and primary functions of each stage. 10
 - (b) List different methods of FM generation. Explain the principle of reactance modulator. Why is direct modulation not preferred for FM generation ? 10
3. (a) Draw the schematic of a ratio detector and describe its operation. 10
 - (b) One input to a conventional AM modulator is a 500 kHz carries with an amplitude of $20 V_p$. The second input is a 10 kHz modulating signal that is of sufficient amplitude to cause a change in output wave of $\pm 7.5 V_p$. Determine - 10
 - (i) Upper and lower side frequencies
 - (ii) Modulation coefficient and percent modulation
 - (iii) Expression for modulated wave
 - (iv) Draw output spectrum
 - (v) Sketch output envelope.
4. (a) Explain the working of balanced ring modulator to generate DSBSC signal. 8
 - (b) For an angle modulated carrier $V_c = 6 \cos (2\pi 110 \text{ Mhz}t)$ with 75 kHz frequency deviation due to the information signal and a single frequency interfering signal $V_n = 0.3 \cos (2\pi 109.985 \text{ Mhz}t)$. Determine - 6
 - (i) Frequency deviation due to interfering signal
 - (ii) Voltage SNR at the output of demodulator.
 - (c) The noise output of a reistor is amplified by a noiseless amplifier having a gain of 60 and a bandwidth of 20 kHz. A meter connected to output of amplifier reads 1 mv (RMS). If the bandwidth of amplifier is reduced to 5 kHz with gain constant, what is the reading of meter ? 6

5. (a) Explain the block diagram of Adaptive delta modulation with waveforms. 10
 How does it reduce slope overload error ?
- (b) Explain generation and detection of PWM signal. 10
6. (a) State sampling theorem for bandpass signal. Compare ideal and practical sampling. 10
- (b) Compare AM and FM. 5
- (c) The output current of a 60% modulated AM wave is 1.5 A. To what value will the current rise if it is modulated additionally by another wave with 70% modulation index. 5
7. Write short notes on any **four** of the following :- 20
- (a) ISB transmission
 - (b) Pre-emphasis and De-emphasis
 - (c) Companding
 - (d) AGC
 - (e) Significance of Signal-to-Noise Ratio.