

Total number of printed pages—4

53 (IE 603) CMEN

2021

COMMUNICATION ENGINEERING

Paper : IE 603

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

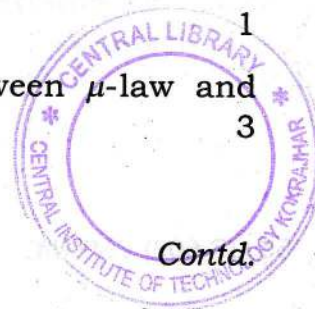
Answer any five questions.

1. (a) With the help of example, explain Baseband Signal and Noise Signal. 3
- (b) Explain Communication System with the help of a neat block diagram. 5
- (c) Explain different propagation medium of communication systems. 6
- (d) Explain the need of Fourier transform with a suitable example in communication system. 6

Contd.

2. (a) If ω_c is carrier frequency, then show that in spectrum of AM wave baseband signal shifted in the positive and negative direction by factor ω_c . 7
- (b) Prove that $I_T = I_c \sqrt{(1+m_a^2/2)}$. 3
- (c) Explain collector modulation method to obtain AM wave. 8
- (d) "Modulation has an important role with height of the antenna." Explain the statement. 2
3. (a) What is DSB-SC signal ? Explain Ring modulator to generate DSB-SC signal. 2+6=8
- (b) Write the difference between DSB-SC and SSB-SC. With the help of a neat block diagram, explain phase-shift method for SSB-SC generation. 2+6=8
- (c) In SSB-SC signal generation using phase discrimination method, the carrier phase shift network produces a phase shift which differs from $\pi/2$ by a small angle α . Obtain the output waveform. The modulating signal $x(t)$ may be considered to be a single tone sinusoidal signal $1.0 \cos(2\pi f_m t)$. 4

4. (a) What is Tuned Radio Frequency Receiver ? Give its drawbacks. 1+3=4
- (b) With the help of a neat block diagram, explain Superhetrodyne receiver. Also discuss its characteristics. 9+3=12
- (c) What are the advantages of an RF amplifier ? 3
- (d) The rejection of an image frequency signal by a single-tuned circuit is _____. (Fill in the blank) 1
5. (a) With a neat block diagram, explain and derive the equation for narrowband FM. 8
- (b) Explain PLL FM demodulator. 6
- (c) Explain the indirect method of FM generation. 6
6. (a) What is balanced slope detector in FM demodulation ? Also give its disadvantages. 5+2=7
- (b) What is Quantizer ? 1
- (c) Give differences between μ -law and A-law Compounding. 3



(d) Derive the expression for Signal to Quantization Noise Ratio (in dB) for Linear Quantization. 9

7. Write short notes on : (**any four**) $5 \times 4 = 20$

(i) Satellite Systems

(ii) FDM

(iii) VSB

(iv) Wideband FM

(v) Intersymbol Interference.

