Total number of printed pages–5

53 (IE 603) CMEN

2019

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)* What is Communication system? Explain. Define Baseband Signal and Carrier Signal. 7

   (b) Explain the need of Fourier transform with a suitable example in communication system. 7

   (c) Differentiate between twisted pair cable and coaxial cable. 3

   (d) Find the carrier power of signal $A \cos \omega_c t$. 2

Contd.

(e) Give the limitation of baseband transmission. 1

2. (a) What is Modulation ? Modulation helps reducing antenna height. Explain. 1+2=3

(b) Prove that $I_T = I_C = \sqrt{\left(1 + m_a^2/2\right)}$. 3

(c) Explain collector modulation method to obtain AM wave. 7

(d) A 400 watt carrier modulated to a depth of 75%. Find the total power in the amplitude modulated wave. Assume the modulating signal to be a sinusoidal signal. 2

(e) 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. 5

3. (a) Draw frequency spectrum of DSB-SC, SSB-SC and VSB signal. 6

(b) What is DSB-SC signal ? Explain Ring modulator to generate DSB-SC signal. 2+7=9

(c) Explain how diode can extract the envelope of an AM wave. 5

4. (a) Give differences between low-level and high-level AM transmitters. 2

(b) Write the main functions of a radio receiver. 3

(c) What is Tuned Radio Frequency Receiver ? Explain. Also write its drawbacks. 4+3=7

(d) Explain in brief, the block diagram of superheterodyne receiver. 8

5. (a) Derive the general expression for FM wave. 6

(b) With a neat block diagram, explain and derive the equation for narrowband F.M. 7

(c) Determine the frequency deviation and carrier swing for a frequency modulated signal which has a resting frequency of 10*MHz* and whose upper frequency is 105·007*MHz* when modulated by a particular wave. 5

(d) Name different methods of FM generation. 2

6. (a) Explain PCM Receiver with suitable block diagram. 4

(b) What is Quantizer? Differentiate between Midtread and Midrise quantization. 2+4=6

(c) Show that signal to noise power ratio of quantizer increases exponentially with increasing bits per sample. 4

(d) Explain different types of compressor characteristics. 3

(e) Draw the following data formats for the bit stream 1100110 :

(i) Unipolar *Rz*

(ii) Polar *Rz*

(iii) AMI 3

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

(i) Optical Fiber

(ii) FDM

(iii) Delta Modulation

(iv) Satellite Systems

(v) TV transmitter.