53 (IE 603) CMEN

2018

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)* Describe the following : 3×3=9
   (i) Digital Communication
   (ii) Guided Propagation
   (iii) Modulation.

   (b) Draw the frequency spectrum of an AM wave. 5

   (c) Explain Square Law diode modulation and obtain expression for its output. 6

2. *(a)* What is the advantage of SSB-SC signal generation over DSB-SC ? With the help of neat block diagram, explain the Third Method for SSB-SC generation. 3+7=10

(b) Explain Ring modulator to generate DSB-SC signal. 6

(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 $1{\cdot}0\cos(2\pi f_m t)$. 4

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

(b) Explain Tuned radio frequency receiver. Give its disadvantages. 4+3=7

(c) With the help of a neat block diagram, explain superheterodyne receiver. Also discuss its characteristics. 8+2=10

4. (a) What is Angle modulation ? Give different types of angle modulation. 1+2=3

(b) Derive the general expression of FM wave. 6

(c) Determine the frequency deviation and carrier swing for a frequency modulated signal which has a resting frequency of 105·00*MHz* and whose upper frequency is 105·007*MHz* when modulated by a particular wave. 5

(d) Explain the indirect method of FM generation. 6

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

(b) What is Quantizer ? Differentiate between Mid-tread and Mid-rise quantization. 1+4=5

(c) Derive the expression for Signal to Quantization Noise Ratio (in *dB*) for Linear Quantization. 8

(d) A Television signal having a B.W. of 5*MHz* is transmitted using binary PCM system. Given that the number of Quantization levels is 512.

Determine —

(i) Codeword length

(ii) Transmission bandwidth. 3

6. *(a)* To transmit a bit sequence 10011011, draw the resulting waveforms using : 5

   (i) Unipolar RZ

   (ii) Unipolar NRZ

   (iii) Bipolar RZ

   (iv) AMI RZ

   (v) Manchester.

   (b) Explain the block diagram of Monochrome TV Transmitter. 6

   (c) Explain how light propagate through optical fibre. 3

   (d) Explain Satellite System Link Models. 6

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

   (i) VSB

   (ii) FDM

   (iii) Delta modulation

   (iv) Optical fibre communication

   (v) Crystal lattice filter.
