

Total number of printed pages-5

53 (IE 603) CMEN

2016

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 modulation ? What is the need for modulation ? 1+3=4
- (b) Draw the frequency spectrum of an AM wave. 5
- (c) The antenna current of an AM transmitter is 10A, if only the carrier is sent, but it increases to 12A, if the carrier is modulated by a single sinusoidal wave. Determine the percentage modulation. Also find antenna current if the per cent of modulation changes to 0.8. 6

Contd.

- (d) Explain the working of a Square Law Diode modulation for generating AM wave. 5
2. (a) Write the difference between DSB-SC and SSB-SC. With the help of neat block diagram explain phase-shift method for SSB-SC generation. 2+6=8
- (b) Explain the working principle of Ring Modulator. 6
- (c) The total power content of an AM signal is $1000w$. Determine the power being transmitted at the carrier frequency and at each of the sidebands when the per cent modulation is 100%. 5
- (d) Bandwidth of DSB-SC signal is _____ . 1
3. (a) Explain the block diagram of superheterodyne receiver. 10
- (b) Differentiate between low-level AM transmitters and high-level AM transmitters. 4

- (c) What do you mean by sensitivity and selectivity for AM receiver? 2
- (d) Write the advantages of a R.F. amplifier. 3
- (e) The rejection ratio α for a single tuned circuit is _____ . 1
4. (a) Derive the general expression for FM wave. 6
- (b) Explain the indirect method of FM generation. 5
- (c) Determine the frequency deviation and carrier swing for a frequency-modulated signal which has a resting frequency of 105.00MHz and whose upper frequency is 105.007MHz when modulated by a particular wave. 5
- (d) What is the modulation index of an FM signal having a carrier swing of 100kHz when the modulating signal has a frequency of 8kHz ? 3
- (e) Mathematical expression for a PM wave is _____ . 1

5. (a) Explain PCM Receiver with suitable block diagram. 4
- (b) What is Quantizer? Differentiate between uniform and non uniform Quantizer. 4
- (c) Derive the expression for signal to Quantization noise ratio (in dB) for Linear Quantization. 10
- (d) A Television signal having a bandwidth of 4.2MHz is transmitted using binary PCM system. Given that the number of Quantization levels is 512. Determine :
- (i) Code word length
- (ii) Transmission bandwidth. 2
6. (a) To transmit a bit sequence 10011011, draw the resulting waveforms using :
- (i) Unipolar RZ
- (ii) Unipolar NRZ
- (iii) Bipolar RZ
- (iv) AMI RZ
- (v) Manchester 5

(b) Explain the three laws of Kepler that govern the motion of a planet and other heavenly bodies. 5

(c) Explain satellite system Link models. 10

7. Write short notes on : **(any four)**

5×4=20

(a) Delta modulation

(b) Monochrome TV transmitter

(c) Balance modulator

(d) FDM

(e) Optical fiber communication.