2016 (5)

F-5

Sl. No.	:	6197
Unique Paper Code	:	2511503
Name of the Paper	:	Communication Electronics
Name of the Course	:	B.Tech Electronics
Semester	:	V
Duration	:	3 hours
Maximum Marks	:	75

Instructions for candidates

1. Attempt five questions in all, including Question No. 1 which is compulsory
2. Use of scientific calculators is allowed

1. (a) Discuss two reasons why modulation is necessary in electronic communication?

(b) What is pilot carrier modulation? How does it remove the difficulties of suppressed carrier modulation?

(c) Differentiate between wide band and narrow band FM. Give expressions for the bandwidth of each.

(d) What are the advantages of digital communication over analog communication?

(e) What is M-ary coding? Where is it used? (5x3)

2 (a) What is noise factor (F)? Obtain Friss formula for amplifiers in Cascade? (7)

(b) An amplifier operating over frequency range 455 KHz to 465 KHz has a 200 KΩ input resistance. What is the rms noise voltage at the input to the amplifier if the ambient temperature is 27^0C. (4)

(c) Define thermal noise and describe its relationship to temperature and bandwidth? (4)

3 (a) What is a balanced modulator? Explain how a FET balanced modulator can be used to generate a suppressed carrier AM signal. (7)

(b) What are the two main causes of distortion in envelope detection? How can they be minimized? (4)

(c) The total power content of an AM wave is 600 watt. Determine the percentage modulation of the signal if each of the sideband contains 75 watt. (4)

4 (a) Explain the working of a basic Reactance modulator used for the generation of FM wave. (7)

(b) Give equivalence relationship between FM and PM. List two advantages of FM over AM. (4)

(c) The maximum deviation allowed in a FM broadcast system is 75 KHz. If the modulating signal is a single tone sinusoid of 10 KHz, find the bandwidth of the FM signal. What will be the change in bandwidth, if the modulating frequency is doubled? Determine the bandwidth when the modulating signal's amplitude is also doubled. (4)

5 (a) What are the different types of sampling techniques. Explain the aperture effect. (7)

(b) Find the Nyquist sampling rate and Nyquist sampling interval for the signal $20\cos(3000\pi t)\cos(1000\pi t)$. (4)

(c) Explain the generation of PPM from a PWM signal. (4)

6 (a) With the help of suitable block diagrams, explain the working of a PCM transmitter and receiver. (7)

(b) Differentiate between uniform and non-uniform quantization. (4)

(c) Represent the data 1011 using the following coding formats: Unipolar return to zero, Bipolar return to zero, Bipolar non return to zero and split phase Manchester. (4)

7 (a) Draw the block diagram of a digital communication system. Explain each block? (7)

(b) For a BPSK modulator with a carrier frequency of 70MHz and input bit rate of 10 Mbps, determine the maximum and minimum upper and lower side frequencies, draw the output spectrum and determine the minimum Nyquist bandwidth? (4)

(c) What is constellation diagram and how it is used with PSK? (4)