ANNA UNIVERSITY COIMBATORE

B.E. / B.TECH. DEGREE EXAMINATIONS : DECEMBER 2009

REGULATIONS : 2007

FIFTH SEMESTER : ELECTRONICS AND COMMUNICATION ENGINEERING

070290039 - COMMUNICATION THEORY

TIME : 3 Hours Max.Marks : 100

PART – A

(20 x 2 = 40 MARKS)

ANSWER ALL QUESTIONS

1. Define base band and pass band transmission.
2. Define Shannon limit for information capacity?
3. How the non sinusoidal waveforms are represented?
4. What is the need for modulation?
5. The antenna current of an AM transmitter is 8A when only carrier is sent. It increases to 8.93A when the carrier is modulated by a single sine wave. Find the percentage modulation.
6. What is single tone and multi tone modulation?
7. SSB is suitable for speech signals and not for video signals. Why?
8. A transmitter radiates 9 KW without modulation and 10.125 kW after modulation. Determine depth of modulation.
9. What is the use of crystal controlled oscillator?
10. Compare WBFM and NBFM.
11. A 80MHz carrier is frequency modulated by a sinusoidal signal of 1-V amplitude and the frequency sensitivity is 100 Hz/V. Find the approximate bandwidth of the FM waveform if the modulating signal has a frequency of 10KHz .
12. What are the disadvantages of balanced slope detector?
13. What are the merits and demerits of TRF receiver?

14. What is the function of amplitude limiter in FM system?
15. Define Intermediate frequency (IF).
16. In a super heterodyne receiver the input AM signal has a center frequency of 1425 kHz and bandwidth 10 kHz. The input is down converted to 455 kHz (single stage of down conversion). What is the image frequency?
17. Define flicker noise.
18. Define White Noise.
19. What is threshold effect?
20. Find the thermal noise voltage developed across a resistor of 700Ω. The bandwidth of the measuring instruments is 7 MHz and the ambient temperature is 27°C.

PART – B

(5 x 12 = 60 MARKS)

ANSWER ANY FIVE QUESTIONS

21. a) Draw a diagram of electromagnetic energy spectrum. 4

    b) Explain in detail about various frequency ranges signal and explain its applications. 8

22. a) A certain AM transmitter radiates 10kW with the carrier modulated, and 11.8kW when the carrier is sinusoidally modulated. Calculate the modulation index. If another sine wave, corresponding to 30% modulation, is transmitted simultaneously, determine the total radiated power. 6

    b) Explain in detail about Diode AM Detector? 6

23. Draw the block diagram for the generation and demodulation of a VSB signal and explain the principle of operation

24. a) A carrier is frequency modulated with a sinusoidal signal of 2kHz resulting in a maximum frequency deviation of 5kHz. Find 1) modulation index 2) Bandwidth of the modulated signal 6

b) Explain how varactor diode can be used for frequency modulation 6

25. Draw the circuit diagram of Foster seeley Discriminator and explain its working

26. a) Draw the circuit of reactance modulator and explain its principle of operation. Derive an expression for the equivalent capacitance in terms of the g_m of the device and circuit components. 6

b) Explain in detail about various types of AGC 6

27. Derive an expression for the output signal –to –ratio of an AM SSB-SC system.

28. a) Define the following: 4

(i) Noise equivalent bandwidth

(ii) Noise temperature

b) What is the function of Pre-emphasis and De-emphasis in FM? Draw the circuit diagram of pre emphasis and De-emphasis and explain its operation. 8

*****THE END*****