



Reg. No. :

Name :

**Third Semester B.Tech. Degree Examination, May 2018
(2013 Scheme)**

13.304 : ANALOG COMMUNICATION (T)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer all questions.

(10×2=20 Marks)

1. Relate the terms modulating signal frequency and the bandwidth in a conventional AM system.
2. Why is trapezoidal pattern used to evaluate AM envelope ?
3. Obtain the maximum modulating signal frequency that can be used with an AM DSBFC system with 20 KHZ bandwidth.
4. An amplifier operating over a frequency range from 18 to 20 MHZ has a 10 KΩ input resistor. What is the rms noise voltage at the input to this amplifier, if the ambient temperature is 27°C ?
5. Explain the use of amplitude emitters on an FM Receiver Circuit.
6. Write the mathematical expression for IFRR.
7. Diagrammatically compare the phase changes and frequency changes with respect to time.
8. What is the purpose of 19 KHz pilot in FM stereo broadcasting ?
9. List the four significant advantages of digital transmission.
10. Define loop resistance. What is the dc loop resistance for copper conductors ?

PART – B

Answer **any one** question from **each** Module.

Module – I

11. a) List and elaborate the advantages and disadvantages of single sideband transmission. 8
- b) What is ISB system ? With a neat block diagram of ISB transmitter, explain its functioning. 12



12. a) Name the techniques used in SSB transmitters. Discuss the technique that makes use of the filter. Support your answer with block diagram, output spectrum and filtering requirements. 10
- b) Define and describe the following :
- i) Carrier reinsertion – pilot carrier system
- ii) Companded SSB. 10

Module – II

13. a) Define noise figure. Write the calculation procedure to determine the noise figure and derive the same. 12
- b) Why is the inductive coupling being the most common technique for IF amplifier coupling ? Discuss any one of the transformer coupled amplifiers with their schematic and response curve. 8
14. a) The front end of the TV receiver having a bandwidth of 7 MHz and operating at a temperature of 27°C consists of an amplifier having a gain of 15 followed by a mixer whose gain is 20. The amplifier has a 300 Ω input resistor and a shot noise equivalent resistance of 500 Ω. For the converter these values are 2.2 KΩ and 13.5 KΩ respectively and the mixer load resistance is 470 KΩ . Calculate the R_{equ} for this TV receiver. 10
- b) For an AM commercial broadcast band receiver (535 KHz to 1605 KHz) with an input filter Q factor of 54, determine the bandwidth at the low and high ends of the RF spectrum. 3
- c) High light the impacts of image frequency in AM receivers and the ways of rejecting the same. 7

Module – III

15. a) Derive the deviation sensitivity of PM. 8
- b) Explain the operation of slope detector circuit. How does it differ from balanced slope detector. 12
16. a) If the signal $V(t) = 20 \sin(6.26 \times 10^6 t + 10 \sin 6.283 \times 10^3 t)$ represents a phase modulated signal, determine the carrier frequency, the modulating frequency, the modulation index and the peak phase deviation. 8
- b) What is direct FM ? Elaborate the working of varactor diode modulator with a neat circuit diagram and obtain the expression for peak frequency deviation. 12



Module - IV

17. a) For an input sinusoidal signal having its amplitude varying from V_{\max} to V_{\min} . Find out its PWM, PPM, PAM and PCM waveforms. 6
- b) Describe the transmission level point, transmission level and data level point. 9
- c) For a signal measurement - 42 dBm, a noise measurement of 16dBrc and a - 40 dBm TLP, determine the signal level in dBrc and noise level in dBm. 5
18. a) Which are the considerations addressed by the interface parameters and facility parameters uniquely? 10
- b) Specify the importance of echo suppressor and echo canceller. 10
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