

(Pages : 4)

J – 4697

Reg. No. :

Name :

Third Semester B.Tech. Degree Examination, April 2020

(2013 Scheme)

13.304 : ANALOG COMMUNICATION (T)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer for **all** questions. **Each** question carries **2** marks.

1. Give the mathematical expression for a Single Side Band (SSB) modulated signal.
2. What is modulation index of an AM system? How the modulation has classified according to the modulation index value?
3. Give the principle of Automatic Gain Control (AGC) of a radio receiver.
4. What are factors which depends the selectivity of a radio receiver?
5. What is white noise?
6. Define the threshold effect in FM receivers.
7. Generate a Phase Modulated (PM) signal from a Frequency Modulator (FM).
8. A 2 KHz audio signal modulates a 50 MHz carrier causing a frequency deviation of 2.5 KHz. Determine the bandwidth of the FM signal.

P.T.O.



9. Give four types of pulse modulation methods.
10. List the essential component of a standard telephone set.

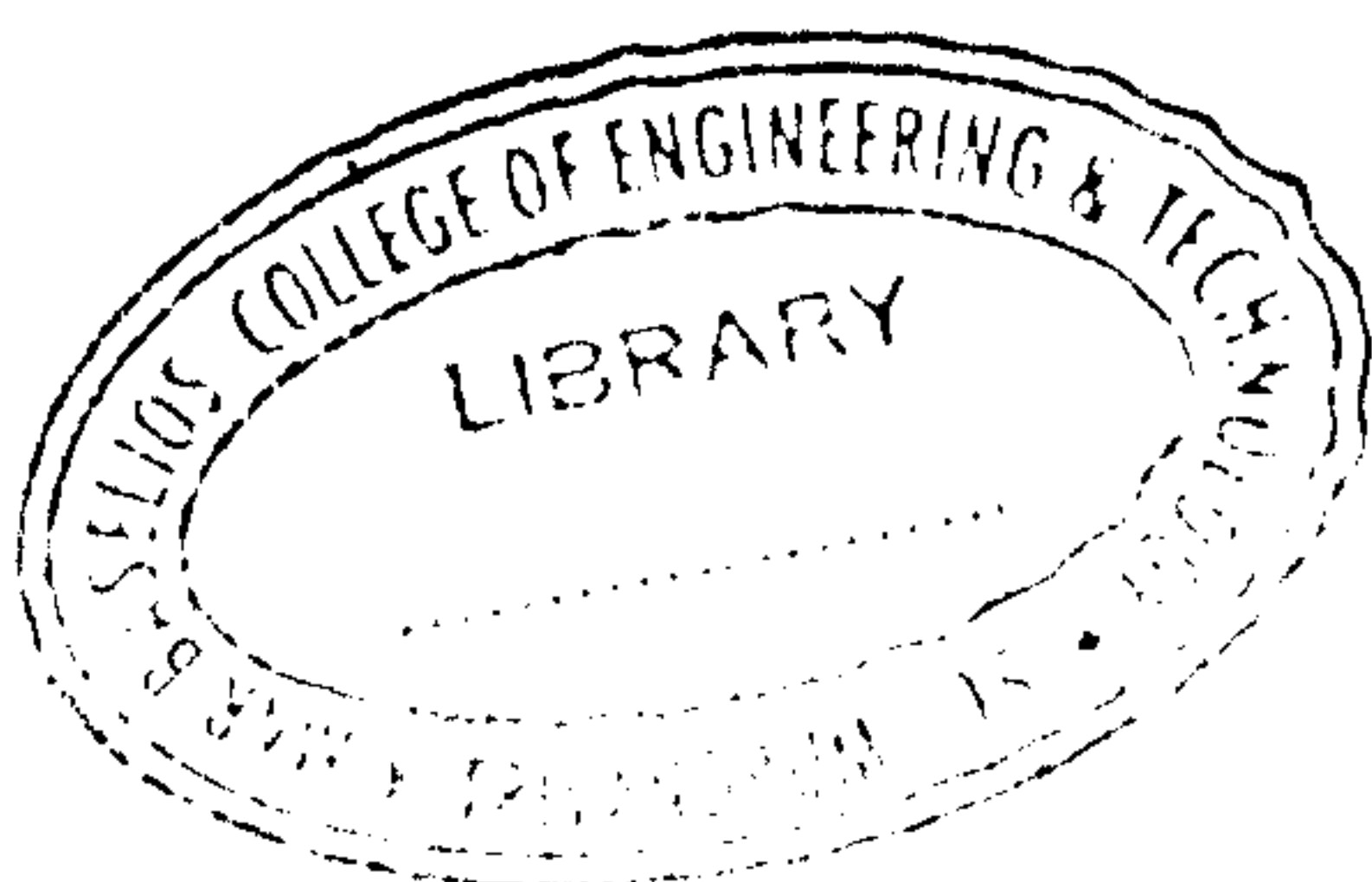
(10 × 2 = 20 Marks)

PART – B

Answer any **one** question from each module. Each full question carries **20** Marks.

Module – I

11. (a) The antenna current of an AM transmitter is 6 A, if only the carrier is sent. But this value increase to 6.89 A, When the carrier is modulated with monotonic sinusoidal wave. Determine the percentage of modulation. Also find the antenna current if the percentage of modulation changes to 0.6. **10**
- (b) Explain the generation of SSB signal with filter method. Give a neat block diagram. **10**
12. (a) Prove that the balanced modulator generates only sidebands at the output and also plot the spectrum. **11**
- (b) A given AM broadcast station transmits a total power of 5 kW, when the carrier is modulated by a sinusoidal signal with a modulation index of 0.707. Hence compute, **9**
- (i) the carrier power
- (ii) the transmission efficiency
- (iii) the peak amplitude of the carrier assuming the antenna to be represented by a $(50 + j0) \Omega$ load.

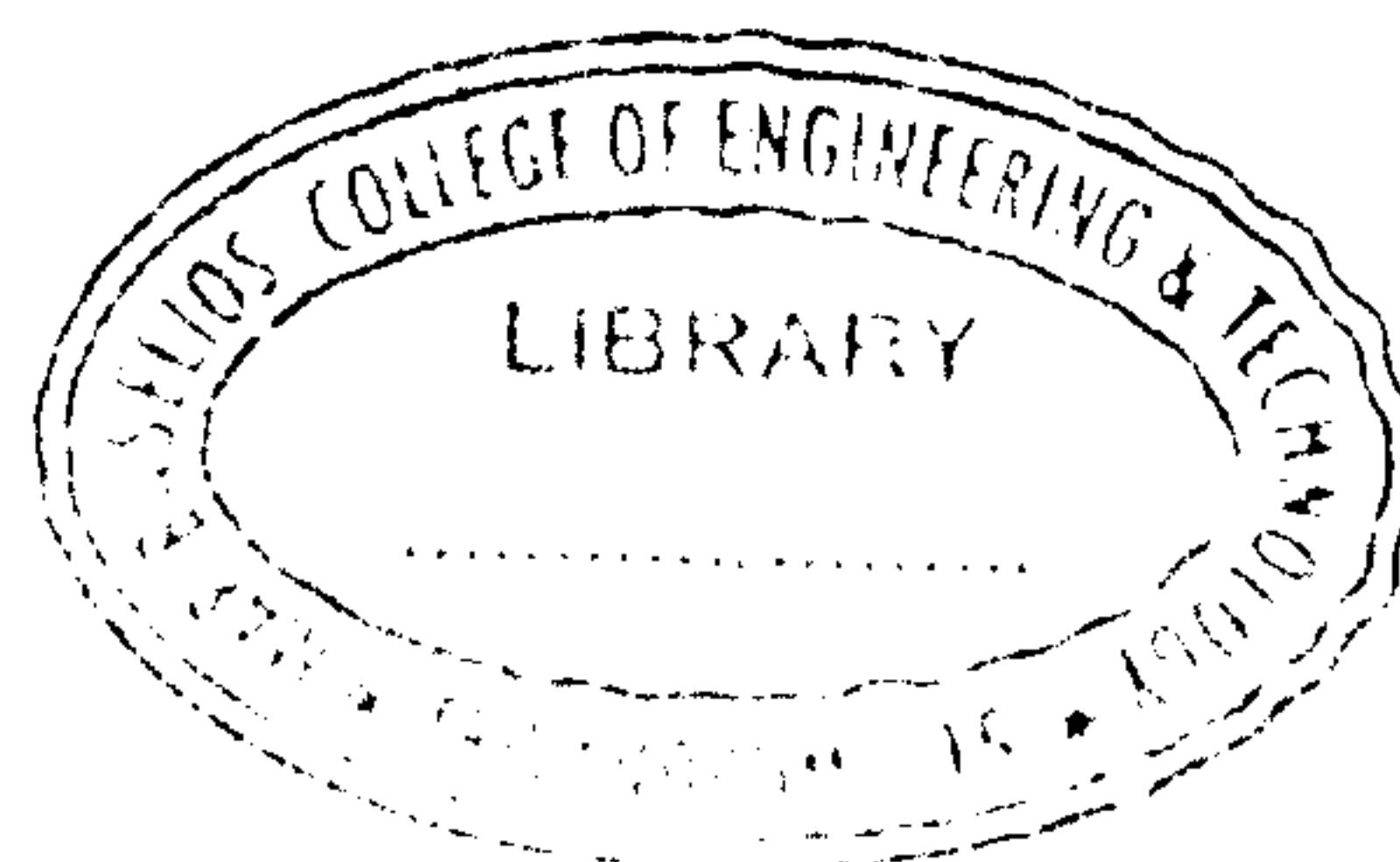


Module – II

13. (a) Give different aspects for selecting the IF frequency for a super-heterodyne radio receiver. **6**
- (b) What is double spotting? Give the reasons for the same. **4**
- (c) Find the overall noise factor of a three stage cascaded amplifier, each stage having a power gain of 10 dB and noise figure of 6 dB. **10**
14. (a) A super-heterodyne receiver is tuned to receive a 1 MHz carrier amplitude by 1 KHz sine wave. It is also assumed that the IF frequency is 455 KHz. Find the frequency components at the input and output of the IF amplifier. Assume the IF bandwidth to be 10 KHz. Plot the spectrum also. **7**
- (b) What is image frequency? **3**
- (c) What is noise temperature? Derive the expression for the noise temperature ' T_n ' in terms of noise factor F . **10**

Module – III

15. (a) Discuss about the noise effect in angle modulation. **10**
- (b) Differentiate between FM and PM with the help of necessary equations. **5**
- (c) Compare the advantages and disadvantages of AM and FM systems. **5**
16. (a) Derive the mathematical expression for the single tone FM modulated signal and hence differentiate the NBFM and WBFM. **8**
- (b) Differentiate between pre-emphasis and de-emphasis for FM signals. **6**
- (c) How the Automatic Frequency Controller (AFC) is functioning in FM receivers? Explain. **6**



Module – IV

17. (a) Give the block diagram of a PCM system and Explain the functions of each block. **10**
- (b) Describe the functions of a automated telecommunication switching system. **10**
18. (a) Briefly discuss about different types of Pulse Time Modulation (PTM) systems. **10**
- (b) How the cordless telephones systems functions? Explain. **5**
- (c) What is a Local Subscriber Loop? Explain. **5**

