

Roll No. 5EEBEC036

[Total No. of Pages : 3]

5E5024

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B.Tech. V Semester (Main/Back) Examination, Nov./Dec. - 2017
Electronics & Communication Engineering
5EC4A Analog Communication

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

Attempt any **five** questions, selecting **one** question from each unit. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) Noise and other types of signal power needs to be expressed in two commonly used units of dBW and dBm which are absolute units of power compared to 1 W and 1m W respectively. (10)
- i) Change the powers into dBW and dBm : 470mW; 1W & 100nW
- ii) Change the powers into watts : -20dBW; 47dBm; 0dBm
- b) Prove that the effective noise temperature of k - 2 port networks in cascade is

$$T_e = T_{e1} + \frac{T_{e2}}{G_1} + \frac{T_{e3}}{G_1 G_2} + \dots + \frac{T_{ek}}{G_1 G_2 \dots G_k} \quad (6)$$

OR

1. a) i) An electrical communication system uses a channel that has a 20dB loss. Estimate the received power if the transmitted power is 1W.
- ii) The channel interfaces in a point-to-point communication system attenuates the signal by 3dB each. The channel loss is 30dB. If the received signal is to be amplified such that the over all loss is limited to 20dB. Find the amplifier gain. (8)
- b) Explain using mathematical equation noise temperature and noise figure in communication systems. (8)

Unit - II

2. a) Explain with suitable sketch and plot the generation of SSB. Signals using phase - shift method. (8)
- b) A DSB modulated signal $\phi(t) = A_m t \cos 2\pi f_c t$ is multiple with a local carrier $c(t) = \cos(\omega_c t + \theta)$ and the output is passed through a LPF with a bandwidth equal to the bandwidth of the message $m(t)$. If the power of the message signal $m(t)$ is P_m determine. (8)
- The power of the modulated signal.
 - The power of the signal at the output of the LPF.

OR

2. a) With the help of neat sketch explain how VSB signals are generated. (6)
- b) When a sinusoidal test tone of frequency ω_m (in radian) is applied to the input of the modulation in Ang broad casting (DSB with full carrier). the modulated waveform is as shown in figure 1. Where the carrier frequency is ω_c . (10)

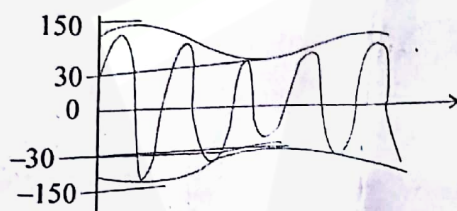


Figure-1.

- Find the modulation index and the expression of the modulated signal.
- Determine the total Average power of the modulated signal the carrier power the USB power and the LSB power (assume unit load)
- Determine the modulation efficiency.
- What is the peak envelop power accross the 60Ω load.

Unit - III

3. a) An angle modulated signal is described by $X_c(t) = 10 \cos [2\pi(10^6)t + 0.1 \sin (10^3)\pi t]$ (8)
- Considering $X_c(t)$ as a PM signal with $k_p = 10$ find $m(t)$
 - Considering $X_c(t)$ as an FM signal with $k_f = 10\pi$. Find $m(t)$.
- b) Define frequency and phase modulation and explain the relation between them. (8)

OR

3. a) What are the effects of channel non-linearity. (4)
- b) Compare AM, FM and PM and tabulate their performance. (6)
- c) Explain with neat sketch. FM broad casting transmitter and Receiver. (6)

Unit - IV

4. a) With the help of mathematical expression, explain the SNR calculation for synchronous detection of DSB. (8)
- b) What is pre-emphasis & de-emphasis? How it is help full in communication system. (8)

OR

4. a) What is threshold effect? (4)
- b) How is an angle modulation system SNR is calculated? (6)
- c) What are internal noises in a communication systems? Explain in brief. (6)

Unit - V

5. a) Compare and tabulate. Natural and flat top sampling. (8)
- b) With the help of neat sketch explain how PPM. modulation and demodulations is done. (8)

OR

5. a) Explain what do you understand by noise performance of pulse Analog Modulation system. How it is calculated mathematically? (8)
- b) How PWM signal are reconstructed at the receiver side? (8)

