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TEST -2 EXAMINATION- Oct 2019

B.Tech Vth Semester(CSE/IT)

COURSE CODE: 10B11EC514

MAX. MARKS: 25

COURSE NAME: Communication Systems

COURSE CREDITS: 4

MAX. TIME: 1.5Hrs

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

- 1 (a) With the help of a suitable diagram explain the working of an envelope detector. [3]
(b) For an AM DSBFC envelope with $V_{max} = 20V$ and $V_{min} = 4V$, determine the following: [2]
 - (i) Peak amplitude of the carrier
 - (ii) Modulation coefficient
 - (iii) Peak amplitude of the upper and lower side frequencies.
- 2 (a) Design an Armstrong indirect FM modulator to generate an FM signal with carrier frequency 97.3MHz and $\Delta f = 10.24kHz$. An NBFM generator of $f_c = 20kHz$ and $\Delta f = 5Hz$ is available. Only frequency doublers can be used as multipliers. Additionally, a local oscillator with adjustable frequency between 400 and 500 kHz is readily available for frequency mixing. [3]
(b) Compare FM and AM by discussing the merits and demerits of both. [2]
- 3 (a) An angle modulated signal with the carrier frequency $\omega_c = 2\pi \times 10^6$ is described by the equation [3]
$$\phi_{EM} = 5 \cos(\omega_c t + 20 \sin 1000\pi + 10 \sin 2000\pi)$$
 - (i) Find the power of the modulated signal
 - (ii) Find the frequency deviation
 - (iii) Estimate the bandwidth of the signal
(b) With the help of a suitable diagram explain the working of Varactor Diode Method for generation of FM signals. [2]
- 4 (a) Comparing with TRF receiver, elaborate the advantages of a superheterodyne receiver drawing its block diagram. [3]
(b) Multiple users of nearly same bandwidth have to get access to a common channel. What techniques would you adapt to achieve this? [2]
- 5 (a) Derive an expression for Wideband FM signal. [3]
(b) Explain the technique by which you can make an FM communication system effective so that the SNR increases considerably. [2]
