Code No: NR221102 **NR**

II B.Tech II Semester Supplementary Examinations, Apr/May 2006
COMMUNICATION ENGINEERING
(Bio-Medical Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What are the applications of balanced modulator? Prove that the balanced modulator produces an output consisting of sidebands, with the carrier removed.
   (b) An AM broadcast station has a modulation index of 0.75 on the average. What would be its average power saving it if could go over to SSB-SC transmission while having to maintain the same signal strength in its reception area. [8+8]

2. (a) Draw the complete block diagram of the Armstrong frequency modulation system and explain the function of the mixer and multipliers. In what circumstances can we dispense with the mixer?
   (b) The equation of an angle-modulated voltage $v(t) = 10\sin(10^8t + 3\sin 10^4t)$ what form of angle modulation is this? Calculate the carrier and modulating frequencies, the modulation index and deviation and power dissipated in a 100-ohm resistor. [8+8]

3. (a) An AM transmitter of 1KW power is fully modulated. Calculate the power transmitted if it is transmitted as SSB.
   (b) Calculate the filter requirement to convert DSB signal to SSB signal, given that the two side bands are seperated by 200 HZ. The supressed carrier is 29 MHZ.
   (c) Give and explain three areas of application where standard FM transmission is needed? [4+6+6]

4. (a) Discuss in detail the various tracking techniques used for receivers.
   (b) A Superheterodyne receiver is to tune the range from 4-10 MHz, with an IF of 1.8 MHz. Calculate the range of oscillator frequencies, the range of image frequencies.
   (c) Write about image frequency. [5+6+5]

5. (a) Derive the expression for Noise Figure for an amplifier.
   (b) The first stage of a two-stage amplifier has a voltage gain of 10, a 600 Ω input resistor, a 1600 Ω equivalent noise resistance and 27 K Ω output resistor. For the second stage these values are 25, 81 kΩ, 10kΩ and 1MΩ respectively. Calculate the equivalent input-noise resistance of this two-stage amplifier. [8+8]

6. (a) What is Pulse Modulation? Classify pulse modulation systems.
   (b) State and explain Sampling Theorem. [8+8]

7. (a) What is companding? Why is it used? Why is it preferable to quantizing with tapered steps? Illustrate your answer with a sketch of typical companding curves.
   (b) What are the advantages and applications of Pulse-code Modulation? [8+8]
8. (a) Why FSK is not suitable for high speed modems.
   (b) Why are modems needed for telephone communications.
   (c) Explain the asymmetry of 56 k modems. [6+6+4]

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