Code No: RR311302 **Set No.1**

III B.Tech. I Semester Supplementary Examinations, May -2005
COMMUNICATION ENGINEERING
(Electronics & Control Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Explain the operation of square law modulator.
   (b) The message signal is given by $m(t) = 20\cos 2\pi t$ volts and the carrier wave is $c(t) = 50\cos 100\pi t$ volts. Find the power developed across a load of 100 ohms due to the AM wave with 75% modulation.

2. (a) Explain clearly the difference between Amplitude, Frequency, and Phase modulations, beginning with the difinition of each type and the meaning of the modulation index in each case.
   (b) Explain with the block diagram the Armstron method of FM generation.

3. (a) A certain transmitter radiates 9 KW with the carrier unmodulated , and 10.125 KW when the carrier is sinusoidally modulated . Calculate the modulation index. If another sine wave, corresponding to 40 % modulation, is transmitted simultaneously , determine the total radiated power.
   (b) Explain the classification of radio transmitter based on the frequency range involved?
   (c) Explain the classification of radio transmitter based on the type of service involved?

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. (a) Define and explain the terms sensitivity, selectivity and image frequency of a receiver.
   (b) Discuss the merits of a delayed AGC as compared with simple AGC. Explain the operation of a delayed AGC with neat circuit diagram.
   (c) Explain about BFO in communication receiver.

6. (a) What is Pulse-width Modulation? What other names does it have? How is it demodulated?
   (b) Distinguish between Natural and flat-top Sampling.
   (c) Explain the principle of basic transistor PAM modulator with a circuit.

7. (a) Draw the block diagram of PCM system and explain in detail the functions of each block.

   (b) In what way it differs to other pulse modulation methods.

8. (a) An asynchronous transmission uses 8 data bits, an even parity bit, and 2 stop bits. What percentage of clock inaccuracy can be tolerated at the receiver with respect to framing error? Assume that the bit samples are taken at the middle of the clock period. Also assume that, at beginning of the start bit, clock and incoming bits are in phase.

   (b) Suppose that the sender and receiver agree not to use any stop bits. Could this work? If so, explain any necessary conditions.

⋆ ⋆ ⋆ ⋆ ⋆

III B.Tech. I Semester Supplementary Examinations, May -2005
COMMUNICATION ENGINEERING
(Electronics & Control Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Explain filter method of suppressing unwanted sideband.
   (b) A SSB-SC transmitter operating at a 16MHz has frequency stability of 1 part per million. If its transmission is reproduced by a receiver whose stability is 8 part per million, what is the maximum frequency error at the output of the receiver could have in reproducing the transmission.

2. (a) An angle modulated wave is given by the equation $w(t) = 10\cos(2\pi 10^6 t + 10\cos 2000\pi t)$. Find
      i. the power of modulated signal
      ii. the maximum frequency deviation.
      iii. the bandwidth of modulated signal.
   (b) Write the non-linear effects in FM systems.
   (c) Obtain the relation between FM and PM.

3. (a) Why frequency drift and scintillation should be very small in radio transmitter.
   (b) Give and explain radio frequency spectrum used for various communications.
   (c) Draw the block diagram of a filter type SSB-SC transmitter with 20 KHZ oscillator and emission frequency in the range of 6 MHZ. Explain the function of each stage.

4. (a) Explain the necessity for AGC in a radio communication.
   (b) Discuss the consideration that governs the choice of IF in a receiver.
   (c) Explain the operation of superheterodyne receiver.

5. Draw the block diagram of a generalized communication receiver. Explain special features of each of the block.

6. (a) Explain the generation and demodulation of pulse-position modulation.
   (b) What is meant by Cross-talk? Explain in detail.

7. (a) Draw the block diagram of FSK transmitter and explain.
   (b) Draw the block diagram of non coherent receiver for the detection of binary FSK signals.

8. Explain what do you understood by the following terms used in relation to packet switched data network.

(a) Datagram

(b) Virtual circuit

(c) Logical channel

⋆ ⋆ ⋆ ⋆ ⋆

III B.Tech. I Semester Supplementary Examinations, May -2005
COMMUNICATION ENGINEERING
(Electronics & Control Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

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.
2. (a) Explain Preemphasis and deemphasis with neat circuit diagrams.
   (b) Explain the working principle of varactor diode modulator for FM generation.
3. (a) Write short notes on the following:-
      i. Harmonic generators
      ii. transmitter power supplies
   (b) Explain with suitable block diagram the various stages of a frequency modulated broadcast transmitter. Draw the block schematic of a crystal controlled frequency modulation broadcast station operating on 96.5MHZ. The modulating frequency employed cover the range 60 to 12000 HZ. and a maximum deviation of 75 KHZ is desired.
4. (a) Write short notes on:
      i. Frequency synthesizers
      ii. Spurious responses in radio receivers
   (b) Bring out the factors influencing the choice of IF and indicate the values of IF employed in each of the following cases
      i. AM Broadcast receivers
      ii. FM Broadcast receiver
      iii. TV receivers in the VHF and UHF bands.
5. (a) Differentiate between simple, delayed and amplified AGC and explain their action with the help of simple circuits blocks.
   (b) Discuss briefly similarities and differences between FM and AM receivers.
   (c) Write in detail about the limiter used in FM receiver.
6. (a) Explain the generation and demodulation of pulse-position modulation.
   (b) What is meant by Cross-talk? Explain in detail.

7. What is the main draw back of delta modulation and explain how it is eliminated in Adaptive delta modulation with the help of block diagram and waveforms.

8. (a) What are the parallel interfaces? What is the difference between serial interface and parallel interface?

   (b) What is centronics parallel interface and Explain control, data and status lines for it?

⋆ ⋆ ⋆ ⋆ ⋆

Code No: RR311302 **Set No.4**

III B.Tech. I Semester Supplementary Examinations, May -2005
COMMUNICATION ENGINEERING
(Electronics & Control Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) What are advantages and disadvantages of FM over AM.
   (b) The single-tone modulating wave m(t) $=A_m \cos 2\pi f_m t$ is used to generate the following Vestigial Side Band modulated wave
   $s(t) = aA_mA_c\cos[2\pi(f_c+fm)t] + A_mA_c(1-a)\cos[2\pi(f_c-f_m)t]$ where a is a constant. Find the in-phase and quadrture components of the VSB modulatd wave. For what value of constant 'a', s(t) reduces to a DSB-SC modulated wave.

2. (a) Derive the expression for FM wave in terms of modulation index and carrier frequency.
   (b) The equation of an angle-modulated voltage is v=10sin($10^8t + 3\sin 10^4t$) . What form of angle modulation is this? Calculate the carrier and modulating frequencies, the modulation index and deviation, the power dissipated in a 100- ohm resistor.

3. (a) Why frequency drift and scintillation should be very small in radio transmitter.
   (b) Give and explain radio frequency spectrum used for various communications.
   (c) Draw the block diagram of a filter type SSB-SC transmitter with 20 KHZ oscillator and emission frequency in the range of 6 MHZ. Explain the function of each stage.

4. (a) How do you find IF of a radio receiver?
   (b) Discuss the factors influencing the selection of IF frequency.
   (c) Write about double spotting and 3pt tracking.

5. (a) Draw a neat diagram of a double conversion receiver and explain.
   (b) Define sensitivity, selectivity and fidelity.
   (c) Calculate the image frequency rejection of double conversion receiver which has a first IF of 2 MHz and second IF of 200 kHz, on RF amplifier whose tuned circuits has a Q of 75 (Same as that of mixer) and which is tuned to a 30MHz signal. Give the answer in decibels.

6. (a) Explain the principles of Pulse duration modulation and pulse position modulation.
   (b) Discuss the basic theory behind Time Division Multiplexing.

7. (a) Illustrate the waveforms of the three basic forms of signaling binary information
   i. ASK
   ii. FSK
   iii. PSK

8. (a) Describe the synchronous data format?
   (b) Which data format is best suited for long messages? Why?
   (c) Suppose that the sender and receiver agree not to use any stop bits could this work? If so, explain any necessary conditions?

⋆ ⋆ ⋆ ⋆ ⋆