

**III B.Tech II Semester Supplementary Examinations,
November/December 2005**

**COMMUNICATION ENGINEERING
(Electronics & Instrumentation Engineering)**

Time: 3 hours

Max Marks: 80

**Answer any FIVE Questions
All Questions carry equal marks**

1. (a) Explain clearly envelop detector one method of demodulation of AM wave.
(b) A certain transmitter radiates 9KW with the carrier unmodulated and 10.125 KW when the carrier is sinusoidally modulated. Calculate the modulation index and percent of modulation. If another sine wave, corresponding to 40% modulation is transmitted simultaneously, determine the total radiated power. [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 $v(t) = 10 \sin(10^8 t + 3 \sin 10^4 t)$ 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 separated by 200 HZ. The suppressed carrier is 29 MHZ.
(c) Give and explain three areas of application where standard FM transmission is needed? [4+6+6]
4. (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+6+4]
5. (a) Write brief notes on the sources of noise, that arise in electronic equipment.
(b) Describe how the power spectral density varies with frequency in each case. [8+8]
6. (a) Discuss the two different forms of pulse time modulation for the case of a sinusoidal modulating wave.
(b) Discuss the features of pulse amplitude modulation. [10+6]

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. [10+6]
8. (a) Why the oscillation is undesirable in packet-switching networks.
(b) What are the advantage and disadvantage of adaptive routing? [8+8]

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1. (a) Explain the third method of SSB generation.
(b) When a broadcast AM transmitter is 50% modulated, its antenna current is 12A. What will be the current when the modulation depth is increased to 0.9?
[10+6]
2. (a) Explain the principle of pre-emphasis and de-emphasis in FM with circuits.
(b) A carrier frequency modulator by sinusoidal modulating signal of frequency 2KHz resulting in a frequency deviation of 5KHz. What is the bandwidth occupied by the modulated waveform? The amplitude of the modulating sinusoidal is increased by factor of 3 and its frequency lowered to 1KHz. What is the new bandwidth?
[8+8]
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.
[5+5+6]
4. (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+6+4]
5. (a) Write brief notes on the sources of noise, that arise in electronic equipment.
(b) Describe how the power spectral density varies with frequency in each case.
[8+8]
6. (a) What is the fundamental difference between Pulse modulation schemes and frequency and amplitude modulation schemes.
(b) Explain the generation and demodulation of pulse width modulation. [8+8]
7. (a) Illustrate the waveforms of the three basic forms of signaling binary information
 - i. ASK
 - ii. FSK

iii. PSK [16]

8. (a) Explain the adaptive routing techniques

(b) What is original ARPANET Algorithm? Explain. [8+8]

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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. [10+6]
2. (a) Explain the indirect method of FM generation.
(b) A 500Hz modulating voltage fed into a PM generator produces a frequency deviation of 2.25KHz. What is the modulation index if the amplitude of the modulating voltage is kept constant but its frequency is raised to 6KHz? What is the new deviation? [8+8]
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. [5+5+6]
4. (a) Draw the block diagram of AM radio receiver and explain the function of each block.
(b) Explain what is meant by image frequency.
What are the considerations in the choice of IF in a Superheterodyne receiver? [8+8]
5. (a) Define the terms
 - i. sensitivity,
 - ii. selectivity,
 - iii. fidelity and
 - iv. noise figure of a radio receiver.
(b) Explain with a diagram, the procedure for measurement of the above.
(c) Write about variable selectivity and sensitivity [8+4+4]
6. (a) What is PAM? Explain the requirement of channel bandwidth for PAM signal. How PAM signal is demodulated?
(b) Differentiate quantization and quantization noise. [8+8]

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. [10+6]
8. (a) Name the elements of routing techniques for packet-switching networks and Explain?
(b) Compare different routing strategies.
(c) What is the random routing? [6+5+5]

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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
 $s(t) = aA_m A_c \cos[2\pi(f_c + f_m)t] + A_m A_c(1 - a) \cos[2\pi(f_c - f_m)t]$ where a is a constant. Find the in-phase and quadrature components of the VSB modulated wave. For what value of constant 'a', $s(t)$ reduces to a DSB-SC modulated wave. [8+8]
2. (a) Explain the principle & working of Transistor Reactance modulator for FM generation.
(b) compare FM with AM . [8+8]
3. (a) What is the function of VCO in FM transmitter.
(b) What is stereo FM transmitter? Explain with the help of block diagram.
(c) What is the use of Balanced modulator in SSB transmitter.? [6+4+6]
4. (a) Explain the principles of delayed AGC with a circuit diagram.
(b) What are the functions of variable selectivity and sensitivity? How is each achieved in practice?
(c) Draw a block diagram of a FM receiver and explain each block. [4+6+6]
5. (a) With suitable diagram explain how noise figure is measured.
(b) The equivalent noise resistance for an amplifier is 300 ohms and the equivalent shot noise current is 5 micro amps. The amplifier is fed from a 150 ohms, 10 micro volts rms sinusoidal signal source. Calculate the individual noise voltages at the input and the input signal to noise ratio in decibels. The noise bandwidth is 10 MHz. [8+8]
6. (a) Discuss the basic problems involved in the design of digital multiplexer.
(b) Draw the functional model of pass band data transmission system and explain. [6+10]
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. [10+6]

8. Discriminate between the reset and restart error recovery procedures used in the packet layer of X.25 and explain their operation. [16]
