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WC April 08/06

Con. 2653-08.

Communication Engg-I

(REVISED COURSE)

CO-9724

(3 Hours)

[Total Marks : 100

MASTER

- N.B. : (1) Question No. 1 is compulsory.  
 (2) Attempt any five questions including the compulsory question.  
 (3) Assume suitable data, stating the same clearly.

1. (a) State and prove frequency shifting property of Fourier transform. Give its application. 4  
 (b) List the advantages of wideband frequency modulation. 4  
 (c) Describe briefly how frequency modulation can be used for generation of phase modulation. List the parameter to be taken care off during operation/conversion. 6  
 (d) Describe in brief the operation of yagi  $\mu d_n$  Antenna using suitable diagrammatic representation and find the power that can be transmitted when used for transmission. 6
  
2. (a) For the three stage, double tuned RF amplifier with an RF equal to 1000 KHz and coefficient of coupling  $k_{opt} = 0.01$ , Determine : 10  
 (i) Bandwidth for each individual stage.  
 (ii) Bandwidth for the three stages cascaded together.  
 (b) Draw the block diagram of a high level AMDSBFC transmitter. Represent waveform at each stage. Explain in brief the function of each block in the receiver. 10
  
3. (a) Sketch the circuit and explain the working of Foster Seeley discriminator for FM detection. Give phasor diagram and discriminator response curve. 10  
 (b) For an angle modulated carrier : 10  

$$V_c = 4 \cos (2\pi 300 \text{ MHz } t)$$
 With -75 KHz of frequency deviation due to modulating signal and a single frequency interfering signal  $V_n = 0.2 \cos (2\pi 300.015 \text{ MHz } t)$   
 Determine :-  
 (i) Frequency of the demodulated interference signal.  
 (ii) Peak and rms phase and frequency deviation due to interfering signal.  
 (iii) S/N ratio at the output of the FM demodulator.
  
4. (a) A PCM system samples the signal at the rate of 8000 Frames/sec. for a given condition draw a PCM transmitter and receiver system. 5  
 (b) A PCM system uses a 7 bit binary encoder following a uniform quantizer. If the bit rate of the system is 49 Mb/sec. Determine the maximum message bandwidth for a satisfactory system operation. 10  
 (c) Define :- 5  
 (i) Bit / frame  
 (ii) Frame synchronization  
 (iii) Bit rate.

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S. E. (L. E. H. E. Y) IV Rev<sup>2</sup> Comm. Cryst. I 14/6/08

5. (a) The channel in the communication receiver is shared on time basis. Total bandwidth of channel is 10 MHz. Find how many signals can be transmitted on the time sharing basis and bandwidth of each signal to be shared. Draw the block diagram arrangement for implementing the communication between transmitter and receiver. Draw waveform for transmitted and received signal. 10
- (b) Explain intermodulation distortion in communication system using suitable waveform representation. 5
- (c) Define composite baseband signal draw and explain the composite baseband signal transmission system for bandwidth of 48 KHz. 5
6. (a) What is the meaning of Polarization of Antenna. Compare the performance of grounded and ungrounded antenna. What are the advantages of using different type of polarization. 10
- (b) Find the convolution of following function : 10
- $f_1(t) = \delta(t)$
- $f_2(t) = u(t-2)$
- Use graphical convolution method.
7. (a) What is the tracking error in a radio receiver. Explain three point tracking. 5
- (b) What is capture effect ? Use suitable waveform to represent it. 5
- (c) Sketch the block diagram of Delta Modulation Transmitter. Explain the following with appropriate waveforms : 10
- (i) Slope overload error
- (ii) Hunting error.
- Also state remedies for these error.

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