MARWADI UNIVERSITY

Faculty of Technology
Department of Information & Communication Technology
Subject: Analog and Digital Communication

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Question Bank

(1) Classify Electronic communication system.

(2) Justify need of modulation in detail.

(3) Define modulation index of AM. List method to find modulation index and demonstrate any one in detail

(4) Consider an AM signal $x(t) = 2\cos(2\pi fct) + 0.5\cos(2\pi fmt) \cdot \cos(2\pi fct)$. Compute the modulation index used to generate the signal.

(5) Derive mathematical expression of amplitude modulated signal also draw equivalent frequency spectrum.

(6) A 500 W carrier is modulated to a depth of 75%. Calculate the total power in the modulated wave.

(7) In an amplitude modulation system, the carrier frequency is $fc = 100 KHz$. The maximum frequency of the signal is 5 KHz. Estimate the lower & upper side bands and bandwidth of the AM signal

(8) Explain FET method for generation of DSB-SC.

(9) Demonstrate the trapezoidal method for finding modulation index of AM Wave.

(10) Summarize the advantages of SSBSC modulation

(11) State methods of SSB-SC generation. Explain any one in detail.

(12) Compare bandwidth and power requirement for DSB-FC, DSB-SC and SSB-SC.

(13) Determine the following for DSBSC
(i) Bandwidth
(ii) Time domain representation
(iii) Frequency spectrum
(iv) Advantages and Disadvantages

(14) i)A 400W carrier is amplitude modulated to a depth of 100%. Calculate the total power in case of the AM and DSBSC techniques. Formulate how much power saving in watts is achieved for DSBSC? If the depth of modulation is changed to 75%, then how much power in W is required for transmitting the DSBSC wave? Invent the power required for DSBSC in both cases and comment on the reason for change in the power levels.
(ii)For an AM DSBFC wave with peak unmodulated carrier voltage Vc=10V, a load resistance RL = 10 Ω and a modulation coefficient m = 1.
a. Predict the Power of carrier, upper and lower side band and Total power of modulate wave. b. Estimate the total sideband power and draw the frequency spectrum.

(15) An Audio signal whose mathematical description is 25sin(2π*1000t) modulates carrier describe as 75sin(2π*150000t)
(i) Sketch audio signal (ii)Sketch carrier signal
(iii) Find modulation index
(iv) Find total power.
(v) Find frequency spectrum.

`   (16) (i)Discuss on Pilot Carrier SSB system with a neat block diagram.
(ii) Compare AM techniques DSBSC, SSB and VSB.

(17) Define Frequency modulation and derive mathematical expression of FM.

(18) Draw frequency spectrum of FM. Find Bandwidth of FM using Carson's rule.

(19) Explain generation of by reactance modulator with block diagram.

(20) Analyze the indirect method for generating wideband FM signal (Armstrong method)

(21) Compare NBFM and WBFM.
(22) The maximum frequency deviation in an FM is 10KHz and the signal frequency is 10KHz. Estimate the bandwidth using Carson's rule and the modulation index.
(23) Compare Amplitude modulation and Frequency modulation and Phase modulation.
(24) Write functions of radio receiver
(25) State the principle of Super heterodyne receiver.
(26) State the principle of Angle Modulation.
(27) Describe phase deviation, modulation index, and frequency deviation and percent modulation.
(28) Explain direct method to generate WBFM.
(29) Classify various types of noise and explain in brief.
(30) Explain external noise in detail.
(31) Explain internal noise in detail.
(32) Explain following terms: (i) Signal to noise ratio (ii) Noise figure (iii) Noise factor.
(33) Derive Friss Formula for Cascaded amplifier.
(34) Compare analog modulation and digital modulation.
(35) Describe sampling theorem with appropriate diagrams
(36) State and Prove sampling theorem
(37) What is Nyquist rate Nyquist interval.
(38) Compare PAM, PWM and PPM system.
(39) With the help of neat diagram explain PCM transmitter and Receiver.
(40) Explain uniform(linear) quantization.
(41) Explain Differential Pulse Code modulation
(42) Compare digital pulse modulation methods PCM, DM, ADM and DPCM.
(43) State the principle of ADM. Draw the block diagram of ADM transmitter and receiver and explain with relevant expressions.
(44) State advantages of ADM over DM.
(45) Explain ASK with block diagram.
(46) Describe generation of FSK with necessary diagram.
(47) Illustrate 8- PSK modulator and demodulator with the diagrams
(48) Draw constellation diagram for following modulations (i) BPSK, (ii) QPSK (iii) 16-QAM
(49) Compare ASK and FSK
(50) Describe in brief OFDM.