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M. TECH.
(SEM III) THEORY EXAMINATION 2017-18
COMMUNICATION THEORY

Time: 3 Hours ***Total Marks: 100***

Q.1 **Attempt any four Parts** **(5x4=20)**

a. What is Cell? What do you understand by frequency re-use concept? Draw the cell cluster for N=7 and M=3.
b. Find the relation between any two nearest co-channel cell distance D and cluster size of N.
c. A FDD cellular communication system uses a 945 radio channel available for handling traffic. The total area of the entire system is 2450 km^2 with 7 km^2 as the area of cell. Calculate the System capacity for cluster size N=7 & 4.
d. Discuss about the channel assignment strategies.
e. What do you mean by "Hand-off" in cellular system?
f. Explain co-channel and adjacent channel interference in cellular system?

Q.2 **Attempt any four parts** **(5x4=20)**

a. Draw the frequency spectrum and explain the receiver and transmitter block diagram of BFSK.
b. Explain the receiver and transmitter block diagram of MSK.
c. Write the wave form for a binary sequence 101100 modulated under OPSK.
d. Calculate the error probability of BPSK.
e. What do you understand by ISI? Explain the practical solution.
f. Show that the maximum signal to noise ratio of the matched filter is $2E/N_{o.}$

Q.3 **Attempt any four parts** **(5x4=20)**

a. A carrier wave is represented by equation E_c (t) =12 sinωt. Draw the wave form of an AM wave for the depth of modulation of (i) 1 (ii) 0.5 (iii) 3/2 (iv) 2/3.
b. Define the Angle Modulation, Calculate Phase deviation, Modulation index and Frequency deviation.
c. Explain the FM generation technique by direct method using Hartley's Oscillator.
d. Explain the Narrow band Frequency modulation.
e. Explain the FM Demodulation using Ratio detection technique.
f. Show that in an envelope detector circuit the demodulator output is to follow the envelop of m(t). it is required that at any time $1/RC \geq \omega_m m_a \sin\omega_m t/1+m_a \cos\omega_m t$.

Q.4 **Attempt any four parts** **(5x4=20)**

a. How we can demodulate AM wave using square-law detector.
b. Generate the AM-DSBSC signal by using Balance modulator method.
c. A broadcast transmitter radiates 20KW when the modulation percentage is75. Calculate the carrier power and power of each sidebands.
d. Compare between NBFM and WBFM as well as FM and PM.
e. Derive the expression for AM current and calculate modulation index in terms of currents.
f. What do you mean by carrier re-insertion technique in demodulation of DSB-SC signal?

Q.5 **Attempt any two Parts** **(10x2=20)**

a. Optimum/suboptimum receiver
b. Diversity Combing
c. Trellis's coded modulation

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