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Question Paper Code : 31357

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Fourth Semester

Electronics and Communication Engineering

EC 2252/EC 42/EC 1252/080290020 — COMMUNICATION THEORY

(Regulation 2008)

(Common to PTEC 2252 Communication Theory for B.E. (Part-Time)
Third Semester ECE – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. The average power of a periodic signal $g_p(t)$ is calculated using what theorem? State the theorem.
2. Represent an amplitude modulated wave as a function of time with amplitude sensitivity of the modulator as the constant.
3. Define the modulation index of the FM wave and specify how you will distinguish narrow band and wide band FM respectively.
4. Draw a simple schematic of a PLL demodulator.
5. When carrier to noise ratio is high, how will you get figure of merit of FM systems?
6. How will you define the narrow - band noise $m(t)$ at the IF filter output in terms of its inphase and quadrature components?
7. What is known as aliasing?
8. Justify the need for pre-emphasis and de-emphasis.
9. Give the equation for finding the entropy of a binary source.
10. For a discrete memoryless channel define channel capacity as per Shannon.

PART B — (5 × 16 = 80 marks)

11. (a) With suitable block diagrams and equations show how will you generate :
- (i) DSBSC and
 - (ii) VSB signals.

Or

- (b) A sine wave of frequency 10Hz is applied to a product modulator, together with a carrier wave frequency of 1 MHz. The modulator output is next applied to a resonant circuit. Determine the modulated wave after transmission through the circuit. Assume suitable data.
12. (a) A carrier wave of frequency 80 MHz is frequency modulated by a sine wave amplitude of 20 volts and frequency of 80 KHz. The frequency sensitivity of the modulator is 20 KHz/vdf.
- (i) Determine the approximate bandwidth of the FM wave by Carson's rule.
 - (ii) Determine the bandwidth by transmitting only those side frequencies whose amplitude exceed 1% of the unmodulated carrier amplitude (use the universal curve/ideal condition).

Or

- (b) Describe how FM wave is generated by the indirect method and give a suitable demodulating scheme for the same.
13. (a) Summarise the characteristics of various noise found in a communication channel.

Or

- (b) Derive the equation for finding the probability density function of a one to one differentiable function of a given random variable.
14. (a) Explain the functioning of a superhetrodyne radio receiver and enlist its characteristics.

Or

- (b) Compare the performance of any two CW modulation schemes.
15. (a) (i) Prove how you use the source coding to increase average information per bit.
- (ii) Write the advantages of Huffman coding.

Or

- (b) Write short notes on :
- (i) Lossy source coding
 - (ii) S/N trade off.