B.Tech II Year II Semester (R13) Regular & Supplementary Examinations May/June 2016
PRINCIPLES OF COMMUNICATIONS
(Electronics and Instrumentation Engineering)

Time: 3 hours   Max. Marks: 70

PART – A
(Compulsory Question)
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1   Answer the following: (10 X 02 = 20 Marks)
(a)   What is the need for modulation?
(b)   A 400 W carrier is modulated on a depth of 75%. Calculate the total power in the modulated wave in,
(i) AM. (ii) DSB-SC.
(c)   A receiver is connected to an antenna whose resistance is 50 Ω. The receiver has an equivalent noise resistance of 45 Ω. Calculate the receiver noise figure and its equivalent noise temperature.
(d)   Define Signal to Noise Ratio.
(e)   Why SSB transmission is preferred than DSB-SC?
(f)   A 70 MHz carrier is QPSK modulated by a T1 data stream. Transmitter employs a raised – cosine filter with α = 0.3. What is the transmitted band width of the signal? What is the bandwidth of the filter has 100% roll off factor?
(g)   What is Nyquist filter? Is it realizable?
(h)   A discrete data source produces messages from a set {x_1, x_2, x_3, x_4} where the possibilities associated with the messages are P_1 = ½, P_2 = ¼, P_3 = 1/8, and P_4 = 1/8. Find the entropy of this source in bits.
(i)   What is Mutual Information?
(j)   What is efficiency?

PART – B
(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2   (a)   Explain about frequency division multiplexing with a neat diagram.
(b)   Draw the one cycle of AM wave and calculate the modulation index of it in terms of Vmax and Vmin voltages.

OR

3   Explain in detail about internal noises in communications.

UNIT – II

4   (a)   Explain the collector modulated method for generating AM wave with a neat circuit diagram and waveforms.
(b)   Explain the operation of Costas loop for demodulating DSB-SC waves.

OR

5   (a)   Draw the block diagram of phase cancellation SSB generator and explain how the carrier and unwanted side bands are suppressed.
(b)   What are the limitations of frequency discrimination method generation of SSB-SC?

UNIT – III

6   Discuss about the generation of Vestigial Side Band modulation. What are its advantages and applications

OR

7   Calculate the percentage saving in power if only one side band transmission is used over the DSB- FC system at:
(a)   100% modulation.
(b)   80% modulation.
(c)   50% modulation.

UNIT – IV

8   (a)   Describe the performance of a PCM system.
    (b)   A PCM coder employs an 8-bit A-law companded quantizer with A = 87.6. Find the maximum signal-quantization noise ratio & maximum signal- quantization noise ratio when a µ-law companded with µ = 55 is employed.

OR

9   Describe the Quadrature Phase Shift Keying modulation (QPSK) in detail with the help of block diagram.

UNIT – V

10   (a)   Briefly describe the parity check coding.
     (b)   Explain source code efficiency.

OR

11   Consider a DMS $X = \{X_1, X_2, X_3... X_7\}$ with following message possibilities:

X	X_1	X_2	X_3	X_4	X_5	X_6	X_7
Pxi	0.4	0.25	0.15	0.1	0.05	0.03	0.02

Encode this source with available length binary code using Huffman algorithm. Find the average code length and efficiency.

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