Registration No. : | | | | | | | | | | |

Total number of printed pages – 2

B. Tech

PCEI 4301

Fifth Semester (Back / Special) Examination – 2013

COMMUNICATION SYSTEMS ENGINEERING

BRANCH : AEIE, BIOMED, IEE

QUESTION CODE : D 261

Full Marks – 70

Time : 3 Hours

*Answer Question No. **1** which is compulsory and any **five** from the rest.*
The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10

   (a) Draw the spectrum of DSB and SSB signal without carrier.

   (b) What is flat top sampling and what is it's advantage ?

   (c) Explain Inter symbol interference (ISI) and how it can be minimized.

   (d) Find the Nyquist rate sampling of the given signal

   10sin (1000t) +20cos (1500t)

   (e) State Eye pattern.

   (f) State the difference between Delta modulation and Adaptive Delta modulation.

   (g) State S-Ary system.

   (h) What is Image frequency ?

   (i) What is sampling theorem ?

   (j) Find the Fourier transform of $y(n)=10\sin(20\Pi t+\Pi/3)$.

2. (a) Explain with example coherent detection of AM signal . 5

   (b) Derive the expression of SNR in PCM and Delta modulation. 5

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3. (a) Find the modulation index of the signal $x(t)= 5\sin(wt)+10\cos(wt)-3\sin(wt+\Pi/3)$ when it is modulated by carrier signal $c(t)=15\sin(1000wt)$. 5

(b) Explain with diagram time division and frequency division multiplexing. 5

4. (a) Explain VSB modulation for television broadcasting and square law Demodulation. 5

(b) Explain Armstrong method of FM generation and what is interleaving. 5

5. (a) Consider that the signal $\cos 2\Pi t$ is quantized into 16 levels. The sampling rate is 4Hz. 5

Assume that the sampling signal consists of pulses each having a unit height and duration dt. the pulses occur every $t= k/4$ sec where $-\infty < k < \infty$.

(i) Sketch the binary signal representing each sample voltage.

(ii) How many bits are required per sample ?

(b) Explain Phase and filter method for SSB generation with diagram. 5

6. (a) The bandpass signal $v(t) = \cos 10wt + \cos 11wt + \cos 12wt$ is sampled by an impulse train $S(t) = I \sum (t-kTs)$, where k varies from $-\infty$ to ∞. Find the maximum time between samples. 5

(b) Describe different types of line codes with examples. 5

7. (a) The signals $v1(t)=2\cos w1t + \cos 2w1t$ and $v2(t)=2\cos w2t + 2\cos 2w2t$ are multiplied. Plot the resultant amplitude frequency characteristic, assuming that $w2 > 2w1$, but is not a harmonic of w1. 5

(b) What is the need for frequency translation and explain the method for frequency translation. 5

8. Write short notes on any **two** of the following : 5×2

(a) Adaptive delta modulation.

(b) Pulse Modulation.

(c) Television Broadcasting.

(d) Multiplexing.