Registration No. :

B. Tech

PCEE 4304

Sixth Semester Back Examination – 2015

COMMUNICATION ENGINEERING

BRANCH (S) : CSE, IT

QUESTION CODE : M 399

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) Define Nyquist sampling rate.

   (b) Define energy signal.

   (c) What is pulse modulation ?

   (d) Two signals are band limited to 5 to 7 kHz, are to be time division multiplexed. Find the maximum permissible interval between two successive samples.

   (e) What is the band width required for an FM wave signal in which the modulating signal is 2 kHz and the maximum frequency deviation is 12 kHz ?

   (f) Define Entropy.

   (g) Draw the NRZ and RZ waveform for the pulse stream 10101011.

   (h) What do you mean by interpolation ? Write the formula for it.

   (i) Explain the PWM modulator.

   (j) What are the video and audio IF carrier frequencies ?

P.T.O.

2. An AM signal is generated by modulating the carrier $f_c = 800$ kHz by the signal m (t) $= \sin(2000\pi t) + 5\cos(4000\pi t)$. The AM signal u(t) $= 100[1+m(t)]\cos(2\pi f_c t)$ is fed to a 50 ohms load. 10

   (a) Determine and sketch the spectrum of the AM signal.

   (b) Determine the average power in the carrier and sidebands.

   (c) What is the modulation index ?

   (d) What is the peak power delivered to the load ?

3. Explain how can you realize a low cost receiver for binary FSK ? Draw suitable diagrams. What is the basis of this receiver ? 10

4. (a) Derive an expression for the AM wave and its power relation. 5

   (b) Draw the spectrum of a BPSK signal when the modulating signal is a NRZ signal. Hence find out the bandwidth needed to transmit such a signal. 5

5. (a) Explain the cross-talk in PAM due to HF and LF limitation of the channel. 5

   (b) Explain how PLL can be used as an FM demodulator. 5

6. (a) State the comparison between PCM and DM. 5

   (b) Explain the SNR vs. transmission bandwidth trade-off in PCM. Derive the necessary equations. 5

7. (a) Explain the working of a FM transmitter employing Armstrong method. 5

   (b) Explain the concept of BPSK and QPSK technique in data communication. 5

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

   (a) Fading

   (b) Huffman Coding

   (c) Angle Modulation

   (d) Multiple Access in Cellular Systems.