Code: R7321004

B.Tech III Year II Semester (R07) Supplementary Examinations December/January 2015/2016

PRINCIPLES OF COMMUNICATIONS

(Electronics and Instrumentation Engineering)

(For 2008 regular admitted batch only)

Time: 3 hours   Max Marks: 80

Answer any FIVE questions

All questions carry equal marks

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1 (a) State and prove scaling property of Fourier transform.
   (b) Sketch the following signal x(t) and find its Fourier transform:
        x(t) = r(t) − r(t-1) − u(t-1).

2 (a) A transmitter supplies 8 kW to the antenna when un-modulated. Determine the total power radiated when modulated to 30%.
   (b) Distinguish between synchronous and envelope detectors.
   (c) Give the limitations of square law modulator.

3 (a) With block diagram explain how to generate PM using FM modulator.
   (b) Consider an angle – modulated signal:
        $x_c(t) = 10 \cos [10^8] \pi t + 5 \sin 2\pi(10^3)t$
        Find the maximum phase deviation and the maximum frequency deviation.

4 (a) Three signals $e_{m1}(t)$, $e_{m2}(t)$ and $e_{m3}(t)$ having bandwidths of 5 kHz, 5 kHz, and 10 kHz respectively are to be multiplexed. Design a commutator switching system so that each is sampled at its Nyquist rate.
   (b) Draw the circuit diagram of PPM modulation using 555 timer and explain.

5 (a) What are the applications of PCM systems? Write any two applications in detail.
   (b) Explain why it is necessary to use greater sampling rate for DM than for PCM.

6 (a) With a neat block diagram explain non-coherent detection of ASK receiver.
   (b) Distinguish between QAM and Multi-phase PSK.

7 (a) Define and discuss the following terms:
        (i) Information.
        (ii) Entropy.
        (iii) Joint Entropy.
   (b) If a source is delivering 4 different messages with probabilities ½, ¼, 1/8 and 1/8, what is the entropy of the source? If it is sending the messages at the rate of 2000 symbols/sec, calculate the average rate of information.

8 (a) What do you understand by error control coding? Explain the various methods briefly.
   (b) What are cyclic codes? Explain the algebraic structure of cyclic codes.