



Name :

Roll No. :

Invigilator's Signature :

CS/M.Tech (ECE-VLSI)/SEM-1/MVLSI-105D/2012-13

2012

ADVANCED DIGITAL COMMUNICATION

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Answer Question No. 1 and any *four* from the rest.

1.
 - a) What are the advantages of digital communication ?
 - b) Compare CDMA, TDMA, FDMA.
 - c) Name the different communication bands up to 5.8GHz.
 - d) What is the difference between SSS and WSS Random Process ?
 - e) Under which condition, Probability of error P_e remains same in both PSK and FSK ?
 - f) Find Manchester representation of 1011001.
 - g) What is PN sequence ? 2 + 3 + 2 + 2 + 2 + 2 + 1



2. a) Compare Energy Spectral Density (ESD) and Power Spectral Density (PSD).

- b) A power signal $x(t)$ has a power spectral density given by $S_g(f) = \infty$ for $|f| < B$

$$= 1 \text{ otherwise}$$

Determine power spectral density and mean square value of its derivative.

- c) "An Ergodic Process is Wide Sense Stationary (WSS), but the converse is not true." Justify the above statement. 2 + 5 + 7

3. a) State and prove central limit theorem and explain its application in communication Engineering.

- b) The autocorrelation function of a stationary random process $X(t)$ is given by

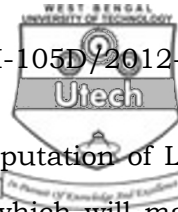
Find mean and variance of the process. 8 + 6

4. a) Explain Adaptive Delta Modulation with suitable diagram.

- b) In a binary PCM transmission of a video signal with $f_s = 15$ MHz. Calculate the signalling rate needed to achieve signal-to-noise ratio (SNR) > 40 db.

- c) Find mean and variance of Raleigh Density Function.

$$5 + 3 + 6$$



5. a) Explain correlation method for the computation of LPC coefficient and also explain a method which will make the computation faster.
- b) What is ISI ? Describe Nyquist Criterion for maximum channel capacity and distortion less binary transmission. 8 + 6
6. a) Compare probability of errors in ASK, PSK, FSK.
- b) Show that one bit error in transmission using DPSK causes two bit error in detection.
- c) Discuss QPSK with suitable diagram. 6 + 4 + 4
7. a) Find the impulse response of the optimum filter.
- b) What is matched filter ?
- c) Find probability of error of matched filter. 6 + 2 + 6
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