

II B.Tech I Semester Supplementary Examinations, November 2005
SIGNALS AND MODULATION THEORY
(Electronics & Computer Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain the procedure to recover the signal $f(t)$ from its samples.
 (b) Find the F.T of d.c and step signals. [8+8]
2. (a) Define auto-correlation and cross-correlation functions. Prove that $\phi_{12}(\iota) = \phi_{21}(\iota)$, where $\phi_{12}(\iota)$ is the correlation between $f_1(t)$ and $f_2(t)$ and $\phi_{21}(\iota)$ is the correlation between $f_2(t)$ and $f_1(t)$.
 (b) Find the auto-correlation of $f(t) = \sin wt$. [8+8]
3. (a) A Linear Time Invariant system has the impulse response $h(t) = e^{-3t} u(t)$. Find and plot the output of the system for the input $x(t) = e^{-t}[u(t) - u(t-2)]$?
 (b) A signal $e^{-3t}u(t)$ is passed through an ideal Low Pass filter with cutoff frequency of 1 rad/sec. Find the input and output energy. [8+8]
4. (a) Draw the spectrum of the wave $V(t) = 10 \cos(2\pi \cdot 10^3 t) + \cos[(2\pi t)10^5]$.
 (b) Give the effects of frequency & phase errors in synchronous detection corresponding to DSB-SC. [8+8]
5. (a) Compare and contrast FM and AM system.
 (b) An angle modulated wave is described by an equation. $Q(t) = 10 \cos(2 \times 10^6 \pi t + 10 \cos 2000 \pi t)$
 Find:
 - i. The power of modulated signal
 - ii. The maximum frequency deviation
 - iii. The maximum phase deviation
 - iv. The bandwidth of the signal. [4+12]
6. (a) State and prove sampling theorem in frequency domain.
 (b) Explain the effect of aliasing on sinusoidal signal. [10+6]
7. (a) What is the difference between bit rate and baud rate? Derive the relation between the two for QPSK signal.
 (b) Draw QPSK transmitter circuit and explain its operation. What is the bandwidth required for transmission. [8+8]
8. (a) What are the different coding techniques?
 (b) Explain the Manchester coding with a neat diagram. [8+8]
