Nepal College of Information Technology

**Unit Test**

Spring 2012

Program : BE ELX Time : 2 hrs

Semester : (VI) FM : 70

Subject : Analog Communication PM : 35

* *Candidates are requested to give their answer as far as practicable in their own words.*
* *The figure in the margin indicates the full marks*
* ***Attempt ALL question***

1. a) What is modulation? Discuss about the necessity of modulation in communication system. Define different types of analog modulation with neat sketch. [1+4+3]

b) State and explain Shannon’s channel capacity theorem. Calculate maximum data rate in Mbits/sec that could be sent over telephone lines, whose S/N ratio is 42 dB and passes over the frequency range from 300 - 3200Hz. [3+4]

2. a) Derive the necessary condition for distortion less transmission of signal through LTI system. [6]

b) Represent the band pass signal x(t) in terms of its complex envelope (t). [9]



3. a) Drive time and frequency domain expression for Single Tone Standard AM wave with necessary sketch. [8]

b) The antenna current of an AM broadcast transmitter modulated to depth of 40 % by an audio sine wave is 11A. It increases to 12A as a result of simultaneous modulation by another audio sine wave. What is the modulation index due to second wave? [5]

4. a) Define Hilbert transform with necessary explanation . List out its properties. Find Hilbert transform signal x(t)= sinc(t). [2+2+6]

b) With reference to square law detector, Prove that percentage modulation shouldn’t exceed 100% in order to obtain distortion less recovery of message signal. [7]

5. Write short notes on following (any two) [5x2]

a) Channel bandwidth and its importance.

b) Causality property of ideal low pass filter.

c) Advantages of digital communication over analog communication.

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