Nepal college of information echnology

Assessment

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| Level: Bachelor | Semester – Spring | Year : 2013 | |
| Programme: BE-ELX | | Full Marks : 100 | |
| Course: Analog Communication | | Time : 3hrs. | |
| *Candidates are required to give their answers in their own words as far as practicable.* | | |
| *The figures in the margin indicate full marks.* | | |
| Attempt all the questions. | | |

1. a) Explain the need of modulation in communication system. Define why high frequency carrier is needed in a communication system. 8

b) Explain the importance of channel bandwidth with the help of Hartley-Shannon law. Calculate the maximum data rate that could be sent over telephone lines, whose S/N ratio is 25 db and passes over the frequency range from 300 -3200 Hz. 7

2. a) Discuss and elaborate the difference between distortion and interference. 7

b) Define pre-envelope, complex envelope and natural envelope of a bandpass signal. 8

3. a) Show that the transmission bandwidth required for the transmission of the AM modulated wave is twice the frequency of the message signal used. 8

b) A 3500-Hz audio tone amplitude modulates a 200 KHz carrier resulting in Modulated signal having a percent modulation of 85%. Total power being transmitted is 15Kw. 7

a) What frequencies would appear in spectrum analysis of Modulated wave?

b) Determine the Power contain at each of the frequencies that appear in spectrum analysis of the modulated wave.

4. a) What is the effect of the frequency and phase error of the local oscillator in the synchronous demodulation of the DSB-SC modulated wave? Also define the quadrature null effect. 7

b) Analyse angle modulated wave with Bessel’s function and derive an expression for the radio bandwidth. 8

5. a) Briefly explain the generation of FM using Armstorng's method. 8

b) The carrier c(t)= Acos2π106t is angle modulated by sinusoidal signal m(t)=2cos2000πt. 7

Assuming kf=kp=300Hz/volt determine

i) Modulation indices of Fm and PM signals.

ii) The bandwidth in each case using Carson’s rule.

6. a) What is communication Satellite? Classify and explain. 8

b) What are FDM and FDMA? Derive analog telephone hierarchy from CCITT standard group, super group and master group with sketch of frequency spectrum. 7

7. Write short notes on (any two): (5\*2=10)

a) Hilbert transform and its properties

b) Narrowband and Wideband FM

c) Radio Broadcasting