TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2078 Kartik

Exam.	Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Data Communication *(CT 602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) Differentiate data and signal with two examples of each. [5]
   b) Explain the procedure of converting an analog signal to digital. Also, briefly explain each steps involved. [5]
2. Define periodic and non-periodic signals with examples. [2+4+4]
   a) Test the stability of the system $h(t) = e^{4t}.u(t)$
   b) Test the given function $y(t) = t.x(t)$ for causality, non causality and anti causality.
3. How Nyquist theorem applied for a noiseless channel? Calculate number of discrete signal content in the channel if a channel has a spectrum of 3 to 4 MHz with signal to noise ratio of 24 dB. [5+5]
4. Explain the operation of CRC-4 with example of error detection. [10]
5. Define line coding. Explain polar RZ and bipolar AMI line coding scheme with example and compare them. [4+3+3]
6. a) How is source coding different from channel coding? [2]
   b) Under what conditions does a linear code become a cyclic code? Explain with the help of an example. [3]
   c) Explain the concept of convolutional code with the help of a state-transition diagram. [5]
7. Write down the Huffman Algorithm clearly and find an efficient code word and efficiency that can be assign to the symbols using Huffman Algorithm for "Kun Mandir Ma Janchhau Yattri". [10]
8. a) Explain the mechanism of frequency Hopping spread spectrum (FHSS). Also, compare FDM and FHSS using suitable time-frequency graph. [4+3]
   b) Explain the "near-far problem" in CDMA. How can it be solved? [2+1]

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