TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2076 Ashwin

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. Enlist the advantages and disadvantages of digital communication system over analog communication system. Discuss the transmission impairments of data communication system with suitable diagrams and suggest the methods in overcoming attenuation. [3+5]
2. What are properties Fourier transform? Plot the magnitude and phase spectra of $X(t) = 5 + \sin(12t + 20^\circ) - \cos(16t - 60^\circ) + \cos(20t + 40^\circ)$. [4+4]
3. Sketch the output of LTI system having impulse response $h(t) = e^{-at}u(t)$ (a>0) and $h(t) = e^{at}u(-t)$ (a>0). [10]
4. List different types of digital-to-analog line encoding techniques. Give an example of QAM-32 in its constelletion diagram. [2+6]
5. Explain with example how CRC-5 work to detect 3 burst errors. [10]
6. Define Frequency division Multiplexing. Explain the FDM Multiplexing and demultiplexing process with neat diagrams. [8]
7. Design a suitable generation matrix for a convolution code using c(3,1,3) architecture and encode input data stream of (00110). [10]
8. Design a Binary Shannon-Fano code with a six symbol source with probability assignment as $P(s_1)=0.04$, $P(s_2)=0.1$, $P(s_3)=0.1$, $P(s_4)=0.4$, $P(s_5)=0.06$, $P(s_6)=0.3$. Test its transmission efficiency. [7+3]
9. Write short notes on: ***(Any Two)*** [4×2]
   a) Analog versus digital mux hierarchy
   b) DSSSH versus FSSH
   c) Optical fiber versus STP

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