Oct./TE/ Insem. - 175
T.E. (Electronics)
DATA COMMUNICATION
(2015 Pattern) (Semester - I)

Time : 1 Hour] *[Max. Marks :30*

Instructions to the candidates:

1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right side indicate full marks.*
4) *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
5) *Assume suitable data if necessary.*

Q1) a) Explain the functions of physical layer and data link layer with the help of layered architecture of OSI reference model. **[6]**

b) A voice signal with bandwidth of 3.4KHz Calculate the capacity of the channel for SNR of 30 dB. **[4]**

OR

Q2) a) An ideal communication system with an average power limitation and white Gaussian noise has a BW of 1 MHZ and S/N of 10 **[6]**

i) Determine Channel Capacity

ii) If S/N drops to 5 what BW is required for the same channel capacity.

iii) Comment on the result

b) Write a note on ISDN **[4]**

Q3) a) Consider a (7,4) LBC with generator matrix **[6]**

G = 1 0 0 0 1 1 0
    0 1 0 0 0 1 1
    0 0 1 0 1 1 1
    0 0 0 1 1 0 1
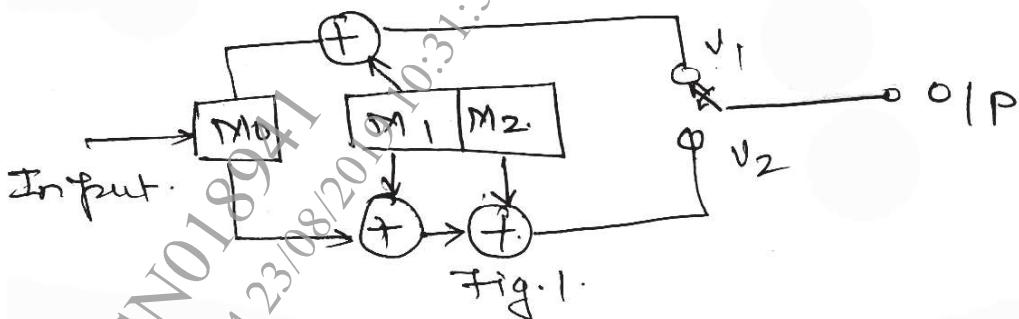
i) Find all Code vector

ii) Find the error Detection and Correction capabilities.

b) What is ARQ? Explain Go-back-N ARQ and selective repeat ARQ **[4]**

OR

P.T.O.

Q4) a) Determine the state diagram, and trellis diagram for the convolution encoder as shown in figure below (Fig.1) **[8]**

Fig.1.

b) Define with example **[2]**
   i) Hamming Weight
   ii) Hamming Distance

Q5) a) A memory source emits six messages (m1, m2, m3, m4, m5, m6) with probabilities (0.30, 0.25, 0.15, 0.12, 0.10, 0.08) find **[8]**

   i) Huffman Code

   ii) Determine its average word length

   iii) Find Entropy

b) Define Entropy and show that entropy is maximum when binary message has 50% probability of occurrence **[2]**

OR

Q6) a) A memory source emits six messages with probabilities (0.3, 0.25, 0.2, 0.12, 0.08, 0.05) Find **[8]**

   i) Entropy of source

   ii) Determine Shannon Fanon code

b) Explain Joint entropy and Conditional Entropy. **[2]**

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