# Department of Electronics & Communication Engineering

## Faculty of Engineering, Integral University, Lucknow

Quiz 1

Information Theory & Coding (EC-031)

Candidate Name & Roll Number :

Date :

Maximum Marks : 10

Group: Final Year

Note : Last two questions are two marks each.

1. Pick the correct unit of Information content
   (a). Nat (b). Bit (c). Hartely (d). Decibel
2. Maximum value of source entropy can be expressed in mathematical expression as
   (a). $log_2 m$ (b). $log_e m$ (c). $log_{10} m$ (d). None
   Where m is the size of the alphabet of the source.
3. Write down the mathematical expression for the mutual information in term of conditional entropy

4. Write down general mathematical expression for the mutual & conditional Entropy.

5. Write down mathematical expression for the channel capacity.

6. Draw the relationship graph between Entropy & Information probability.

7. A four letter alphabet has following probabilities (1/2), (1/4), (1/8) & (1/8). Find a codebook for this four letter alphabet that satisfies source coding theorem.

8. A voice grade channel of telephone network has a bandwidth of 3.4 kHz. Calculate

(a). The information capacity of the telephone channel for a signal to noise ratio of 30 dB

(b). The min signal to noise ratio required to support information transmission through the telephone channel at the rate of 9.6Kb/s