Total Pages : 4

K-1057

M.A./M.Sc. (Final) Examination, 2022

MATHEMATICS

(Information Theory)

[Paper : Seventh (Optional)]

Time Allowed : Three Hours

Maximum Marks : 100

Minimum Passing Marks : 36

Note : Attempt **any five** questions. All questions carry **equal** marks. [5×20=100]

1. How uncertainty is related to information and explain all axiom for measure of uncertainty.

2. State and prove "The necessary and sufficient condition for the existence of instantaneous codes".

3. Write and explain : The converse to the coding theorem for the time discrete Gaussian Channel.

4. What is Joint and Conditional entropies ? Explain it with example.

5. Write and explain strong and weak converses of the fundamental theorem of information theory.

6. Explain the following with example :

   (a) Additivity and Sub-additivity

   (b) Noiseless coding

7. Axiomatric characterization of Shannon entropy due to Shannon and Fadeev, explain it.

8. Explain classification of Channels information processed by a channel.

9. Write and explain non-negative bounded information functions with its properties.

10. What are the role in the study of information functions? Explain it with example.

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