

I-1057

M.A./M.Sc. (Final) Examination, 2020

MATHEMATICS

(Information Theory)

Time Allowed : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 34

Note : Attempt any five questions. All questions carry equal marks.

- Q. 1.** Explain the difference between joint and conditional entropies. Explain with suitable example.
- Q. 2.** Describe Shanon entropy and its properties.
- Q. 3.** What is channels information ? Explain the steps involved in calculation of channel capacity.

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- Q. 4.** Describe the ingredients of noise coding problem.
- Q. 5.** State and prove coding theorem for time discrete Gaussian channel.
- Q. 6.** Explain following :
- (a) Band - limited channel
 - (b) Normalization
- Q. 7.** Explain the non negativity, subadditivity properties to measure the entropy.
- Q. 8.** Explain the general solution of the fundamental equation of information.

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Q. 9. Discuss the basic characteristics of axiomatic characterization of the Shannon entropy due to Tverberg and Leo.

Q. 10. Write short notes :

(a) Discrete memoryless channel

(b) Decoding schemes in channel capacity

