

AJ-1551/CV-19
M.A./M.Sc. FINAL
Term End Examination , 2021-22
MATHEMATICS (Paper-VII)
(Information Theory)

Time : 3 hours]

[Maximum Marks : 100

Note: *Answer any five questions. All questions carry equal marks.*

1. State and prove general solution of the fundamental equation of information.
2. State and prove Shannon entropy and its properties.
3. State and prove joint and conditional entropies.
4. State and prove ingredients of noiseless coding problem.
5. State and prove commutative properties of a measures of entropy.
6. State and prove uncertainty principle of an absolutely continuous random variable.
7. State and prove strong and weak converses.
8. Define the following :
 - (i) Construction of optional codes
 - (ii) Real observers
 - (iii) Normalizer
 - (iv) Information function
9. Define the following:
 - (i) Looping
 - (ii) Continuous channels
 - (iii) Expansibility
 - (iv) Ideal observer
10. State and prove necessary and sufficient condition for the existence of instantaneous codes.