

HARINGHATA MAHAVIDYALAYA  
SEM-II 1 ST INTERNAL ASSESSMENT-2019

B.SC (Hons.)

SUB:MATH-H-CC-T-03

SUBJECT TITLE: REAL ANALYSIS

Coverage: **Unit 1.** Review of algebraic and order properties of  $\mathbb{R}$ ,  $\varepsilon$ -neighborhood of a point in  $\mathbb{R}$ . Idea of countable sets, uncountable sets and uncountability of  $\mathbb{R}$ . Bounded above sets, bounded below sets, bounded sets, unbounded sets. Suprema and infima. Completeness property of  $\mathbb{R}$  and its equivalent properties. The Archimedean property, density of rational (and Irrational) numbers in  $\mathbb{R}$ , intervals. Limit points of a set, isolated points, open set, closed set, derived set, illustrations of Bolzano-Weierstrass theorem for sets, compact sets in  $\mathbb{R}$ , Heine-Borel Theorem.

Submission from 08.03.2019 to 14.03.2019

Answer any two questions

Maximum Marks :10

1. Define closed set. Show that the derived set of a set is closed set.
2. Show that the intersection of a finite number of open sets is also a open set. Does the intersection of infinite number of open sets is also open? Justify your answer.
3. State and prove Bolzano weierstrass theorem.
4. Show that the interval  $[0,1]$  is uncountable.