HARINGHATA MAHAVIDYALAYA

SEM-II 2nd INTERNAL ASSESSMENT-2019

B.SC (Hons.)

SUB:MATH-H-CC-T-03

SUBJECT TITLE: REAL ANALYSIS

Coverage: **Unit 2.** Sequences, bounded sequence, convergent sequence, limit of a sequence, liminf, lim sup. Limit theorems. Monotone sequences, monotone convergence theorem. Subsequences, divergence criteria. Monotone subsequence theorem (statement only), Bolzano Weierstrass theorem for sequences. Cauchy sequence, Cauchy's convergence criterion.

Submission from22.05.2019 to 31.05.2019

Answer any two questions                                        Maximum Marks :10

1. State and prove the Sandwich theorem for sequence of real numbers.
2. Define Cauchy sequence. Prove that a convergent sequence is Cauchy sequence.
3. Define subsequence of a sequence. If the subsequence $\{x_{2n}\}$ and $\{x_{2n-1}\}$ of a sequence $\{x_n\}$ converge to the same limit $l$, then show that the sequence $\{x_n\}$ is convergent to $l$.
4. Prove that if $\lim u_n = l$, then $lim \frac{u_1+u_2+\cdots u_n}{n} = l$.

HARINGHATA MAHAVIDYALAYA

SEM-II 2nd INTERNAL ASSESSMENT-2019

B.SC (Hons.)

SUB:MATH-H-CC-T-04

SUBJECT TITLE: Differential Equations & Vector Calculus

Coverage: **Unit 2.** Systems of linear differential equations, types of linear systems, differential operators, an operator method for linear systems with constant coefficients,

Basic Theory of linear systems in normal form, homogeneous linear systems with constant coefficients: Two Equations in two unknown functions.

**Unit 3.** Equilibrium points, Interpretation of the phase plane

Power series solution of a differential equation about an ordinary point, solution bout a regular singular point.

Submission from22.05.2019 to 31.05.2019

Answer any two questions Maximum Marks :10

1. Find $x, y$ as functions of $t$, where they satisfy the system $\frac{dx}{dt} + 4x + 3y = t$ and $\frac{dy}{dt} + 2x + 5y = e^t$.
2. Solve the homogeneous system $\frac{d}{dx}Y = AY$, where $A = \begin{pmatrix} 1 & 1 \\ 0 & 2 \end{pmatrix}, Y = \begin{pmatrix} y_1(x) \\ y_2(x) \end{pmatrix}$ by using eigen values.
3. What do you mean by an ordinary point of the equation $y'' + P(x)y' + Q(x)y = 0; P, Q$ are functions of $x$. Find the solution in series of $y'' + xy' + x^2y = 0$ about $x = 0$.
4. Solve by method of variation of parameter ,$y'' + 9y = \frac{1}{4} cosec 3x$.