

HARINGHATA MAHAVIDYALAYA
SEM-II 1 ST INTERNAL ASSESSMENT-2019

B.SC (Hons.)

SUB:MATH-H-CC-T-04

SUBJECT TITLE: Differential Equations & Vector Calculus

Coverage: **Unit 1.** Lipschitz condition and Picard's Theorem (Statement only).
General solution of homogeneous equation of second order, principle of superposition for homogeneous equation, Wronskian: its properties and applications, Linear homogeneous and non-homogeneous equations of higher order with constant coefficients, Euler's equation, method of undetermined coefficients, method of variation of parameters.

Submission from 08.03.2019 to 14.03.2019

Answer any two questions

Maximum Marks :10

1. Define Wronskian. Find the Wronskian of x and xe^x . Hence conclude whether they are linearly independent or not. If they are independent, set up the differential equation having them as its independent solutions.
2. Show that the functions y_1, y_2, \dots, y_n will be linearly independent if and only if $W(y_1, y_2, \dots, y_n) \neq 0$ where $W(y_1, y_2, \dots, y_n)$ is the Wronskian of y_1, y_2, \dots, y_n .
3. Write the general form of a linear differential equation of order n . Solve the differential equation $(D^2 + 3D + 2)y = e^{e^x}$.
4. Solve $(D^4 + 2D^3 - 3D^2)y = x^2 + 3e^{2x} + 4 \sin x$, where $D = \frac{d}{dx}$.