

North Gauhati College
Department of Mathematics

SEMESTER III(GENERAL)
HOME ASSIGNMENT II 2021

E-301 (NON-CBCS)
Calculus: Methods and applications

August 2021

TOTAL MARKS: 25

INSTRUCTIONS TO CANDIDATES

1. This assignment paper contains **Three (3)** questions and comprises **Two (2)** printed pages.
2. Answer all questions. The marks for each question are indicated at the beginning of each question.
3. Submit the assignment as a single **PDF** file through the online portal of our college website under section “Assignments” and send a copy to the email id mathngc1969@gmail.com.
4. Write your **Name, GU Roll No., and Registration Number** in the assignment .
5. Submission **Due Date** is on or before **7th August, 2021**.

Question 1.

[1+2+3+4=10]

- (i) When is a differential equation said to be exact?
 (ii) Is the equation

$$(x^2 + 2xy^2)dx + (2x^2y + y^2)dy = 0$$

exact? Solve it.

- (iii) Show that $e^{\int Pdx}$ is the integrating factor of the linear differential equation

$$\frac{dy}{dx} + Py = Q,$$

where P, Q are functions of x alone or constants.

Question 2.

[2+4+4=10]

- (i) Write down the general form of a linear differential equation of nth order.
 (ii) Solve the following:

(a) $(D^2 - 4)y = \sin 2x$

(b) $(D^3 + 8)y = x^4 + 2x + 1$

Question 3.

[5]

Find the general solution of the differential equation

$$\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + 4y = e^{2x} - e^{-2x}$$

END OF PAPER