

NORTH GAUHATI COLLEGE

DEPARTMENT OF PHYSICS

ONLINE SESSIONAL EXAMINATION, 2021

Semester 2<sup>nd</sup> (CBCS), Paper: Electricity & Magnetism, PHY-HG/RC-2016

Max Marks-20

Date: 29<sup>th</sup> October, 2021

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- 1) Answer the following questions 1×5=5
- a) A quantity possesses both magnitude and direction. Is it necessarily a vector?
  - b) What does curl of a vector signify?
  - c) What is the S.I unit of Electric flux?
  - d) Give the statement of Gauss's law.
  - e) Write the Poisson's equation in free space.
- 2) Answer any three of the following 3×5=15
- a) Using Gauss's law to determine the electric field for a uniformly charged spherical conductor.
  - b) Determine the electric field intensity at a distance 'r' from a straight infinitely long conductor.
  - c) Derive an expression for the electric field and potential at a point due to an electric dipole.
  - d) Write coulomb's law in vector form. Two charges +5 coulomb and +15 coulomb are located at points (2,-4, 3) and (-3, 2, 1) meters. Calculate the force on +15 coulomb.
  - e) What do you understand by 'self' and 'mutual' inductances? Find an expression for the mutual inductance between the primary and secondary of a standard solenoid.

**Nota Bene:**

- Write your answers in A4 paper sheet mentioning clearly **your name, GU roll number, registration number, paper code etc.** at the front page of your answer sheet.
- You have to make a single PDF file of your answer sheets.
- You need to submit your respective PDF at the online portal of our college website ONLY.
- The submission deadline is 30<sup>th</sup> October, 2021.