BRAC UNIVERSITY

Principles of Physics-II (PHY-112)

Department of Mathematics and Natural Sciences

Assignment: 02 — **Section**: 8

Dispatch Date: February 20, 2024

Submission Deadline: February 28, 2024

Duration: 7 Days | **Spring 2024 (10F-29C)** | Marks: 15

Attempt all questions. Show Your work in detail. 1:1 plagiarism will be strictly penalized.

1. A 20 cm-radius ball is uniformly charged to 80 nC. **Note**: You must use Gauss's Law only to solve the following questions. Memorized formulas will not be accepted. You must show your work in detail, especially how You implemented Gauss's Law and what Gaussian Surfaces You found suitable for the problem.
   (a) Why does the electric field inside a charge increase with distance? **(1)**
   (b) What is the ball's volume charge density? **(2)**
   (c) How much charge is enclosed by spheres of radii 5, 10, and 20 cm? **(3)**
   (d) What is the electric field strength at points 5, 10, and 20 cm from the center? **(4)**

2. A 10 m-long thin glass rod uniformly charged to $+10$ nC and a 10 m-long thin plastic rod uniformly charged to -10 nC are placed side by side, 4 cm apart. What are the electric field strengths E_1 to E_3 at distances 1 cm, 2 cm, and 3 cm from the glass rod along the line connecting the midpoints of the two rods? **(5)**