

**NORTH GAUHATI COLLEGE**  
**DEPARTMENT OF PHYSICS**  
**PAPER: 302**  
**ASSIGNMENT-1**

**Total marks: 15**

1. Answer the following: 1×3=3
  - a) What is electric current density?
  - b) State Ohm's law.
  - c) What is electromagnetic induction?
2. Derive the differential form of Faraday's law. 3
3. Find the mutual inductance of two solenoids. 3
4. What is resonance in LCR series circuit? Find the expression for resonant frequency. 3
5. A circuit has  $R = 10 \Omega$ ,  $L = 0.05 \text{ H}$  and  $C = 20 \mu\text{F}$ . An alternating emf of 100 volt (rms) is applied across it. Calculate a) resonant frequency and b) current at resonance. 3

**Submission date: 10/08/21**