

**PARUL UNIVERSITY**  
**FACULTY OF APPLIED SCIENCE**  
**B.Sc./IMSc, Winter 2017-18 Examination**

**Semester: 3**  
**Subject Code: 11104202**  
**Subject Name: Electricity and Magnetism**

**Date: 27-12-2017**  
**Time: 10:30AM to 01:00PM**  
**Total Marks: 60**

**Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

- Q.1. A) Answer the following questions (Each of 04 marks) (08)**
- (a) Explain Maxwell bridge circuit.
  - (b) Derive the equation of continuity.
- Q.1. B) Answer the following questions (Any two) (04)**
- (a) Definition (Each of 02 marks) (04)
    1. Linear charge density and surface charge density.
    2. Self –inductance and mutual- inductance.
  - (b) Derive the equation of electric field due to infinitely long straight charged wire by using Gauss's law. (04)
  - (c) State faraday's law and derive the formula. (04)
- Q.2. A) Answer the following questions. (04)**
- (a) Short note (Each of 02 marks) (04)
    1. Power Factor
    2. Uniqueness theorem.
  - (b) Explain Tank circuit (04)
- Q.2. B) Answer the following questions (Any two) (03)**
- (a) Definition (Each of 01 marks) (03)
    1. Orsted's observation.
    2. Susceptibility.
    3. Coercivity
  - (b) Derive the equation of decay of current in RL circuit. (03)
  - (c) Write a note on inductor as a choke coil. (03)
- Q.3. A) Answer the following questions (Each of 04 marks) (08)**
- (a) Derive 2<sup>nd</sup> order differential equation of electric charge in L-C-R series AC circuit.
  - (b) Explain Kirchhoff's 2<sup>nd</sup> law using suitable example.
- Q.3. B) Answer the following questions (Any two) (04)**
- (a) Definition (Each of 02 marks) (04)
    1. Gauss's law and Ampere Circuital law.
    2. Drift velocity and relaxation time.
  - (b) Derive and explain current density. (04)
  - (c) Explain polarization of dielectric and derive the equation of displacement field. (04)
- Q.4. A) Answer the following questions. (04)**
- (a) Definition (Each of 02 marks) (04)
    - 1) Rotational and Irrotational vector.
    - 2) Gradient and Divergence.
  - (b) Derive the equation of rise of Current in RL Circuit. (04)
- Q.4. B) Answer the following questions (Any two) (03)**
- (a) Definition (Each of 01 marks) (03)
    1. Biot-savart's law
    2. Lorentz's force
    3. Poisson's equation
  - (b) Explain Quality factor. (03)
  - (c) Explain Kirchhoff's first law. (03)