

Roll No. ....

**91028**

**B. Sc. (Hons.) Physics 1st Semester  
Examination – December, 2015**

**ELECTRICITY**

**Paper : Phy – 103**

*Time : Three Hours ]*

*[ Maximum Marks : 40*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt five questions in all, selecting at least two questions from each Unit. Used scientific (Non-Programmable) calculator is allowed.

**UNIT – I**

1. Deduce the condition of balance for A.C. Bridge. Give the theory and working of Maxwell's Bridge. How would you use it to determine the inductance of a coil.

8

2. With the help of graph between current and frequency that the current in series resonant circuit depends

91028-700 -(P-3)(Q-8)(15)

P. T. O.

- (iii) Surface density induced on the sphere. 8
- (iv) The force between charge  $+q$  and the induced charge on the sphere. 8

7. What do you understand by the polarization of dielectric? How does it explain the effect of inserting a dielectric slab between the plates of a given capacitor. 8

8. (a) Discuss boundary conditions at the surface separating two substances. 8

(b) Discuss boundary conditions at the surface of charged conductors. 4,4

upon the impedance when an inductive coil is shunted by a condenser. 8

3. (a) Explain Gauss law and Coulomb's law and their significance. 8

(b) Deduce Gauss law in a differential form. 4,4

4. Using Gauss's theorem calculate electric field due to a uniformly charged Non-conducting solid sphere at a point : 8

(i) Outside the sphere.

(ii) On the surface of sphere and

(iii) Inside the sphere. 8

#### UNIT - II

5. (a) What do you understand Electric Multipoles ?

(b) Derive Poisson's and Laplace equations. What are importance of these equations. 3,5

6. A point charge  $+q$  is placed at a distance  $d$  from the centre of an earthed conducting sphere of radius  $R$ . Apply the method of electrical images to calculate.

(i) Strength of image charge and its position in the sphere.

(ii) Field on the sphere.