

Code: 19BS1104

**I B.Tech - I Semester – Regular Examinations - December - 2019**

**ENGINEERING PHYSICS**  
**(Common for IT, ECE, EEE)**

Duration: 3 hours

Max. Marks: 70

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- Note: 1. This question paper contains two Parts A and B.  
2. Part-A contains 5 short answer questions. Each Question carries 2 Marks.  
3. Part-B contains 5 essay questions with an internal choice from each unit. Each question carries 12 marks.  
4. All parts of Question paper must be answered in one place.
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**PART – A**

1. a) State Gauss law.  
b) Draw a neat diagram of how refractive index varies in a graded index optical fiber.  
c) List different types of dielectric polarization.  
d) What is meant by generation and recombination in semiconductors?  
e) State Hall Effect.

**PART – B**

**UNIT – I**

2. a) Calculate the electric field intensity outside the solid charged sphere by using the Gauss Law. 6 M  
b) Derive Poisson's and Laplace Equations. 6 M

OR

3. a) Derive Ampere's law in Integral form and Differential forms. 6 M  
b) What are the famous Maxwell's Equations? 6 M

UNIT – II

4. a) Explain the advantages of optical fibers. List the applications of optical fibres. 6 M  
b) When light is launched into fiber through the air, the refractive index of the core is 1.45 and the refractive index of the clad is 1.4, then determine the numerical aperture and acceptance angle? 6 M

OR

5. a) Write about the temperature measurement by using optical fiber sensor. 6 M  
b) If the acceptance angle of the optical fiber is  $45^\circ$  and refractive index of the core is 1.5, then find the refractive index of the clad. 6 M

UNIT-III

6. a) Derive the Clausius – Mossotti relation. 6 M  
b) Explain about the frequency dependence of the polarization? 6 M

OR

7. a) What did you understand about Hysteresis concept and explain that with a neat sketch? 6 M  
b) A substance contains  $2.338 \times 10^{27}$  Atoms/ $m^3$  and their dielectric constants are 1.95, and then determine electronic polarizability of the substance. 6 M

### UNIT – IV

8. a) How the materials are classified based on band theory? Briefly explain about intrinsic and extrinsic semiconductors? 6 M
- b) Derive the expression for the carrier concentration of N-Type Semiconductor material. 6 M

OR

9. a) What is meant by intrinsic carrier concentration? How this intrinsic carrier concentration varies with temperature? 6 M
- b) Derive the expression for the carrier concentration of P -Type semiconductor material. 6 M

### UNIT – V

10. a) What are drift and diffusion currents in semiconductors and explain them using appropriate diagrams? 6 M
- b) Explain the construction and working of Photodiode. What are the potential applications of photodiode? 6 M

OR

11. a) Describe the P-N junction diode under forward and reverse bias configurations with respective (current vs. voltage) graphs. 6 M
- b) Explain the construction and working of solar cell. 6 M