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**PH-110****B.E. I & II Semester**

Examination, June 2017

**Choice Based Credit System (CBCS)****Physics***Time : Three Hours**Maximum Marks : 60*

- Note:** i) Attempt any five questions.  
ii) All questions carry equal marks.

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1. a) Define the gradient of a Scalar field.  
b) State and prove the Gauss's Divergence theorem.  
c) State and prove the Maxwell's equations of Electrodynamics.
2. a) Write down the main properties of LASER.  
b) Calculate the numerical aperture and acceptance angle for an optical fibre, given that refractive index of the core and cladding are 1.45 and 1.40 respectively.  
c) Describe the working of Ruby LASER with energy level diagram.
3. a) Define Numerical aperture in optical fibre.  
b) Discuss fibre dispersion in step index fibre.  
c) Write down the role of each block used in optical fibre communication system.

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4. a) Define black body radiation.  
b) Explain the formation of discrete energy levels by analysing particle in a box.  
c) State and prove the Heisenberg uncertainty principle.
5. a) Differentiate between division of amplitude and division of wavefront.  
b) Write down the experimental detail of Newton's ring to find the wavelength of light.  
c) Deduce the expression for the resolving power of the grating.
6. a) Differentiate between Crystalline and Amorphous solids  
b) Discuss the band theory of Solids.  
c) Explain Hall Effect. Obtain the expression for Hall coefficient.
7. a) Explain the composition of Nucleus.  
b) What are the difference between Nuclear fusion and fission?  
c) Discuss the liquid drop model of Nucleus.
8. a) Define Fermi level of a semiconductor.  
b) If  $\phi = 3x^2y - y^2z^2$ . Find the value of  $\text{grad } \phi$  at the point  $(1, -2, -1)$ .  
c) Deduce the Schrodinger time independent wave equation.

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